European Journal of Taxonomy 1052: 105–124
https://doi.org/10.5852/ejt.2026.1052.3271
europeanjournaloftaxonomy.eu
ISSN 2118-9773
2026 · Jiang Z. *et al.*

Received: 1 November 2025 • *Accepted: 24 February 2026* • *Published: 29 April 2026*

Topic editor: Tony Robillard • *Section editor: Karen Salazar* • *Desk editor: Eva-Maria Levermann*

Research article

urn:lsid:zoobank.org:pub:4FF2DB6C-36A7-47A9-A2D5-CCF2CB74B0DD

Two new species of *Copelatus* Erichson, 1832 from urban low mountains of eastern China, with new province records of the other Copelatinae in China (Coleoptera: Dytiscidae)

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Abstract. Two new species of *Copelatus* Erichson, 1832 from eastern China are described: *C. jinlingensis* sp. nov. from Zijinshan Mt. (Jiangsu) and *C. lankeensis* sp. nov. from Lankeshan Mt. (Zhejiang). Based on the oblong-oval body shape, elytral striation consisting of six dorsal and a submarginal stria with sutural stria complete, and the median lobe of aedeagus without a distinct process, both species are assigned to the *Copelatus japonicus* complex of the *C. irinus* species group. They are compared with similar Chinese species, including the co-occuring ones. Their important morphological characters are photographed. *Copelatus chinensis* Régimbart, 1899, *C. japonicus* Sharp, 1884, and *Austrelatus parallelus* (Zimmermann, 1920) are recorded for the first time from Jiangsu and *C. weymarni* Balfour-Browne, 1947 for the first time from Heilongjiang and Jilin. Data on the ecology and distribution of the species are provided and illustrated.

Keywords. Dytiscidae, *Copelatus*, *Austrelatus*, eastern China, new species, new records.

Jiang Z., Zheng Y., Deng Z., Jia F. & Wang B. 2026. Two new species of *Copelatus* Erichson, 1832 from urban low mountains of eastern China, with new province records of the other Copelatinae in China (Coleoptera: Dytiscidae). *European Journal of Taxonomy* 1052: 105–124. https://doi.org/10.5852/ejt.2026.1052.3271

Introduction

Copelatus Erichson, 1832 is the largest genus of diving beetles with 458 known species/subspecies worldwide (Nilsson & Hájek 2025a). They inhabit a variety of habitats, occurring in temporary puddles predominantly and have also been found in a cave in Brazil (Caetano *et al.* 2013), in wet leaf litter on

tropical forest floors in Madagascar (e.g., Ranarilalatiana & Bergsten 2019), and on phytotelmata in Latin America (e.g., Hájek *et al.* 2024).

Traditionally, the species of *Copelatus* are divided into species groups based on longitudinal striae on the elytra (Sharp 1882; Guignot 1961; Guéorguiev 1968) which does not work well enough anymore for identification (Balke *et al.* 2004; Hájek *et al.* 2018). To simplify the work with the Oriental species of *Copelatus*, several species complexes have been proposed across the *C. irinus* species group (e.g., Hájek *et al.* 2018; Jiang *et al.* 2022; Hájek & Sheth 2024). However, the *Copelatus japonicus* complex has not been defined in Jiang *et al.* (2022). Here, we give a diagnosis of the *C. japonicus* complex: 1) oblong-oval body shape; 2) elytral striation consisting of six dorsal and a submarginal stria, sutural stria complete; 3) the median lobe of aedeagus without a distinct process. According to Hájek *et al.* (2018), the lateral sides of elytra of the species of the *C. doriae-masculinus* complex are often subparallel and sutural stria on the elytron are more or less reduced. Therefore, the *C. japonicus* complex can be distinguished from the *C. doriae-masculinus* complex by its oblong-oval habitus and complete sutural stria. Besides, all species of the *C. japonicus* complex are primarily distributed in China, with a few species also found in some neighboring countries, such as Japan, South Korea, Myanmar, Thailand, Laos, Vietnam (Jiang *et al.* 2022).

Significant advances in the knowledge of the *Copelatus* fauna in mainland China have been made in recent years (Jiang *et al.* 2022, 2025). Shaverdo *et al.* (2023) established a new genus, *Austrelatus* Shaverdo, Hájek, Hendrich, Surbakti, Panjaitan & Balke, 2023, for a distinctive lineage of predominantly Australasian species. All the recently combined species of *Austrelatus* were previously members of the genus *Copelatus*, including *Copelatus parallelus* Zimmermann, 1920, which occurs in China. Up to now, there are 23 species of *Copelatus* occurring in China (Nilsson & Hájek 2025b; Jiang *et al.* 2025). Here, we introduce two new species from eastern China, which were both found on urban low mountains. Illustrations of the habitus and male genitalia for the new species are provided. Based on the habitus and median lobe of the male genitalia, both new species are apparently assigned to the *Copelatus japonicus* complex. In addition, new faunistic data from China are provided for three species of *Copelatus* and *Austrelatus parallelus* (Zimmermann, 1920).

Material and methods

Specimens in this study were examined and measured under a Nikon SMZ800N binocular microscope. A portion of the specimens was dissected, and the genitalia was placed in a drop of glycerol on glass slides for photographing. Photographs of habitus and genitalia were taken with a Nikon DS-Ri2 mounted on a Nikon SMZ25; layers were captured and aligned with the NIS-Elements software. After being photographed, the genitalia were glued on a piece of transparent plastic plate attached to the respective specimen, and the images were edited and assembled with Adobe Photoshop CS6.

Abbreviations for morphological terms

MW = maximum width of body measured at right angles to TL
TL = total length, measurement of length from clypeal margin to apex of elytra
TL-h = total length minus head length, measurement of length from anterior margin of pronotum to apex of elytra

The terminology and style of the description of the new species follow Jiang *et al.* (2022). The terminology to denote the orientation of the genitalia follows Miller & Nilsson (2003). Localities and collector names are cited from the labels and given in quotation marks, with translations provided within square brackets.

Institutional abbreviations

SYSU = Biological Museum, Sun Yat-sen University, Guangzhou, China (F. Jia)
ZJCQ = Zhuo-yin Jiang collection, Quzhou, China

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Coleoptera Linnaeus, 1758
Family Dytiscidae Leach, 1815
Genus *Copelatus* Erichson, 1832

Copelatus jinlingensis Jiang, Jia & Wang sp. nov.
urn:lsid:zoobank.org:act:145934A3-4BA2-4A8A-AC15-294C0150D5CB
Figs 1, 3A–C, 4A–D, 6–7

Diagnosis

Larger-sized (TL: 4.9–5.8 mm), oblong-oval species. Elytra with moderately broad, irregularly shaped, transverse basal yellowish brown band not reaching the suture. Each elytron with six complete discal striae and one submarginal stria. However, the new species can be undoubtedly recognized only based on the shape of male genitalia: median lobe sickle-shaped in lateral view, strongly curved, broadest at mid-length (Fig. 3A); turning right in apical eighth of its length in ventral view (Fig. 3B).

Etymology

The species is named after Jinling (金陵), the ancient name of its type locality, Nanjing. The epithet is an adjective in the nominative singular.

Vernacular name

The Chinese common name of *C. jinlingensis* Jiang, Jia & Wang sp. nov. is '金陵刻翅龙虱'.

Type material

Holotype

CHINA – **Jiangsu** • ♂; "江苏省南京市玄武区紫金山陵园邮局附近 (临时小水坑)" [Jiangsu Province, Nanjing, Xuanwu District, Zijinshan Mt., near Lingyuan Post Office (temporary small puddle)]; 32.0512° N, 118.8499° E; 48.1 m a.s.l.; 1 Apr. 2024; "姜卓寅, 郑以理" [Z. Jiang and Y. Zheng leg.]; SYSU.

Paratypes

CHINA – **Jiangsu** • 7 ♂♂, 17 ♀♀; same data as for holotype; SYSU • 5 ♂♂, 3 ♀♀; same data as for holotype; ZJCQ • 3 ♂♂; "江苏省南京市玄武区紫金山陵园邮局附近 (水塘)" [Jiangsu Province, Nanjing, Xuanwu District, Zijinshan Mt., near Lingyuan Post Office (pond)]; 32.0478° N, 118.8493° E; 26.5 m a.s.l.; 29 Mar. 2024; "姜卓寅, 郑以理" [Z. Jiang and Y. Zheng leg.]; ZJCQ.

Type locality

China, Jiangsu Province, Nanjing, Xuanwu District, Zijinshan Mt., near Lingyuan Post Office; ca 32.0512° N, 118.8499° E; 48.1 m a.s.l.

