

A New Species of *Mallinella* Strand, 1906 (Araneae: Zodariidae) from Guizhou Province, China

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Abstract: A new species belonging to the *annulipes*-group of the genus *Mallinella* Strand, 1906 is described: *Mallinella pseudokunmingensis* sp. n. This species is currently known to occur only in Guiyang City, Guizhou Province, China. Description of males and females, illustrations, diagnosis and map of the record are provided.

Key words: Spiders, China, new species, taxonomy.

Introduction

The genus *Mallinella* Strand, 1906 was revised several times by BOSMANS et al. (1984, 1986a, 1986b) and later redefined by JOCQUÉ (1991, 1995). DANKITTIPAKUL et al. (2012) proposed the most recent revision that recognised *Mallinella* as the most species-rich zodariid genus. At present, this genus contains 209 catalogued species and is exclusively distributed in the Palaeotropics (DANKITTIPAKUL et al. 2012, WORLD SPIDER CATALOG 2018). Despite its high species diversity, *Mallinella* still remains an inadequately studied taxon. More than a half of the described species are known from a single sex only, 44 by females and 54 by males.

Mallinella can be regarded as being poorly represented in China, with only 22 species (LI & LIN 2016), of which 14 are known based on a single sex: for eight only males are known and for six only females are known. Moreover, the diversity of this genus in China is still insufficiently known and several new species have been described in the last few years (WANG et al. 2009a, 2009b, ZHANG & ZHU, 2009, ZHANG et al. 2011, DANKITTIPAKUL et al. 2012, ZHANG et al. 2012, BARRION et al. 2013, JIN & ZHANG, 2013).

Recently, various collections were carried out by researchers of the Guizhou Normal University. During these field explorations, a zodariid species

was found. After a careful examination, this species was found to possess certain characters associated with the genus *Mallinella* but could not be attributed to any of the known species of this genus. Therefore, it is described here as a new species named *Mallinella pseudokunmingensis* sp. n.

Materials and Methods

Spiders in this study were collected using pitfall trapping. Specimens were examined with an Olympus SZX7 stereomicroscope; details were studied with an Olympus CX41 compound microscope. Male palps and female epigynes were examined and illustrated after being dissected. Epigynes were cleared in boiling KOH solution to dissolve soft tissues. Photos were made with Leica DFC 450 digital camera mounted on an Olympus CX41 stereomicroscope. The digital images were taken and assembled using Helifocus 3.10 software. The drawings were made using an Olympus drawing tube. Most hairs and macrosetae were not depicted in the palp and epigyne images.

All measurements are given in millimetres. Eye diameters are taken at their widest point. The total body length does not include chelicerae or spinnerets length. Leg lengths are given as total length (fe-

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mur, patella + tibia, metatarsus, tarsus). The material us deposited at the College of Chemistry and Life Sciences and the Museum of Guizhou Education University, Guiyang, China.

Abbreviations used in the text and figures are as follows: ALE = anterior lateral eyes, AME = anterior median eyes, AME–ALE = distance between AME and ALE, AME–AME = distance between AMEs, C = conductor, CF = cymbial fold, CO = copulatory opening, E = embolus, EA = embolic apex, EB = embolic base, EF = epigynal furrow, EP = epigynal plate, ET = embolic tip, ID = insemination duct, LB = lateral border, LR = lateral ramus, MA = median apophysis, MOQ = median ocular quadrangle, MR = mesal ramus, PLE = posterior lateral eyes, PME = posterior median eyes, PME–PME = distance between PMEs; PME–PLE = distance between PME and PLE, RTA = retrolateral tibial apophysis, S = spermathecae, SF = subterminal fold of embolus. I, II, III, IV = legs I to IV. The terminology used in the text and figure legends follows DANKITTIPAKUL et al. (2012).

Results

FAMILY ZODARIIDAE THORELL, 1881

SUBFAMILY ZODARIINAE SIMON 1890

Genus *Mallinella* Strand, 1906

Mallinella pseudokunmingensis sp. n.

