

## Research article

[urn:lsid:zoobank.org:pub:01616041-C40E-4076-98EF-1BB1ED0C9706](https://zoobank.org/pub:01616041-C40E-4076-98EF-1BB1ED0C9706)***Serratacosa*, a new genus of Lycosidae (Araneae) from the southern slopes of the Eastern Himalayas**Lu-Yu WANG<sup>1</sup>, Xian-Jin PENG<sup>2</sup> & Zhi-Sheng ZHANG<sup>3,\*</sup><sup>1,3</sup>Key Laboratory of Eco-environments in Three Gorges Reservoir Region (Ministry of Education),  
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**Abstract.** A new wolf spider genus, *Serratacosa* gen. nov., is erected based on the type and new species, *S. medogensis* gen. et sp. nov. and two newly combined species, *S. himalayensis* (Gravely, 1924) (from *Hogna* Simon, 1885) and *S. multidentata* (Qu, Peng & Yin, 2010) (from *Pardosa* C.L. Koch, 1847). All of them are from the southern slopes of the Eastern Himalayas. Descriptions of the new genera and species, and a redescription of *S. multidentata* are provided together with digital images, illustrations and a distribution map.

**Key words.** Wolf spider, new combination, new species, Tibet, taxonomy.

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**Introduction**

The southern slopes of the Eastern Himalayas are one of the most important biodiversity hotspots worldwide (Myers *et al.* 2000), having high species richness and a high number of endemic species, such as the spider genera *Himalmartensus* Wang & Zhu, 2008 (Amaurobiidae Thorell, 1870) and *Himalcoelotes* Wang, 2002 (Agelenidae C.L. Koch, 1837), which are only known from this region.

The wolf spider family Lycosidae Sundevall, 1833 is the sixth most diverse spider group, comprised of 125 genera and 2430 valid species worldwide (World Spider Catalog 2021). Some well-revised genera have distinctive distributional regions, such as *Acantholycosa* Dahl, 1908 (revised by Marusik *et al.*

2004) found in Europe, Asia and North America; *Hippasa* Simon, 1885 (revised by Wang *et al.* 2015) found in Asia and Africa, *Ovia* Sankaran, Malamel & Sebastian, 2017 (revised by Sankaran, Malamel & Sebastian 2017 and Lu *et al.* 2018) found in China, Laos, Singapore and India. But many genera are still non-monophyletic and need to be further revised, such as *Arctosa* C. L. Koch, 1847 and *Pardosa* C. L. Koch, 1847 (Piacentini & Ramirez 2019).

Two lycosid species, *Hogna himalayensis* (Gravely, 1924) and *Pardosa multidontata* Qu, Peng & Yin, 2010, found on the southern slopes of the Eastern Himalayas, share similar characteristics, such as the strong, twisted, distal-end grooved terminal apophysis (sickle-shaped in the type species of *Hogna*, *H. radiata* (Latreille, 1817)) (Logunov 2020: 352, figs 19–23); simple and non-grooved in the type species of *Pardosa*, *P. alacris* (C. L. Koch, 1833) (Almquist 2005: 215, figs 214a–f), and the serrated median apophysis (unserrated in *H. radiata* and *P. alacris*) and inverted T-shaped epigynal septum (same as in *H. radiata* and *P. alacris*).

Here a new genus, *Serratacosa* gen. nov., is erected to accommodate these two species, *S. himalayensis* (Gravely, 1924) comb. nov. and *S. multidontata* (Qu, Peng & Yin, 2010) comb. nov., along with the type species of the new genus, *S. medogensis* gen. et sp. nov. from the same area of China (Medog of Tibet).

## Material and methods

All specimens are preserved in 75% ethanol and were examined, illustrated, photographed and measured using a Leica M205A stereo microscope equipped with a drawing tube, a Leica DFC450 camera and LAS software ver. 4.6. Male pedipalps and epigynes were examined and illustrated after dissection. Female genitalia were cleared in 90% lactic acid. Eye sizes were measured as the maximum dorsal diameter. Leg measurements are shown as total length (femur, patella and tibia, metatarsus, tarsus). All measurements are given in millimeters.

Morphological terminology follows Framenau (2007).