Description

Measurements. TL: 4.9–5.8 mm (mean value: 5.4 ± 0.2 mm); holotype: 5.7 mm. TL-h: 4.4–5.2 mm (mean value: 4.8 ± 0.2 mm); holotype: 5.2 mm. MW: 2.4–2.9 mm (mean value: 2.7 ± 0.1 mm); holotype: 2.9 mm.

Variability. All specimens of the type series are rather uniform, except for sexual dimorphism. There is only slight variability in dorsal surface colouration, paler or darker than the holotype. Minor variability can be seen in number and length of strioles presenting laterally on pronotum.

Male (holotype)

Habitus (Fig. 1A). Oblong-oval in shape, with continuous outline, broadest at one-third of elytral length, slightly convex. Dorsal surface shiny.

Colouration. Head brown, with reddish brown clypeus and two oval spots on vertex; pronotum dark brown with broadly orange sides; elytra brown, laterally yellowish brown, with moderately broad, irregularly shaped, transverse basal yellowish brown band not reaching suture; appendages yellowish brown; ventral side reddish brown to brown.

Head. Moderately broad, ca 0.61 × as wide as pronotum, trapezoidal. Anterior margin of clypeus indistinctly concave. Antenna with antennomeres long and slender. Reticulation consisting of moderately deeply impressed polygonal isodiametric meshes. Punctation double, consisting of fine punctures and coarse setigerous punctures; fine punctures spread sparsely on clypeus and slightly larger and more densely on vertex; row of coarse punctures present around inner margin of eyes, several punctures present at frontal level of eyes, and anterolaterally to eyes in fronto-clypeal depressions.

Pronotum. Strongly transverse (width/length ratio = 2.85), broadest between posterior angles, lateral margins moderately curved. Sides with lateral beading very thin and indistinct. Reticulation similar to that of head. Punctation double; rows of coarse setigerous punctures present along anterior margin, laterally close to sides, several punctures present also in shallow basolateral depressions along basal margin; fine punctures smaller and sparser than on head, spread throughout whole surface. Pronotum basolaterally and especially laterally with numerous, irregularly distributed short longitudinal or oblique strioles. Centre of disc with shallowly impressed medial longitudinal smooth line.

Elytra. Base of elytra as broad as pronotal base; lateral margins of elytra slightly diverging in basal third, then distinctly narrowing to apex. Six discal and one submarginal longitudinal striae present on each elytron: stria 1 beginning slightly posteriorly to base, striae 2–6 beginning at base; stria 1 longest, ending close to apex; striae 2–5 somewhat shorter, ending subapically; stria 6 ending at apical fourth; submarginal stria long, beginning before elytral mid-length and ending subapically, at same level as dorsal striae 2–5. Reticulation similar to that of head and pronotum, but less impressed. Punctation consisting of coarse setigerous punctures and very fine sparse punctures; coarse punctures present along elytral striae and lateral margins of elytra.

Legs. Protibia modified, angled near base, distinctly broadened anteriorly, club-shaped. Pro- and mesotarsomeres 1–3 distinctly broadened, with four rows of adhesive setae on their ventral side; claws simple.

Ventral side (Fig. 1B). Prosternum sinuate anteriorly, obtusely keeled medially. Prosternal process shortly lanceolate, in cross-section convex, apex obtuse; process distinctly bordered laterally; reticulation not perceptible. Metaventrite with microsculpture consisting of polygonal meshes; lateral parts of metaventrite ("metasternal wings") tongue-shaped, slender. Metacoxal lines nearly complete, absent only very close to metaventrite. Metacoxal plates covered with long, longitudinal strioles and some

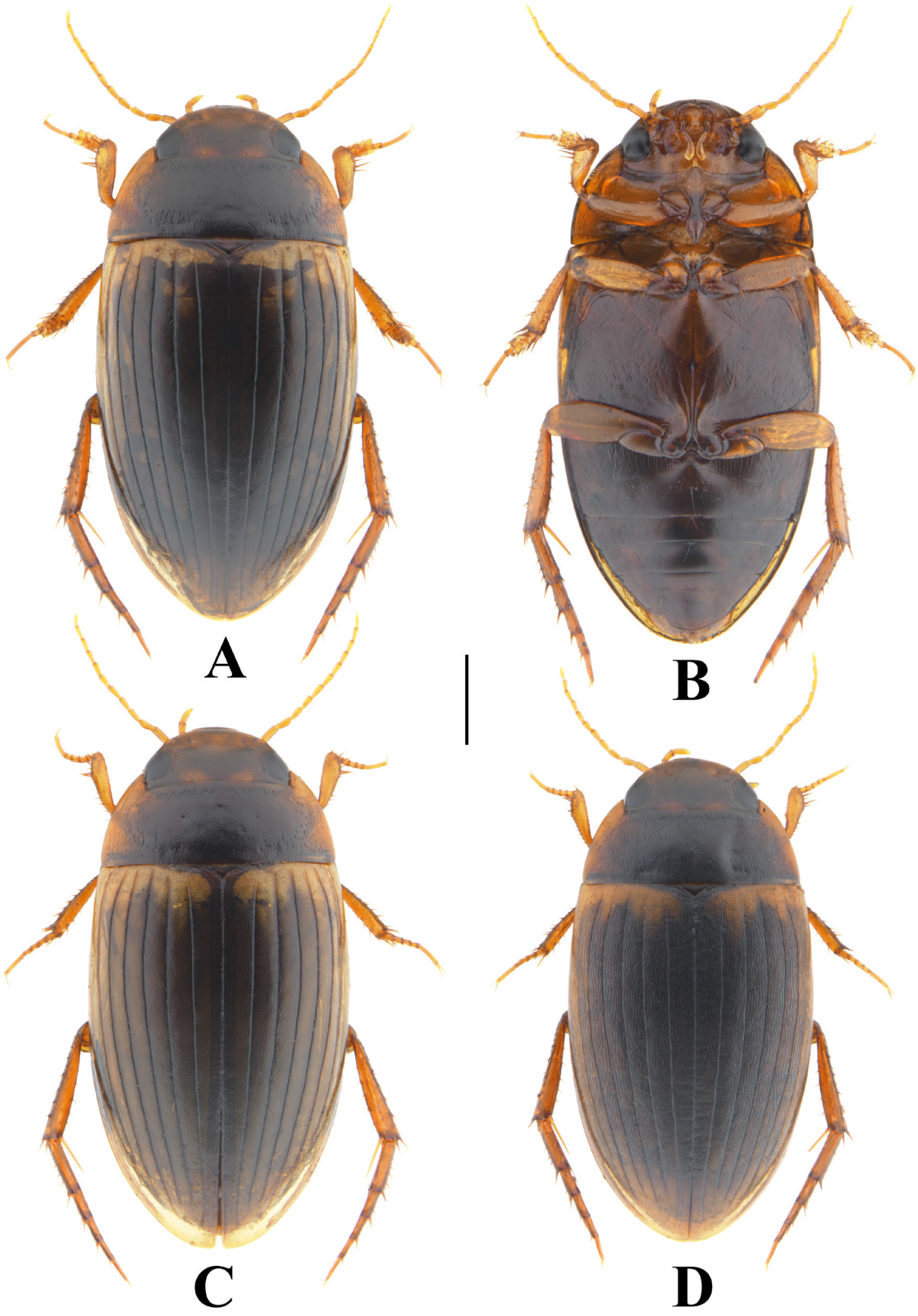

Fig. 1. Habitus of *Copelatus jinlingensis* Jiang, Jia & Wang sp. nov. (Zijinshan, Jiangsu) **A**. Holotype, ♂ (SYSU). **B**. Paratype, ♂ (SYSU). **C**. Paratype, ♀ (SYSU), smooth form. **D**. Paratype, ♀ (SYSU), striolate form. **A**, **C**–**D**. Dorsal views. **B**. Ventral view. Scale bar = 1.0 mm.

transverse wrinkles; reticulation consisting of elongate, oblique polygonal meshes. Metacoxal processes rounded at posterior margin. Abdominal ventrites I–II with longitudinal strioles; ventrites III–IV with oblique strioles laterally. Abdominal reticulation consisting of elongate polygonal meshes, longitudinal on ventrites I–II, oblique on ventrite III and transverse on ventrites IV–VI. Punctation consisting of fine, sparsely distributed punctures; corase setigerous punctures present medially on ventrites III–V, and mediolaterally on ventrite VI.

Male genitalia. Median lobe of aedeagus in lateral view simple, sickle-shaped, strongly curved; broadest at mid-length; in apical third gradually narrowing to pointed apex (Fig. 3A). In ventral view, median lobe turned right at a right angle in apical eighth of its length (Fig. 3B). Parameres slender, C-shaped, broadest at mid-length; apical lobes long, club-shaped (Fig. 3C).