Type specimens:

Holotype: ♂, China, Guizhou, Guiyang City, Wudang District, Guizhou Education University (26°38'53.138"N, 106°48'15.84"E, 755 m a.s.l.), 16.VI–17.VII.2017 (leg. Z. X. Li and H. B. Wan); Paratypes: 20 ♂♂ and 6 ♀♀, same data as holotype; 1 ♂ and 1 ♀, same locality, 20.IV–3.V.2017 (leg. H. Yu and H. B. Wan); 6 ♂, same locality, 1–15.VIII.2017 (leg. Z. Q. Zeng and N. N. Lu).

Diagnosis:

Males easily distinguished from those of all other species of *Mallinella*, except *M. kunmingensis* (WANG et al. 2009a: 51; Figs 13–21), by the digitiform retrolateral tibial apophysis, needle-shaped lateral ramus of embolus and by the general shape of median apophysis, but differ from the latter by: (1) median apophysis without tooth but with three denticles in *M. kunmingensis* (cf. Figs. 7, 16–18; WANG et al. 2009a: 52, fig. 20); (2) tip of the median apophysis not bifid and with folded apico-prolateral process, vs. bifid and not folded in *M. kunmingensis* (cf. Figs. 16–18; WANG et al. 2009a: 52, fig. 20); (3) shape of the embolic tip (subterminal fold of mesal ramus point ventrally in *M. pseudokunmingensis* sp. n., vs. point prolaterally and partly covered by embolic apex in *M. kunmingensis*) (cf. Figs. 9, 24;

WANG et al. 2009a: 52, fig. 21); (4) abdominal pattern (1st pair of spots fused to form trigonal patch in *M. pseudokunmingensis* sp. n., vs. 1st pair separated in *M. kunmingensis*) (cf. Fig. 1; WANG et al. 2009a: 51, fig. 13).

Female of *M. pseudokunmingensis* most similar to those of *M. annulipes* (Thorell, 1892) by having V-shaped epigynal plate, swelling and reniform spermathecae but can be distinguished by: (1) wider lateral border (width-length ratio approximately 0.77 in *M. pseudokunmingensis* vs. 0.43 in *M. annulipes*) (cf. Figs. 19–20, 34–35; DANKITTIPAKUL et al. 2012: figs. 733–734); (2) spermathecae with wrinkled and ribbed appearance in *M. pseudokunmingensis*, instead of smooth in *M. annulipes* (cf. Figs. 21–23, 36–38; DANKITTIPAKUL et al. 2012: figs. 737–738); (3) femora and tibiae without distal annulations (cf. Fig. 5; DANKITTIPAKUL et al. 2012: Fig. 103); (4) dorsal pattern of abdomen (almost all pairs of spots fused together in *M. pseudokunmingensis* vs. all spots situated far apart in *M. annulipes*) (cf. Fig 2; DANKITTIPAKUL et al. 2012: fig. 713).

Description:

Male (holotype): Total length 7.86; carapace 3.46 long, 2.49 wide; abdomen 4.39 long, 2.76 wide. Eye sizes and interdistances: AME 0.17, ALE 0.16, PME 0.17, PLE 0.19, AME–AME 0.12, AME–ALE 0.11, PME–PME 0.15, PME–PLE 0.27; MOQ: 0.33 long, 0.53 anterior width, 0.47 posterior width. Leg measurements: I 10.41 (2.55, 3.29, 2.46, 2.13), II 10.22 (2.59, 3.08, 2.52, 2.04), III 9.92 (2.36, 3.01, 2.78, 1.78), IV 11.85 (2.92, 3.24, 3.67, 2.03).

Coloration and pattern as in Figs. 1, 4. Carapace pear-shaped, reddish-brown anteriorly and centrally, dark posteriorly and marginally, without distinct pattern. Chelicerae orange-red. Labium red. Endites yellowish-brown, distally yellowish-white and with black tuft. Sternum orange-brown and covered with sparse black setae. Legs yellowish, except femora which darker than other segments. Dorsum of abdomen dark purple, mottled with numerous minute spots. Dorsal pattern composed of four pairs of yellow spots: 1st pair fused to form a trigonal patch; 2nd pair fused, represented by a transverse chevron; 3rd pair separated, represented by two short transverse bands; 4th pair fused, forming a W-shaped patch. Venter of abdomen yellowish, medially with four longitudinal purple bands.