## Institutional abbreviations

SWUC = School of Life Sciences, Southwest University, Chongqing, China

HNU = College of Life Science, Hunan Normal University, Changsha, China

## Abbreviations for morphological terms used in the text and figures

ALE = anterior lateral eye  
AME = anterior median eye  
PLE = posterior lateral eye  
PME = posterior median eye  
CO = copulatory opening  
Co = conductor  
DA = dorsal arm  
Em = embolus  
FD = fertilization duct  
HS = head of spermatheca  
MA = median apophysis  
Se = septum  
SS = stalk of spermatheca  
St = subtegulum  
TA = terminal apophysis  
Te = tegulum

VA = ventral arm

## Results

Class Arachnida Cuvier, 1812  
Order Araneae Clerck, 1757  
Family Lycosidae Sundevall, 1833  
Subfamily Lycosinae Sundevall, 1833

*Serratacosa* gen. nov.

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## Type species

*Serratacosa medogensis* gen. et sp. nov.

## Diagnosis

This new genus shares similar characters with some Lycosinae genera, such as *Costacosa* Framenau & Leung, 2013 (male pedipalps with serrated median apophysis), *Hogna* Simon, 1885 and *Trochosa* C. L. Koch, 1847 (epigynes with inverted T-shaped septum). However, the new genus can be distinguished from all above mentioned genera by: median apophysis ventral surface with a semicircular protruding lobe, strongly sclerotized, dorsal surface with an oval sclerite (with keel-shaped ventral spur in *Costacosa*, whereas in *Hogna* and *Trochosa* oblique, with stout spur near base); terminal apophysis twisted, strongly grooved (sickle-shaped in *Costacosa*, *Hogna* and *Trochosa*); embolus long, sinuous (arc-shaped in *Costacosa*, *Hogna* and *Trochosa*) (Figs 1, 2A–B, 3C–F, 4A–B, 5C–F). Epigynal septum as long as wide (Figs 2C–D, 3G–H, 4C–D, 5G–H) (longer than wide in *Costacosa*, *Hogna* and *Trochosa*) (Almquist 2005; Framenau & Leung 2013; Logunov 2020).

## Etymology

The generic name is derived from the Latin word ‘*serratus*’ (‘锯齿状的’ in Chinese), which means serrated, and the lycosid generic suffix ‘*-cosa*’; referring to the serrated anterior edge of the median apophysis; gender feminine.

## Description

CEPHALOTHORAX. Carapace gray brown, with light brown longitudinal marking on mid-line, eye region black. Fovea longitudinal. Radial furrows distinct. Chelicerae brown, with three promarginal and three retromarginal teeth. Labium and endites yellow brown, longer than wide. Sternum yellow brown and scutellate, with sparse brown setae.

LEGS. Yellow-brown, with black pigmentation. Leg formula: 4123.

OPISTHOSOMA. Oval, yellowish-brown, with lanceolate cardiac mark on anterior half and with black irregular markings on posterior half. Venter of abdomen yellow-brown.

PEDIPALPS (Figs 1A, 2A–B, 3C–F, 4A–B, 5C–F). With slender and hooked embolus. Terminal apophysis twisted, strongly grooved. Median apophysis complex, serrated, with two arms: ventral arm earlobe-shaped and dorsal arm oval, with apical end. Conductor small, membranous.

EPIGYNE (Figs 2C–D, 3G–H, 4C–D, 5G–H). With wide, inverted T-like septum, spermathecal heads nearly spherical, with stalks short and curved. Fertilization ducts hook-like.

### Composition

Three species: *Serratacosa medogensis* gen. et sp. nov., *S. himalayensis* (Gravely, 1924) comb. nov. and *S. multidontata* (Qu, Peng & Yin, 2010) comb. nov.

### Distribution

China (Yunnan, Tibet), India (West Bengal, Assam) and Bhutan.

### Remarks

The types of *Hogna himalayensis* were unavailable for our research, but it is clear from the descriptions and figures of Tikader & Malhotra (1980: 382, figs 255–257) and Buchar (1997: 14, figs 15–17), that the median apophysis is serrated and the epigynal septum inverted T-shaped.