Female

Identical to male in habitus. Protibia simple, not angled basally and only slightly broadened distally; pro- and mesotarsomeres not broadened, without adhesive setae. Females dimorphic; smooth form differs from male in more developed striolation laterally on pronotum (Fig. 1C); striolate form submatt, with long striolae covering pronotum and elytra except for apical fourth (Fig. 1D).

Differential diagnosis

Based on the presence of six dorsal striae and a submarginal stria on each elytron, the new species can be assigned to the *Copelatus irinus* species group sensu Guignot (1961). Oblong-oval habitus, elytral striation consisting of six dorsal and one submarginal stria with sutural stria complete, and the median lobe of aedeagus without a distinct process place *Copelatus jinlingensis* Jiang, Jia & Wang sp. nov. in the *Copelatus japonicus* complex. The male genitalia of new species are most similar to *Copelatus tengchongensis* Hájek, Jiang & Jia, 2022, but the median lobe in lateral view of the new species is more curved (see Fig. 3A and Jiang *et al.* 2022: fig. 63). The male genitalia of new species are also similar to *Copelatus diversistriatus* Jiang, Hájek & Jia, 2022, but the lateral carina of the median lobe is without small spines in apical half which is more curved in the new species (see Fig. 3A and Jiang *et al.* 2022: fig. 37). It is difficult to distinguish the new species from the coexisting *Copelatus japonicus* Sharp, 1884 based on the external appearance. Males can be distinguished by the genitalia: in lateral view, the median lobe slender in apical half in *C. japonicus* (Fig. 3D) but moderately broad in *C. jinlingensis* (Fig. 3A); in ventral view, the apical part of the median lobe is turned right in *C. jinlingensis* (Fig. 3B) but bent downward in *C. japonicus* (Fig. 3E). Females of *C. jinlingensis* are dimorphic (Fig. 1C–D) but monomorphic in *C. japonicus*. However, smooth form females of *C. jinlingensis* sp. nov. are almost indistinguishable from the females of *C. japonicus* in morphology. The females in the paratype series were identified because all the males found simultaneously in the temporary small puddles at the type locality are the same species, *C. jinlingensis*.

Ecology

Three male specimens of *Copelatus jinlingensis* sp. nov. were collected from a large pond with duckweed (Fig. 4A) at Zijinshan Mt. They were found in syntopy with *Copelatus japonicus* and *Austrelatus parallelus* at the pond's edge (Fig. 4B). A large number of *C. jinlingensis* were also found in several temporary small puddles near the pond (Fig. 4C–D).

Distribution

Only known from the type locality in southwestern Jiangsu so far (Figs 6, 7A–B).

Copelatus lankeensis Jiang, Jia & Wang sp. nov.
urn:lsid:zoobank.org:act:F11775FA-2346-408D-A494-80A2C43BDDAE
Figs 2, 3F–H, 5A, 6, 8

Diagnosis

Medium-sized (TL: 4.7–5.2 mm), oblong-oval species. Elytra with moderately broad, irregularly shaped, transverse basal yellowish brown band not reaching the suture. Each elytron with six complete discal striae and one submarginal stria. However, the new species can be unequivocally recognized only based on the shape of the male genitalia: median lobe sickle-shaped in lateral view, moderately curved, basal third almost straight, slightly swollen near apex (Fig. 3F); sinuate in apical half, turned right in apical eighth of its length in ventral view (Fig. 3G).

Etymology

The species is named after its type locality, Lankeshan Mt. It is renowned as the "Go Fairyland", famed for the legendary story of Wang Zhi from the Jin Dynasty who watched a Go game until his axe handle rotted away (= "Lanke" in Chinese Pinyin). The specific epithet is an adjective in the nominative singular.

Vernacular name

The Chinese common name of *C. lankeensis* Jiang, Jia & Wang sp. nov. is '烂柯刻翅龙虱'.

Type material

Holotype

CHINA – **Zhejiang** • ♂; "浙江省衢州市柯城区烂柯山" [Zhejiang Province, Quzhou, Kecheng District, Lankeshan Mt.]; 28.8781° N, 118.9199° E; 118.1 m a.s.l.; 5 Feb. 2024; "姜卓寅, 闫巍峰" [Z. Jiang and W. Yan leg.]; SYSU.

Paratypes

CHINA – **Zhejiang** • 3 ♂♂, 2 ♀♀; same data as for holotype; SYSU • 3 ♂♂, 1 ♀; same data as for holotype; ZJCQ.

Type locality

China, Zhejiang Province, Quzhou, Kecheng District, Lankeshan Mt.; ca 28.8781° N, 118.9199° E; 118.1 m a.s.l.

Description

Measurements. TL: 4.7–5.2 mm (mean value: 5.0 ± 0.2 mm); holotype: 5.2 mm. TL-h: 4.1–4.6 mm (mean value: 4.4 ± 0.2 mm); holotype: 4.6 mm. MW: 2.3–2.6 mm (mean value: 2.5 ± 0.1 mm); holotype: 2.6 mm.

Variability. All specimens of the type series are rather uniform, except for sexual dimorphism. There is only slight variability in dorsal surface colouration, paler or darker than holotype. Minor variability can be seen in number and length of strioles presenting laterally on pronotum.

Male (holotype)

Habitus (Fig. 2A). Oblong-oval in shape, with continuous outline, broadest at one-third of elytral length, slightly convex. Dorsal surface shiny.

Colouration. Head dark brown, with orange clypeus; pronotum dark brown with broadly orange sides; elytra brown, laterally yellowish brown, with moderately broad, irregularly shaped, transverse basal