Palp as in Figs. 6–18, 24–33. Tibia short, about 1/4 of cymbium length, with only retrolateral apophysis; apophysis (RTA) about as long as tibia, wine-coloured and digitiform, slightly wider at base, gradually tapering towards blunt tip. Cymbial fold (CF) well developed, about 1/3 of cymbial length. Median apophysis (MA) twice shorter than cymbium, with ros-

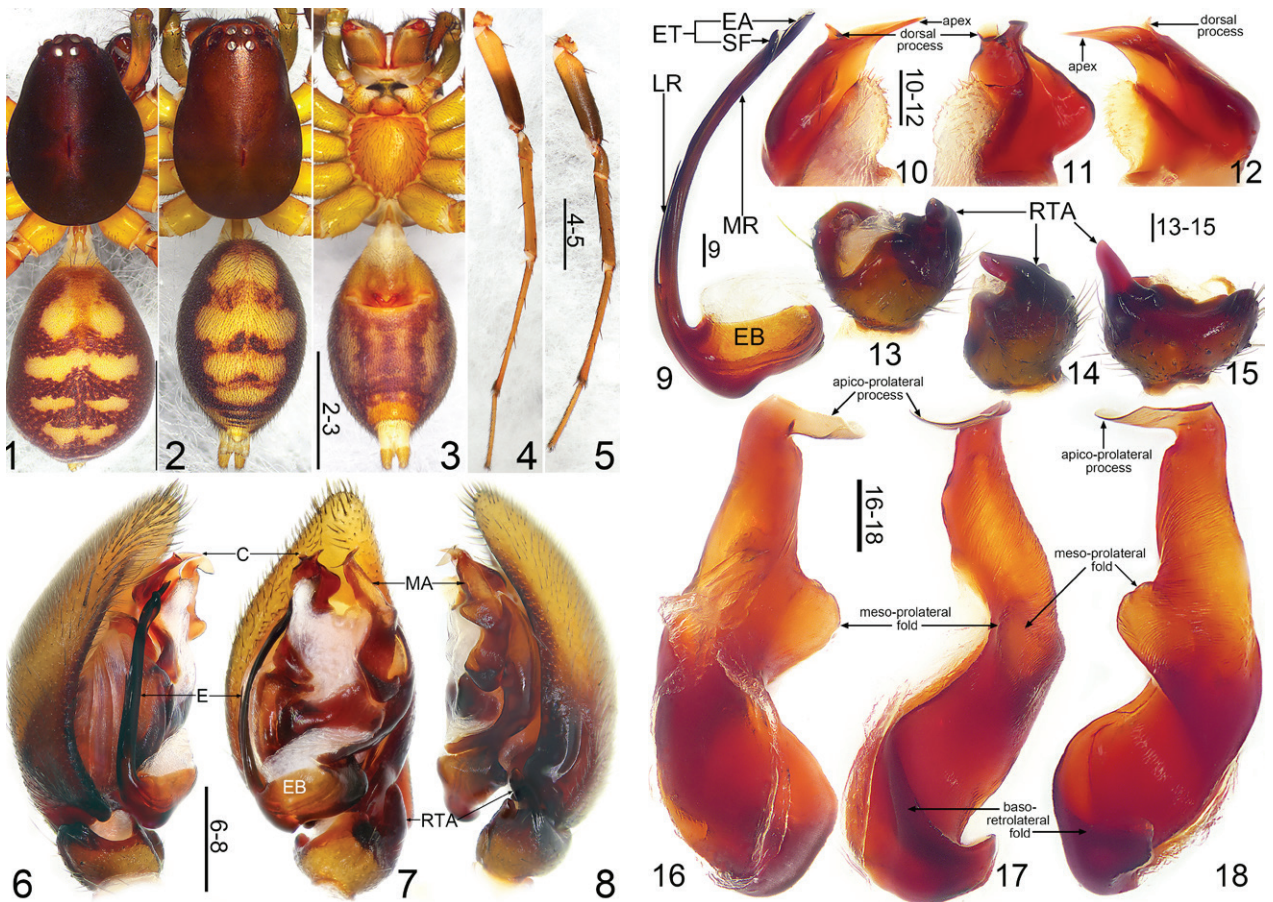


Fig. 1–4. Somatic characters of *Mallinella pseudokunmingensis* sp. n., male (holotype) and female (paratype). 1. male habitus, dorsal view; 2–3. female habitus, dorsal and ventral view; 4. male leg IV, prolateral view; 5. female leg IV, prolateral view; 6–8, flipped right palp, prolateral, ventral and retrolateral view. Abbreviations: C, conductor; E, embolus; MA, median apophysis; RTA, retrolateral tibial apophysis. Scale bar 2 mm (1, 2–3, 4–5); 0.5 mm (6–8).

Fig. 9–18. Left palp of *Mallinella pseudokunmingensis* sp. n., male holotype. 9. embolus, ventral view; 10–12. conductor, prolateral, ventral and retrolateral view; 13–15. palpal tibia, ventral retrolateral and dorsal view; 16–18. median apophysis, prolateral, ventral and retrolateral view. Abbreviations: EA, embolic apex; EB, embolic base; ET, embolic tip; LR, lateral ramus; MR, mesal ramus; RTA, retrolateral tibial apophysis; SF, subterminal fold of embolus. Scale bars = 0.1 mm (9, 10–12, 13–15, 16–18).