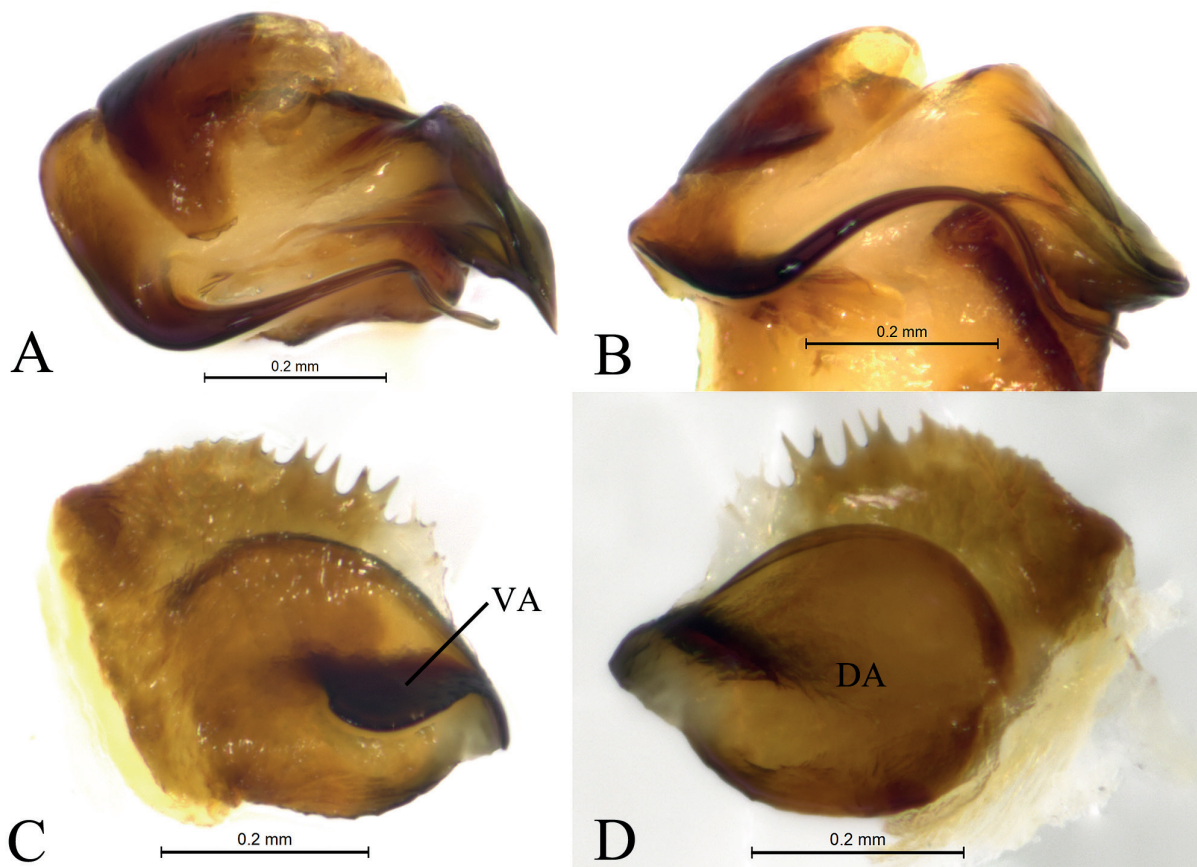
*Serratacosa medogensis* gen. et sp. nov.

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Figs 1–3, 6

### Diagnosis

This new species most closely resembles *S. multidontata* (Qu, Peng & Yin, 2010) (Figs 4–5), but differs from the latter by the following characters. Lateral projection of the median apophysis with a blunt end,



**Fig. 1.** *Serratacosa medogensis* gen. et sp. nov. **A.** Embolus and terminal apophysis, ventral view. **B.** Embolus and terminal apophysis, bottom view. **C.** Median apophysis, ventral view. **D.** Median apophysis, dorsal view.

slightly touching lateral edge of cymbium in the new species (Figs 1C–D, 2A–B, 3C–F), whereas distal end truncate, almost overlapping lateral edge of cymbium in ventral view in *S. multidontata* (Figs 4A–B, 5C–F). Septum wider than long and spermathecal heads spherical with fine spermathecal stalks in the new species (Figs 2C–D, 3G–H), whereas septum longer than wide and spermathecal heads oval with thick spermathecal stalks in *S. multidontata* (Figs 4C–D, 5G–H).

### Etymology

The specific epithet refers to the type locality ‘Medog’ (‘墨脱’ in Chinese); noun in apposition.