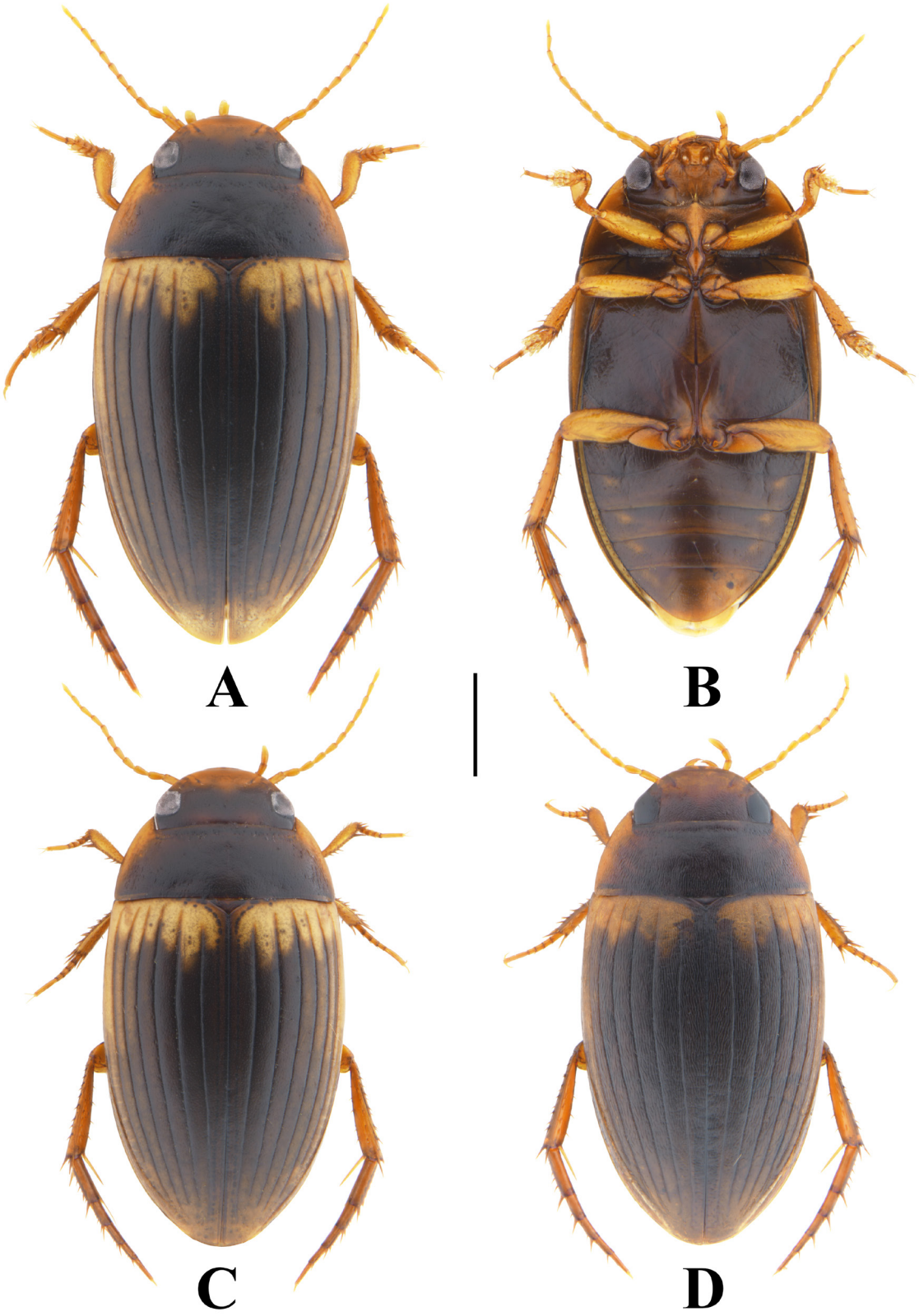

Fig. 2. Habitus of *Copelatus lankeensis* Jiang, Jia & Wang sp. nov. (Lankeshan, Zhejiang) **A**. Holotype, ♂ (SYSU). **B**. Paratype, ♂ (SYSU). **C**. Paratype, ♀ (SYSU), smooth form. **D**. Paratype, ♀ (SYSU), striolate form. **A**, **C–D**. Dorsal views. **B**. Ventral view. Scale bar = 1.0 mm.

yellowish brown band not reaching suture; appendages yellowish brown; ventral side reddish brown to brown.

Head. Moderately broad, ca 0.61 × as wide as pronotum, trapezoidal. Anterior margin of clypeus indistinctly concave. Antenna with antennomeres long and slender. Reticulation consisting of moderately deeply impressed polygonal isodiametric meshes. Punctation double, consisting of fine punctures and coarse setigerous punctures; fine punctures spread sparsely on clypeus and slightly larger and more densely on vertex; row of coarse punctures present around inner margin of eyes, several punctures present at frontal level of eyes, and anterolaterally to eyes in fronto-clypeal depressions.

Pronotum. Strongly transverse (width/length ratio = 2.87), broadest between posterior angles, lateral margins moderately curved. Sides with lateral beading very thin and indistinct. Reticulation similar to that of head. Punctation double; rows of coarse setigerous punctures present along anterior margin, laterally close to sides, several punctures present also in shallow basolateral depressions along basal margin; fine punctures smaller and sparser than on head, spread throughout whole surface. Pronotum basolaterally and especially laterally with numerous, irregularly distributed short longitudinal or oblique strioles. Centre of disc with shallowly impressed medial longitudinal smooth line.

Elytra. Base of elytra as broad as pronotal base; lateral margins of elytra slightly diverging in basal third, then distinctly narrowing to apex. Six discal and one submarginal longitudinal striae present on each elytron: stria 1 beginning slightly posteriorly to base, striae 2–6 beginning at base; stria 1 ending close to apex; striae 2–5 almost equal in length, ending subapically; stria 6 ending at apical fourth; submarginal stria long, beginning before elytral mid-length and ending subapically, at same level as dorsal striae 2–5. Reticulation similar to that of head and pronotum, but less impressed. Punctation consisting of coarse setigerous punctures and very fine sparse punctures; coarse punctures present along elytral striae and lateral margins of elytra.

Legs. Protibia modified, angled near base, distinctly broadened anteriorly, club-shaped. Pro- and mesotarsomeres 1–3 distinctly broadened, with four rows of adhesive setae on their ventral side; claws simple.

Ventral side (Fig. 2B). Prosternum sinuate anteriorly, obtusely keeled medially. Prosternal process shortly lanceolate, in cross-section convex, apex obtuse; process distinctly bordered laterally; reticulation not perceptible. Metaventrite with microsculpture consisting of polygonal meshes; lateral parts of metaventrite ("metasternal wings") tongue-shaped, slender. Metacoxal lines nearly complete, absent only very close to metaventrite. Metacoxal plates covered with long, longitudinal strioles and some transverse wrinkles; reticulation consisting of elongate, oblique polygonal meshes. Metacoxal processes rounded at posterior margin. Abdominal ventrites I–II with longitudinal strioles; ventrites III–IV with oblique strioles laterally. Abdominal reticulation consisting of elongate polygonal meshes, longitudinal on ventrites I–II, oblique on ventrite III and transverse on ventrites IV–VI. Punctation consisting of fine, sparsely distributed punctures; corase setigerous punctures present medially on ventrites III–V, and mediolaterally on ventrite VI.

Male genitalia. Median lobe of aedeagus in lateral view simple, sickle-shaped, moderately curved; basal third almost straight; slightly swollen near apex; apex bluntly pointed (Fig. 3F). In ventral view, median lobe sinuate in apical half, turned right in apical eighth of its length (Fig. 3G). Parameres slender, C-shaped, broadest in basal third; apical lobes long, club-shaped (Fig. 3H).

Female

Identical to male in habitus. Protibia simple, not angled basally and only slightly broadened distally; pro- and mesotarsomeres not broadened, without adhesive setae. Females dimorphic; smooth form differs

from male in more developed striolation laterally on pronotum (Fig. 2C); striolate form submatt, with several short oblique striolae covering posterior part of head, and long striolae covering pronotum and elytra except for apical fourth (Fig. 2D).

Differential diagnosis

Based on the presence of six dorsal striae and a submarginal stria on each elytron, the new species can be assigned to the *Copelatus irinus* species group sensu Guignot (1961). Oblong-oval habitus, elytral striation consisting of six dorsal and one submarginal stria with sutural stria complete, and the median lobe of the aedeagus without a distinct process place *Copelatus lankeensis* Jiang, Jia & Wang sp. nov. in the *Copelatus japonicus* complex. The male genitalia of the new species are not very similar to any other