trate and folded apico-prolateral process terminally; meso-prolateral fold represented by a blunt flange; baso-retrolateral fold wide, triangular, tip blunted. Conductor (C) with large and beak-shaped apex and small extended dorsal process. Embolic base (EB) aligned in transverse direction, anterior membranous area narrowed. Embolus (E) arising at approximately seven o'clock position, terminating at approximately 11 o'clock position, bifurcated, branching at about 1/3 of its length; lateral ramus (LR) short and thin, needle-shaped; mesal ramus (MR) long and stout, with subterminal fold (SF) curved ventrally and prolaterally, its apex (EA) blunt and covered by conductor.

Female (one paratype): Total length 7.38; carapace 3.37 long, 2.18 wide; opisthosoma 4.03 long, 2.14 wide. Eye sizes and interdistances: AME 0.15, ALE 0.11, PME 0.16, PLE 0.15, AME–AME 0.10, AME–ALE 0.14, PME–PME 0.16, PME–PLE 0.27;

MOQ: 0.37 long, 0.47 anterior width, 0.47 posterior width. Leg measurements: I 8.05 (2.27, 2.65, 1.78, 1.34), II 8.12 (2.23, 2.51, 1.85, 1.53), III 7.63 (1.97, 2.09, 2.16, 1.41), IV 9.62 (2.24, 2.88, 2.95, 1.56).

Coloration and pattern as in Figs. 2–3, 5. Carapace oval, pars cephalica slightly narrowed, uniformly reddish-brown, except cephalic region: lighter than other area, without distinct pattern. Chelicerae khaki. Labium red. Endites yellowish-brown, distally yellowish-white and with black tuft. Sternum cordiform, orange-brown and covered with sparse black setae. Coxae and proximal femora yellowish, other leg segments brown. Dorsum of abdomen dark sepia. Dorsal pattern: 1st pair represented by pale round spots, the two spots oblong and conjoined; both 2nd and 3rd pairs represented by narrow and transverse bands, W-shaped; 4th pair absolutely fused, forming folium-like patch. Venter of abdomen yellowish-