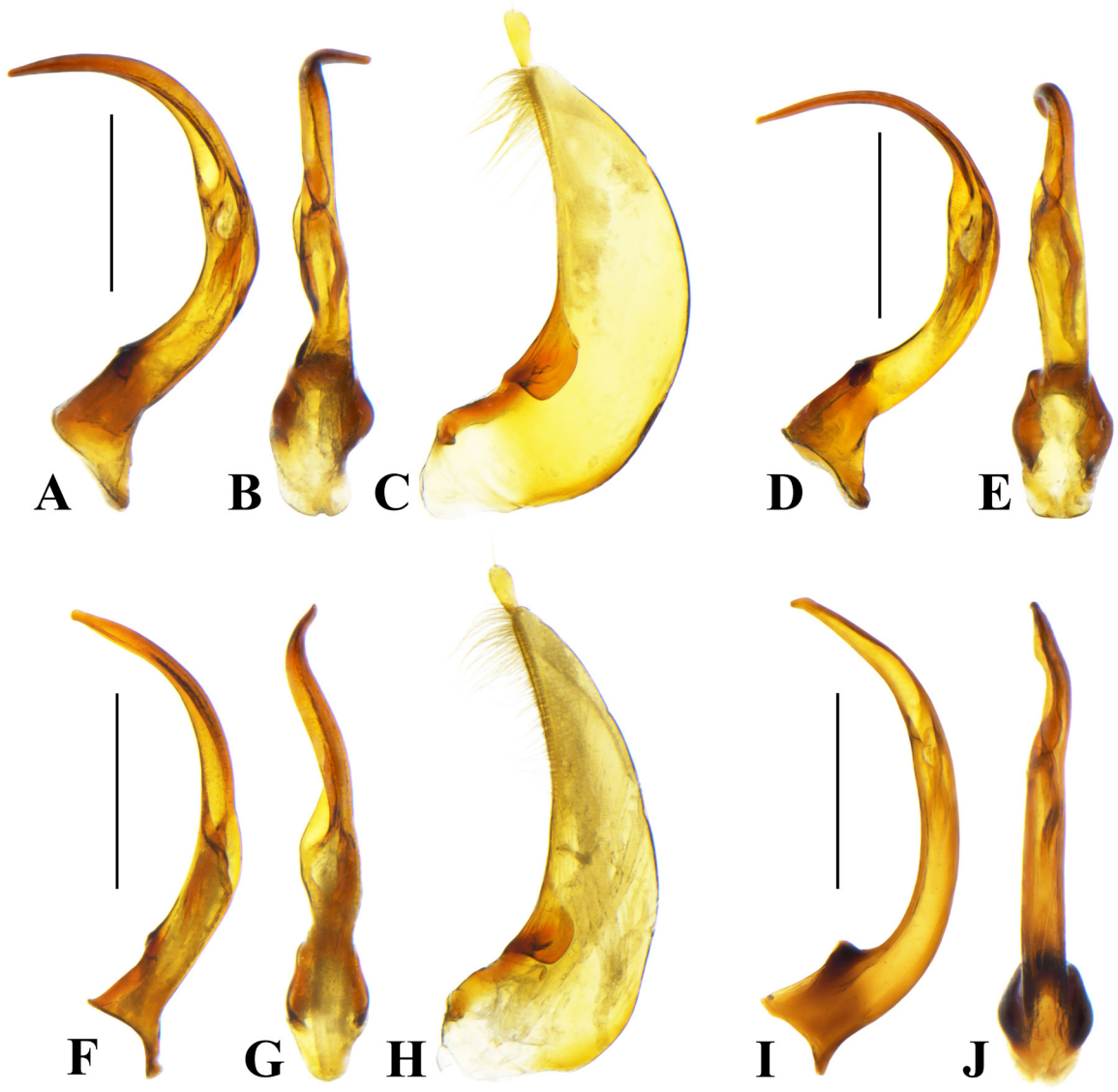

Fig. 3. Male genitalia of *Copelatus* Erichson, 1832. **A**, **D**, **F**, **I**. Median lobe in lateral view. **B**, **E**, **G**, **J**. Median lobe in ventral view. **C**, **H**. Paramere. **A–C**. *C. jinlingensis* Jiang, Jia & Wang sp. nov., holotype, ♂ (SYSU) (Zijinshan, Jiangsu). **D–E**. *C. japonicus* Sharp, 1884, ♂ (ZJCQ) (Zijinshan, Jiangsu). **F–H**. *C. lankeensis* Jiang, Jia & Wang sp. nov., holotype, ♂ (SYSU) (Lankeshan, Zhejiang). **I–J**. *C. chinensis* Régimbart, 1899, ♂ (ZJCQ) (Lankeshan, Zhejiang). Scale bars = 0.5 mm.

Chinese species by its unique shape, especially the swelling near the apex in lateral view and the apical half sinuate in ventral view. Although the new species can be distinguished from the coexisting *Copelatus chinensis* Régimbart, 1899 by its broader habitus and darker coloration, they can be reliably separated only by the male genitalia: in lateral view, the median lobe almost straight in basal third, slightly swollen near apex, apex bluntly pointed in *C. lankeensis* (Fig. 3F) but evenly curved, not swollen near apex, apex skewed in *C. chinensis* (Fig. 3I); in ventral view, median lobe sinuate in apical half, turned right apically in *C. lankeensis* (Fig. 3G) but almost straight, slightly turned left apically in *C. chinensis* (Fig. 3J). Females of *C. lankeensis* dimorphic (Fig. 2C–D) but monomorphic in *C. chinensis*.

Ecology

At Lankeshan Mt., *Copelatus lankeensis* Jiang, Jia & Wang sp. nov. was collected syntopically with *Copelatus chinensis* in a temporary long puddle with decaying leaves in the bamboo forest (Fig. 5A).

Distribution

Only known from the type locality in western Zhejiang so far (Figs 6, 8A–B).

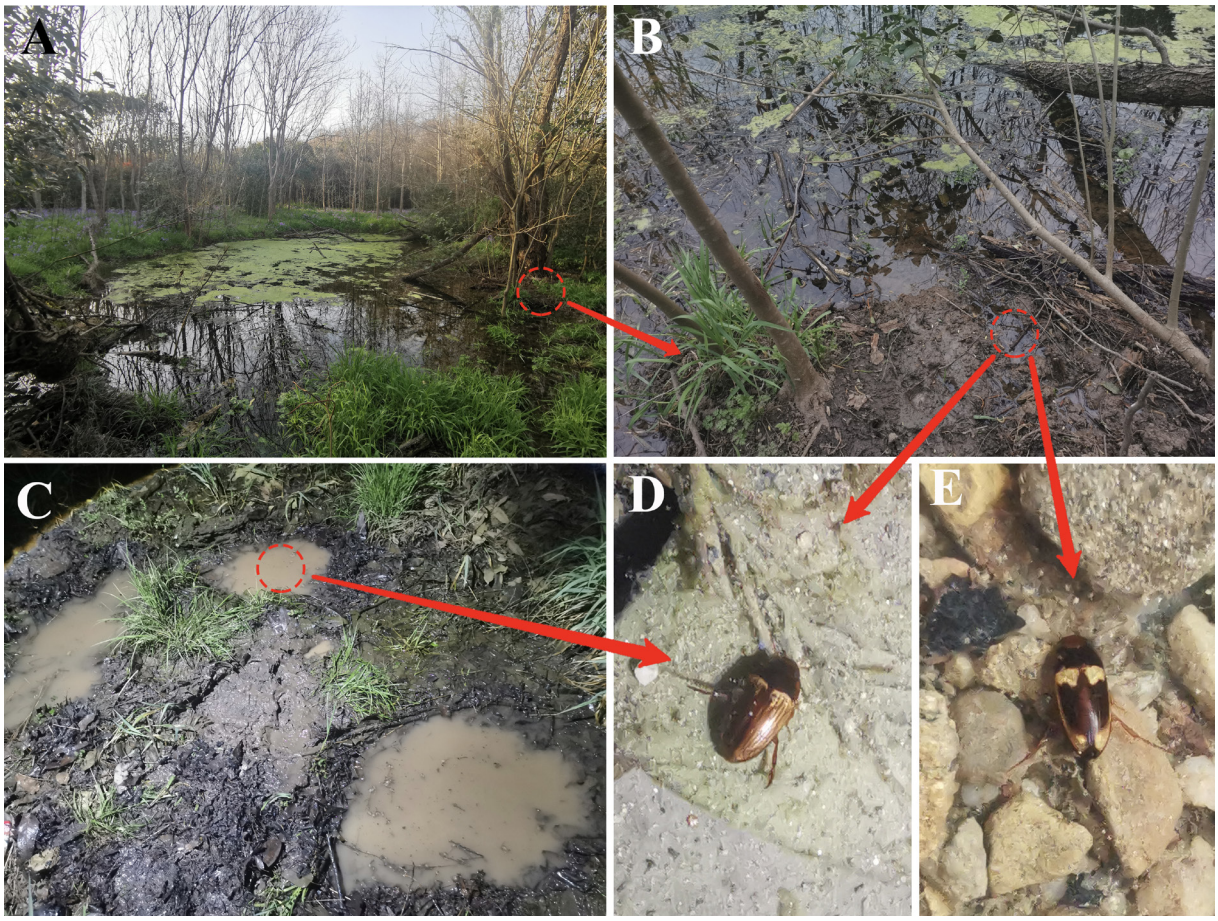

Fig. 4. Habitat and live specimens of species of *Copelatus* Erichson, 1832 and *Austrelatus* Shaverdo *et al.*, 2023. **A**. A large pond with duckweed (Zijinshan, Jiangsu). **B**. The edge of the pond (Zijinshan, Jiangsu). **C**. Some temporary small puddles not far from the pond (Zijinshan, Jiangsu). **D**. Live specimen of *Copelatus jinlingensis* Jiang, Jia & Wang sp. nov. **E**. Live specimen of *Austrelatus parallelus* (Zimmermann, 1920).

First and additional provincial records of Copelatus Erichson, 1832 and Austrelatus Shaverdo, Hájek, Hendrich, Surbakti, Panjaitan & Balke, 2023 from China

Copelatus chinensis Régimbart, 1899
Figs 3I–J, 5A–B, D, 6

Literature records from China

Régimbart 1899: 298 (Hubei, original description); Falkenström 1932: 192 (Sichuan or Chongqing); Falkenström 1933: 14 (Sichuan or Chongqing); Jiang *et al.* 2022: 253 (Hunan, Shandong, Zhejiang).

Material examined (first province record)

First records

CHINA – **Jiangsu** • 4 ♂♂, 1 ♀; "江苏省南京市浦口区老山百鸟园" [Jiangsu Province, Nanjing, Pukou District, Laoshan Mt., Bainiaoyuan]; 32.1059° N, 118.6002° E; 100.4 m a.s.l.; 20 Mar. 2024; "姜卓寅, 郑以理, 邓振" [Z. Jiang, Y. Zheng and Z. Deng leg.]; ZJCQ • 2 ♂♂; "江苏省淮安市盱眙县铁山寺铁索桥附近" [Jiangsu Province, Huaian, Xuyi County, Tieshansi, near Tiesuoqiao]; 32.7311° N, 118.4621° E; 110.9 m a.s.l.; 12 Apr. 2025; "姜卓寅, 郑以理, 苏菲雨, 卢琮文" [Z. Jiang, Y. Zheng, F. Su and C. Lu leg.]; ZJCQ.

Additional records

CHINA – **Zhejiang** • 2 ♂♂; "浙江省衢州市柯城区烂柯山" [Zhejiang Province, Quzhou, Kecheng District, Lankeshan Mt.]; 28.8781° N, 118.9199° E; 118.1 m a.s.l.; 5 Feb. 2024; "姜卓寅, 闫巍峰" [Z. Jiang and W. Yan leg.]; ZJCQ.

Ecology

Copelatus chinensis was found co-occurring with *Copelatus lankeensis* Jiang, Jia & Wang sp. nov. in a long, temporary puddle with decaying leaves under a bamboo forest at Lankeshan Mt. (Fig. 5A), whereas at Laoshan Mt., it was collected at the edge of a muddy reservoir (Fig. 5B, D).

Distribution

Endemic in China. Central and eastern China: Hubei, Hunan, Jiangsu (Fig. 6), Shandong, Sichuan or Chongqing, and Zhejiang.

Copelatus japonicus Sharp, 1884
Figs 3D–E, 4A, 6

Literature records from China

Jiang *et al.* 2022: 260 (Shanghai); Jiang *et al.* 2025: 49 (Hubei).

Material examined (first province record)

First records

CHINA – **Jiangsu** • 3 ♂♂; "江苏省南京市玄武区紫金山陵园邮局附近 (水塘)" [Jiangsu Province, Nanjing, Xuanwu District, Zijinshan Mt., near Lingyuan Post Office (pond)]; 32.0478° N, 118.8493° E; 26.5 m a.s.l.; 29 Mar. 2024; "姜卓寅, 郑以理" [Z. Jiang and Y. Zheng leg.]; ZJCQ • 1 ♀; "江苏省南京市江宁区黄龙堰水库" [Jiangsu Province, Nanjing, Jiangning District, Huanglongyan Reservoir]; 31.9684° N, 118.9576° E; 79.5 m a.s.l.; 24 Apr. 2024; "姜卓寅, 郑以理" [Z. Jiang and Y. Zheng leg.]; ZJCQ • 1 ♂; "江苏省南京市浦口区老山狮子岭窑头" [Jiangsu Province, Nanjing, Pukou District, Laoshan Mt., Shiziling, Yaotou]; 32.0467° N, 118.5518° E; 81.7 m a.s.l.; 2 Oct. 2024; "姜卓寅, 郑以

理, 邓振" [Z. Jiang, Y. Zheng and Z. Deng leg.]; ZJCQ • 1 ♂, 1 ♀; "江苏省淮安市盱眙县铁山寺铁索桥附近" [Jiangsu Province, Huaian, Xuyi County, Tieshansi, near Tiesuoqiao]; 32.7311° N, 118.4621° E; 110.9 m a.s.l.; 12 Apr. 2025; "姜卓寅, 郑以理, 苏菲雨, 卢琮文" [Z. Jiang, Y. Zheng, F. Su and C. Lu leg.]; ZJCQ.

Ecology

At Zijinshan Mt., *Copelatus japonicus* was found syntopically with *Copelatus jinlingensis* Jiang, Jia & Wang sp. nov. and *Austrelatus parallelus* in a large pond with duckweed (Fig. 4A).

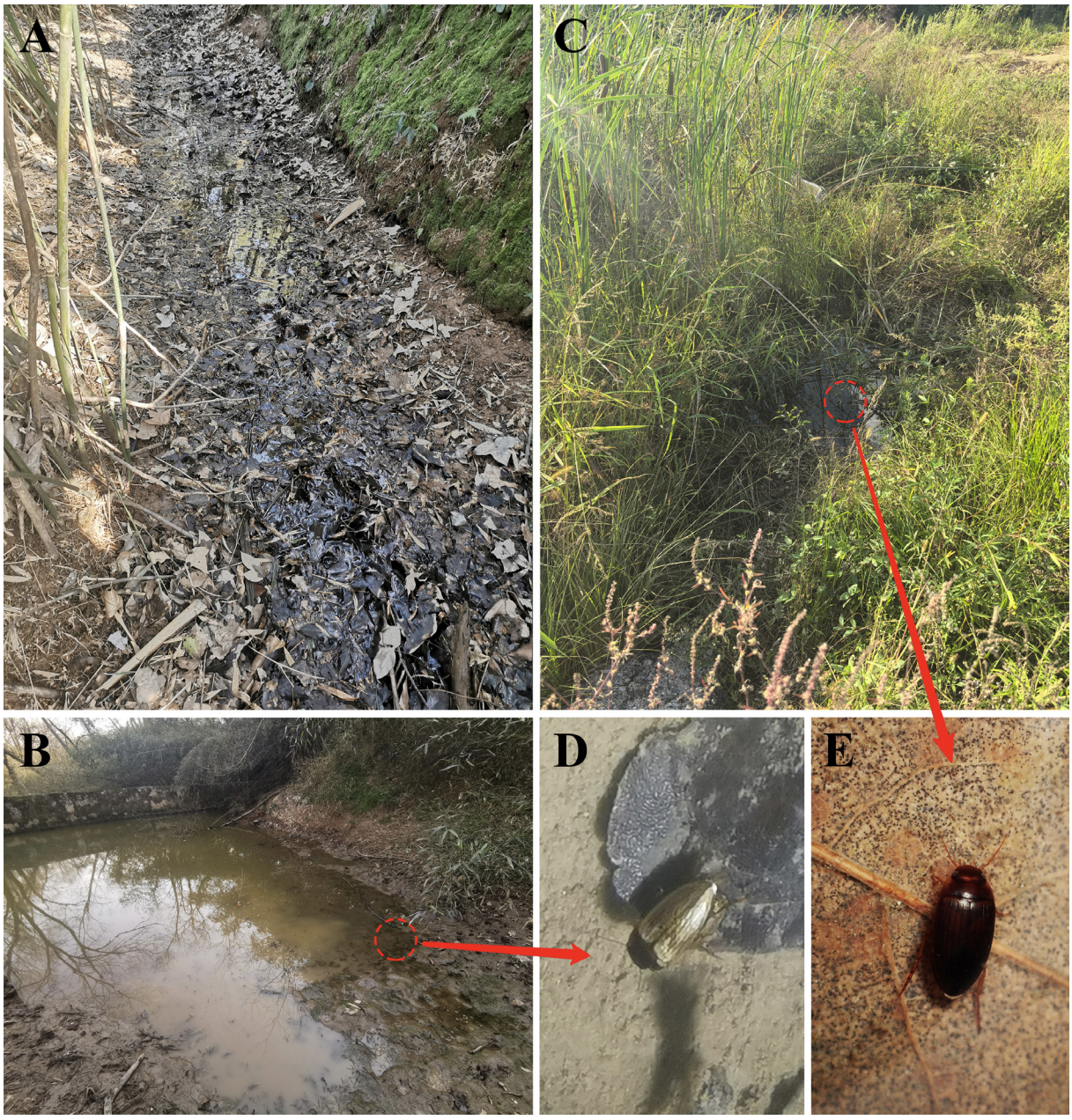

Fig. 5. Habitat and live specimens of species of *Copelatus* Erichson, 1832. **A**. A temporary long puddle with decaying leaves in the bamboo forest (Lankeshan, Zhejiang). **B**. A muddy reservoir (Laoshan, Jiangsu). **C**. A temporary small puddle in the grass (Emerald Park, Jilin). **D**. Live specimen of *Copelatus chinensis* Régimbart, 1899. **E**. Live specimen of *Copelatus weymarni* Balfour-Browne, 1947.