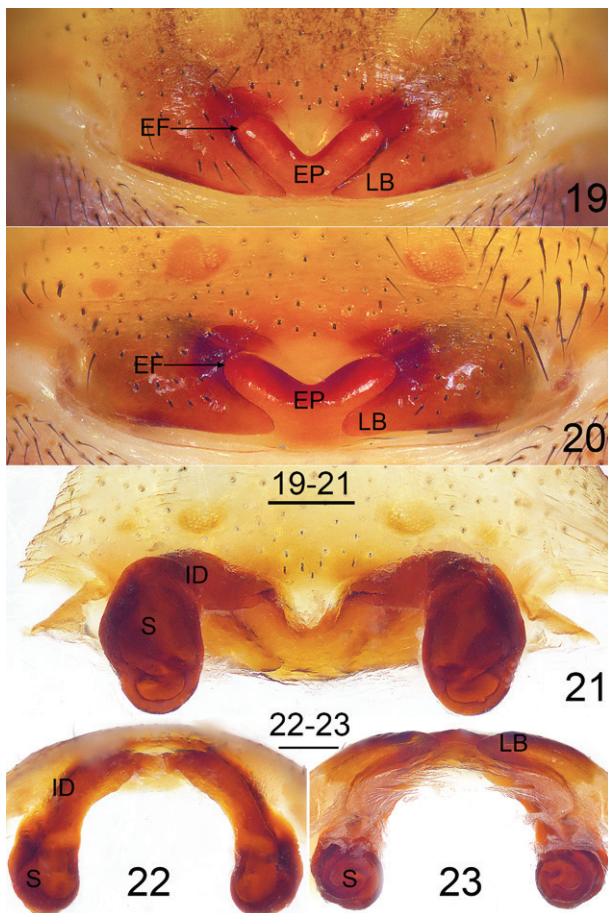


Fig. 19–23. Female epigynes of *Mallinella pseudokunmingensis* sp. n., female paratypes. 19–20. ventral view, showing variations in shape of epigynal plate and lateral border; 21–23. dorsal, anterior and posterior view. Abbreviations: EF, epigynal furrow; EP, epigynal plate; ID, insemination duct; LB, Lateral border; S, spermathecae. Scale bars = 0.2 mm (19–21, 22–23).

brown, medially with three longitudinal purple bands.

Epigyne as in Figs. 19, 21–23, 34, 36–38. Epigynal plate (EP) narrow and V-shaped, flanked with triangular lateral borders. Lateral border (LB) about 1.3 times longer than wide, terminally sharp about 30 degrees. Both lateral borders projecting inwards, separated by 1/2 length. Copulatory openings (CO) indistinct, located on anterolateral margin of epigynal furrow (EF) which situated on inner margin of lateral borders. Insemination ducts (ID) about as long as epigynal plate width, anteriorly thin, posteriorly thick, running transversely and then connecting with spermathecae. Spermathecae (S) reniform, about two times longer than wide, separated by two diameters, provided with subapical depression and posterolateral hump.

Intraspecific variation:

There were almost no differences between the paratype males from the holotype. Meanwhile, some

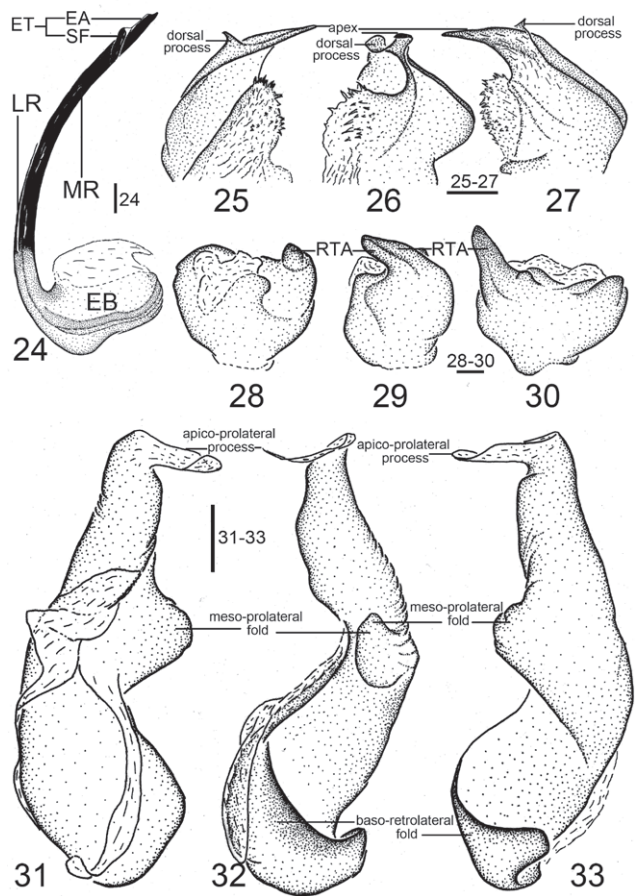


Fig. 24–33. Left palp of *Mallinella pseudokunmingensis* sp. n., male holotype. 24. embolus, ventral view; 25–27. conductor, prolateral, ventral and retrolateral view; 28–30. palpal tibia, ventral retrolateral and dorsal view; 31–33. median apophysis, prolateral, ventral and retrolateral view. Abbreviations: EA, embolic apex; EB, embolic base; ET, embolic tip; LR, lateral ramus; MR, mesal ramus; RTA, retrolateral tibial apophysis; SF, subterminal fold of embolus. Scale bars = 0.1 mm (24, 25–27, 28–30, 31–33).

intraspecific variations were found in females, mostly related to different shape of epigynal plate and lateral borders. Epigynal plate typically V-shaped and lateral borders sharp, with acute angle (about 30 degrees) in some specimens (Figs. 19, 34), while epigynal plate more or less human lip-shaped and lateral borders blunt in other females (Figs. 20, 35).

Distribution:

Known only from the Guizhou Province of China (Fig. 39).

Discussion

Mallinella pseudokunmingensis is temporarily placed in the *annulipes*-group sensu DANKITTIPAKUL et al. (2012: p. 169, Figs. 732–735), because of the striking resemblance of its the extended digitiform lateral

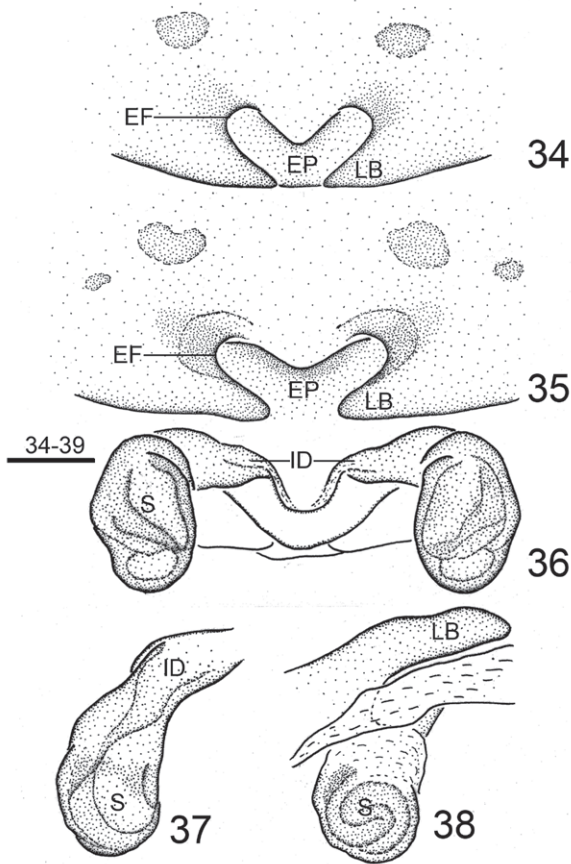


Fig. 34–38. Female epigynes of *Mallinella pseudokunmingensis* sp. n., female paratype. 34–35. ventral view, showing variations in shape of epigynal plate and lateral border; 36–38. dorsal, anterior and posterior view. Abbreviations: EF, epigynal furrow; EP, epigynal plate; ID, insemination duct; LB, Lateral border; S, spermathecae. Scale bars = 0.2 mm (34–38).