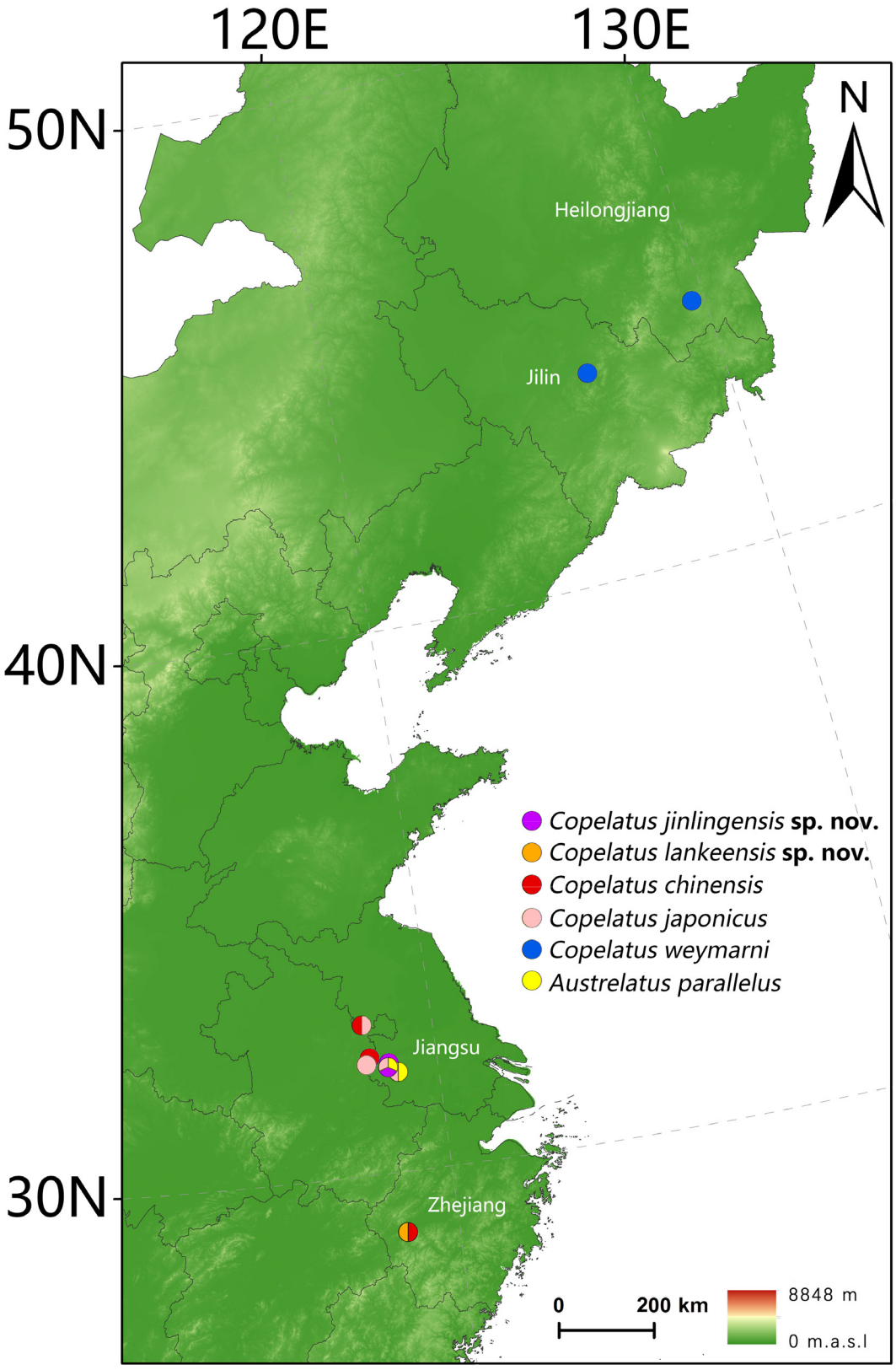

Fig. 6. Map of the distribution of new species and new records of other species of *Copelatus* Erichson, 1832 and *Austrelatus* Shaverdo *et al.*, 2023 in China.

Distribution

Eastern China (Hubei, Jiangsu (Fig. 6), Shanghai), Japan, South Korea.

Copelatus weymarni Balfour-Browne, 1947
Figs 5C, E, 6

Literature records from China

Balfour-Browne 1947: 440 (Nei Mongol, original description); Li 1992: 35 (Liaoning); Nilsson 1995: 42 (Hebei); Jiang *et al.* 2022: 274 (Liaoning, Shanghai).

Material examined (first province record)

First records

CHINA – **Heilongjiang** • 2 ♀♀; "黑龙江省牡丹江市东安区牡丹峰国家森林公园附近" [Heilongjiang Province, Mudanjiang, Dong'an District, near Mudanfeng National Forest Park]; 44.4783° N, 129.7355° E; 314.0 m a.s.l.; 11 Aug. 2025; "郑以理" [Y. Zheng leg.]; ZJCQ. – **Jilin** • 6 ♂♂, 4 ♀♀; "吉林省吉林市丰满区翡翠公园" [Jilin Province, Jilin, Fengman District, Emerald Park]; 43.8036° N, 126.5965° E; 235.5 m a.s.l.; 17 Aug. 2024; "郑以理" [Y. Zheng leg.]; ZJCQ.

Ecology

In Emerald Park (Jilin), *Copelatus weymarni* was collected from temporary small puddles under the grass (Fig. 5C, E). The specimens from Heilongjiang were collected by light traps.

Distribution

Northeastern China (Hebei, Heilongjiang, Jilin (Fig. 6), Liaoning, Nei Mongol, Shanghai), Far East of Russia, Japan, North Korea, South Korea.

Austrelatus parallelus (Zimmermann, 1920)
Figs 4A–B, E, 6

Literature records from China

Jiang *et al.* 2022: 266 (Hebei, Hubei, Hunan, Shanghai).

Material examined (first province record)

First records

CHINA – **Jiangsu** • 2 ♂♂, 1 ♀; "江苏省南京市玄武区紫金山陵园邮局附近 (水塘)" [Jiangsu Province, Nanjing, Xuanwu District, Zijinshan Mt., near Lingyuan Post Office (pond)]; 32.0478° N, 118.8493° E; 26.5 m a.s.l.; 29 Mar. 2024; "姜卓寅, 郑以理" [Z. Jiang and Y. Zheng leg.]; ZJCQ • 1 ♀; "江苏省南京市江宁区黄龙堰水库" [Jiangsu Province, Nanjing, Jiangning District, Huanglongyan Reservoir]; 31.9684° N, 118.9576° E; 79.5 m a.s.l.; 24 Apr. 2024; "姜卓寅, 郑以理" [Z. Jiang and Y. Zheng leg.]; ZJCQ.

Ecology

At Zijinshan Mt., *Austrelatus parallelus* was found in a large duckweed pond (Fig. 4A), where it was collected in syntopy with *Copelatus jinlingensis* Jiang, Jia & Wang sp. nov. and *Copelatus japonicus* at the edge (Fig. 4B, E).

Distribution

Eastern China (Hebei, Hubei, Hunan, Jiangsu (Fig. 6), Shanghai), Japan, South Korea.

Discussion

In recent years, more and more new species have been discovered in urbanized habitats. For example, Fan *et al.* (2021) recorded a new leaf beetle species in Haizhu Wetland, which is located on the central axis of Guangzhou, China. To find unknown species threatened by urban environments, bringing them