border to many members of that group: *M. annulipes*, *M. angustata* Dankittipakul, Jocqué & Singtripop, 2012 and *M. calilungae* (Barrion & Litsinger, 1992) and resemblance of the male palp with flange-like RTA to that of *M. dolichorhyncha* Dankittipakul, Jocqué & Singtripop, 2012, *M. annulipes* and *M. longipoda* Dankittipakul, Jocqué & Singtripop, 2012 (DANKITTIPAKUL et al. 2012: p. 168, Figs. 729–731), which also belongs to this group.

However, the species does not have all the diagnostic characters of this group given by DANKITTIPAKUL et al. (2012), mostly related to different morphology of legs: the anterior femora usually have a round proximal tubercle dorsally in the *annulipes*-group but the tubercle is absent in *M. pseudokunmingensis*. Moreover the female of *M. pseudokunmingensis* also resembles to *M. silva* Dankittipakul, Jocqué & Singtripop, 2012, *M. cymbiforma* Wang, Yin & Peng, 2009 and *M. alticola* Dankittipakul, Jocqué & Singtripop, 2012, regarding the general shape of the epigyne (DANKITTIPAKUL et al. 2012: Figs. 1179, 1181, 1184), which belongs to the *fronto*-group [= *Mallinella sensu lato*, a paraphyletic clade defined by DANKITTIPAKUL et al. (2012) to accommodate 25 species that cannot be assigned to other species-groups] providing an alternative placement.

Overall, we identify more resemblance to the *annulipes*-group than to the *fronto*-group.

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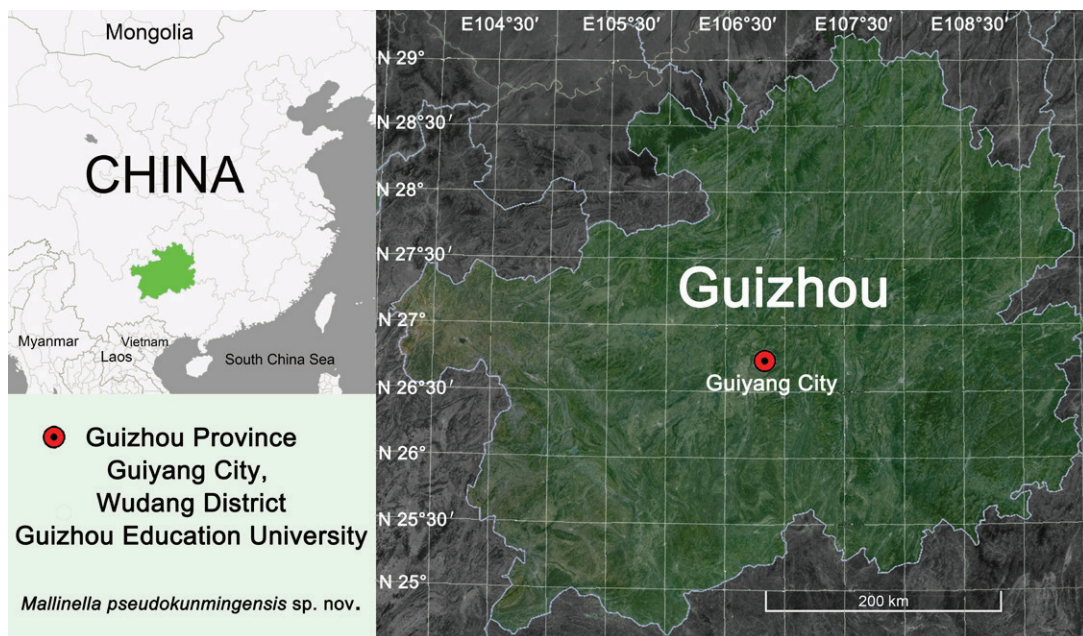


Fig. 39. Distribution record of *Mallinella pseudokunmingensis* sp. n. (circle).

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