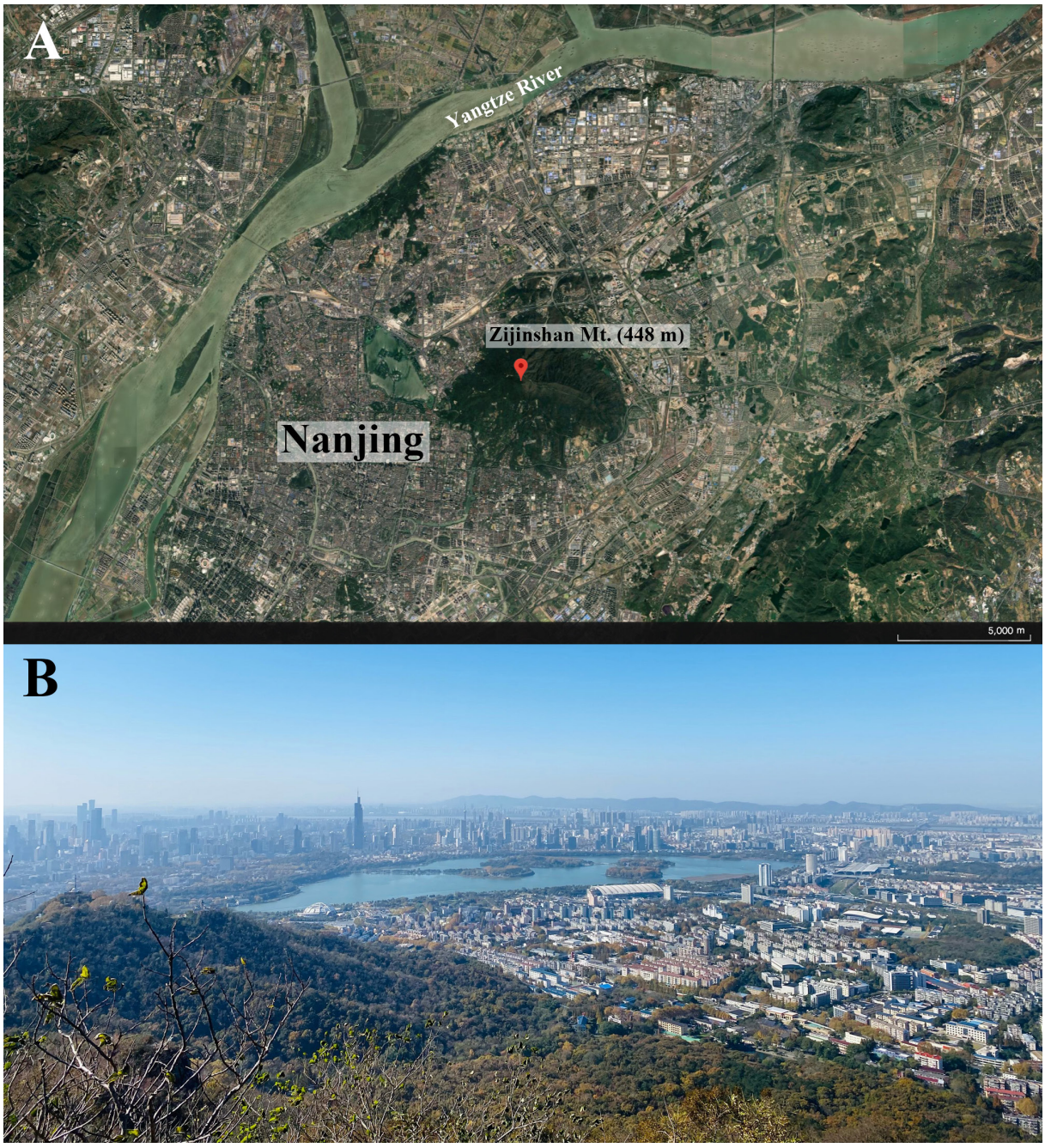

Fig. 7. Location of Zijinshan Mt., China. **A**. Location on satellite map. **B**. The residential areas of central Nanjing viewed from the main peak of Zijinshan Mt.

to light before they become extinct, Ruan *et al.* (2025) proposed the concept of "urban taxonomy" by unveiling a new genus of leaf beetles in the Asian megacity Shenzhen, and advocated taxonomic research on the "new wilderness" urban forests. Zijinshan Mt. is the mother mountain of Nanjing (Jiangsu), located on the south bank of the Yangtze River and surrounded by residential areas (Fig. 7A–B). The maximum length of Zijinshan Mt. from east to west is about 7 km, and the maximum width from north to south is about 3 km. The main peak, Toutuoling Mt., is 448 meters above sea level and is the highest peak in the main city of Nanjing (Fig. 7A). Lankeshan Mt. is located 13 km southeast of the main urban area of Quzhou (Zhejiang), bordered by the Wuxijiang River to the west and surrounded by villages

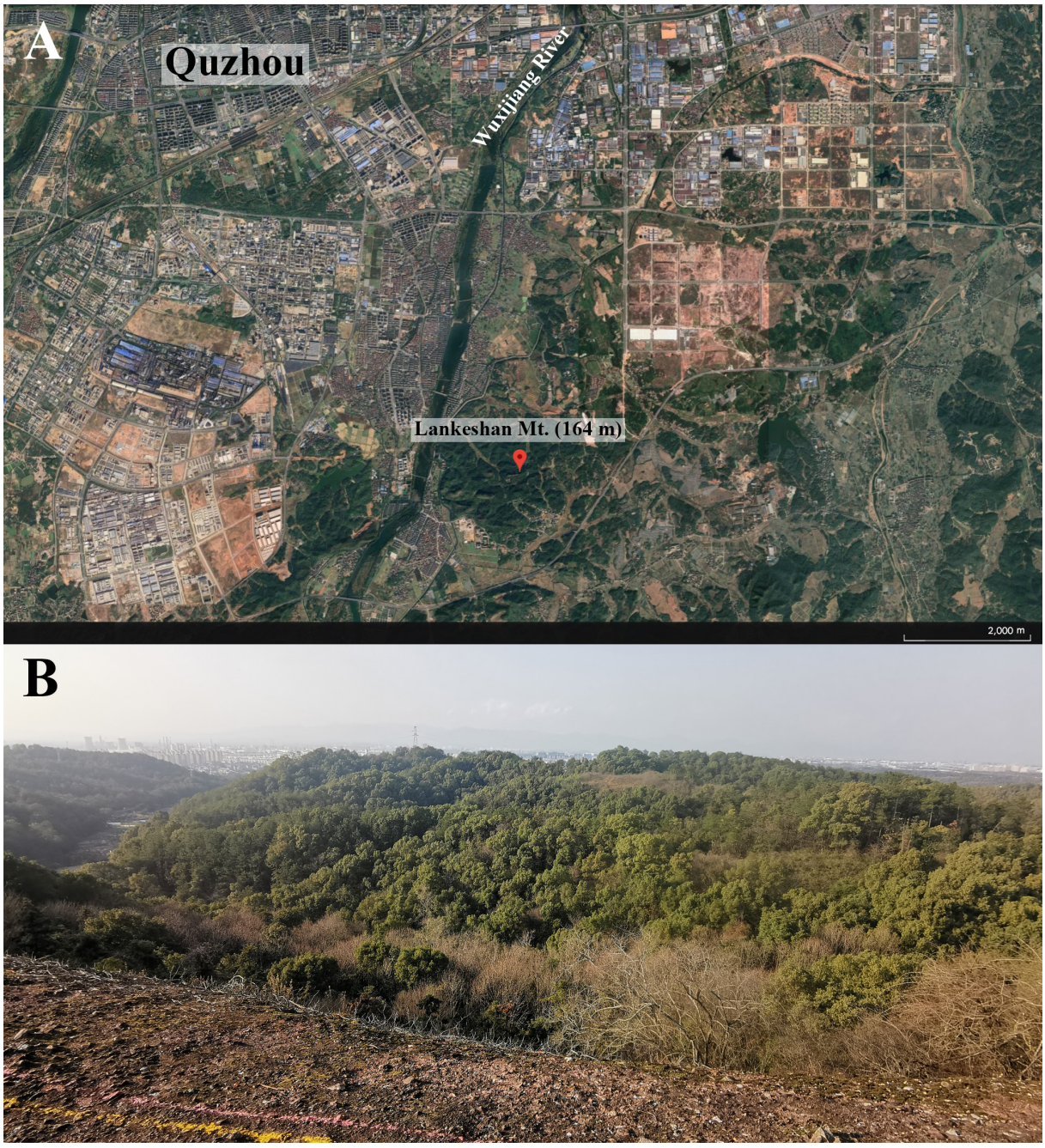

Fig. 8. Location of Lankeshan Mt., China. **A**. Location on satellite map. **B**. The surrounding residential areas viewed from the top.

and farmland (Fig. 8A–B). The mountain is 4 km long from east to west, and 2 km wide from north to south, with an elevation of which is 164 m (Fig. 8A). What the two mountains have in common is their location in or near urban areas, resulting in significant impact from human activities. Although they are limited in both height and area, they serve as ecological, urban fragments that provide habitats and shelter for numerous species. In fact, once these fragmented forests are granted ecological protection amid urbanization, the biodiversity they house far exceeds our imagination. The discovery of these two new species provides an excellent demonstration of this. However, fragmented habitats in cities can become isolated islands for some species, affecting their dispersal and colonization, and thus limiting their gene flow. The strong flight capacity of *Copelatus* enables it to utilize urban farmlands and parks as stepping stones for dispersal, thereby mitigating the habitat fragmentation effect to some extent. Consequently, conservation efforts must shift focus from preserving isolated habitat 'islands' to maintaining the effective connectivity of the entire habitat network, which poses a forward-thinking requirement for urban ecological planning. In addition, the role of umbrella species in biodiversity conservation is also worthy of attention. Zijinshan Mt. is protected not only due to its unique historical and cultural significance but also because it is an important habitat for the rare *Luehdorfia chinensis* Leech, 1893, commonly known as the Chinese tiger swallowtail butterfly. Protection efforts for *Luehdorfia chinensis* have resulted in an umbrella effect for other sympatric species. This is one of the important factors for the recent discovery of *Copelatus jinlingensis* Jiang, Jia & Wang sp. nov. on Zijinshan Mt., despite frequent human activities.

Acknowledgements

We thank Mr Wei-feng Yan for his help during the senior author's field collection at Lankeshan Mt.. We also thank Dr Bing-lan Zhang (SYSU) for her advice on photographic techniques and Dr Wen-fei Liao (University of Helsinki, Finland) for her valuable suggestions in the discussion section. We are obliged to Jirí Hájek (Národní Muzeum, Prague, Czech Republic) and Helena Shaverdo (Naturhistorisches Museum Wien, Vienna, Austria) for critical comments on the manuscript. We are indebted to Karen Salazar (Muséum national d'Histoire naturelle, Paris, France) who improved the English of the main text. This study was supported by the National Natural Science Foundation of China (No. 32271631).

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