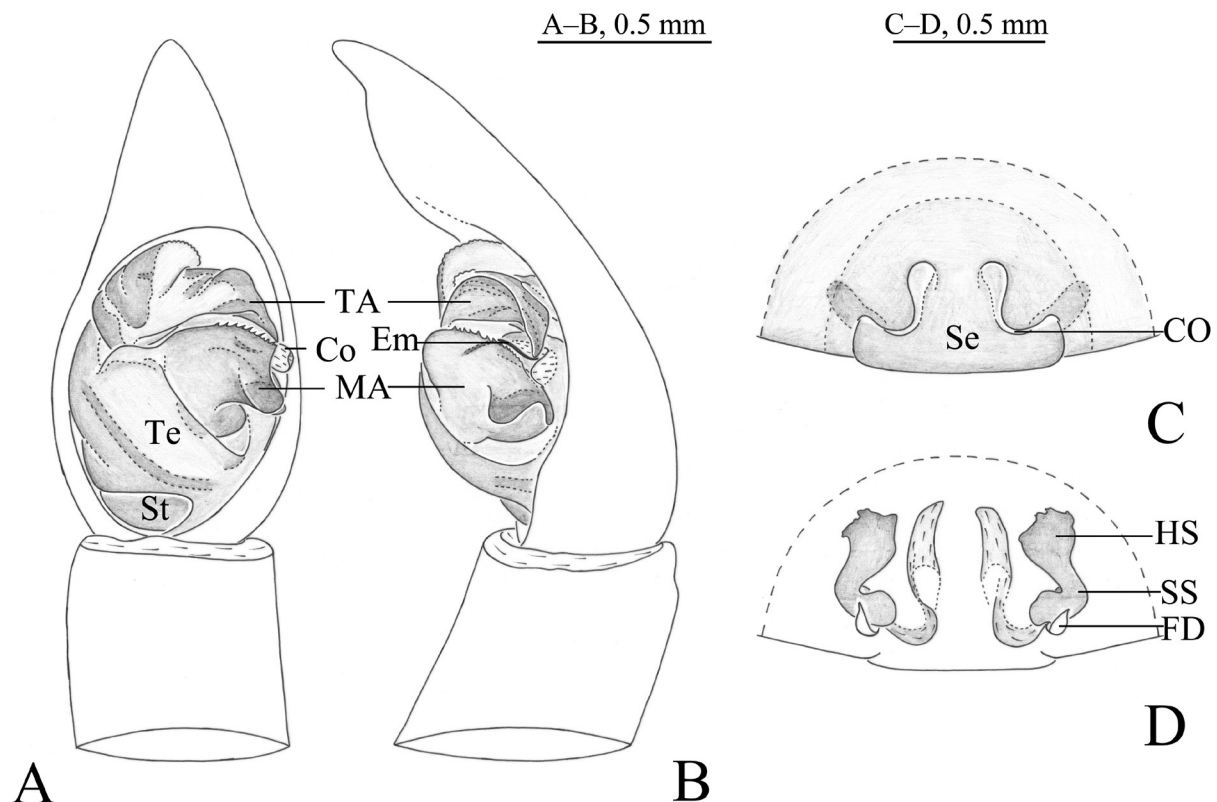
### Type material

#### Holotype

CHINA • ♂; Tibet, Medog County, Beibeng Township; 29°14.376' N, 95°10.675' E; alt. 894 m; 23 May 2019; L.Y. Wang, P. Liu, T. Yuan and H. Wang leg.; SWUC-T-LY-12-01.

#### Paratypes

CHINA • 6 ♂♂, 3 ♀♀; same collection data as for holotype; SWUC-T-LY-12-02 to 12-10 • 4 ♂♂, 3 ♀♀; Medog County; 29°19.470' N, 95°19.618' E; alt. 1116 m; 22 May 2019; L.Y. Wang, P. Liu, T. Yuan and H. Wang leg.; SWUC-T-LY-12-11 to 12-17 • 3 ♂♂, 2 ♀♀; Medog County, Medog Town, Yarang Village; 29°17.758' N, 95°16.827' E; alt. 761 m; 22 May 2019; L.Y. Wang, P. Liu, T. Yuan and H. Wang leg.; SWUC-T-LY-12-18 to 12-22 • 4 ♂♂, 1 ♀; Medog County, Beibeng Township; 29°14.866' N,

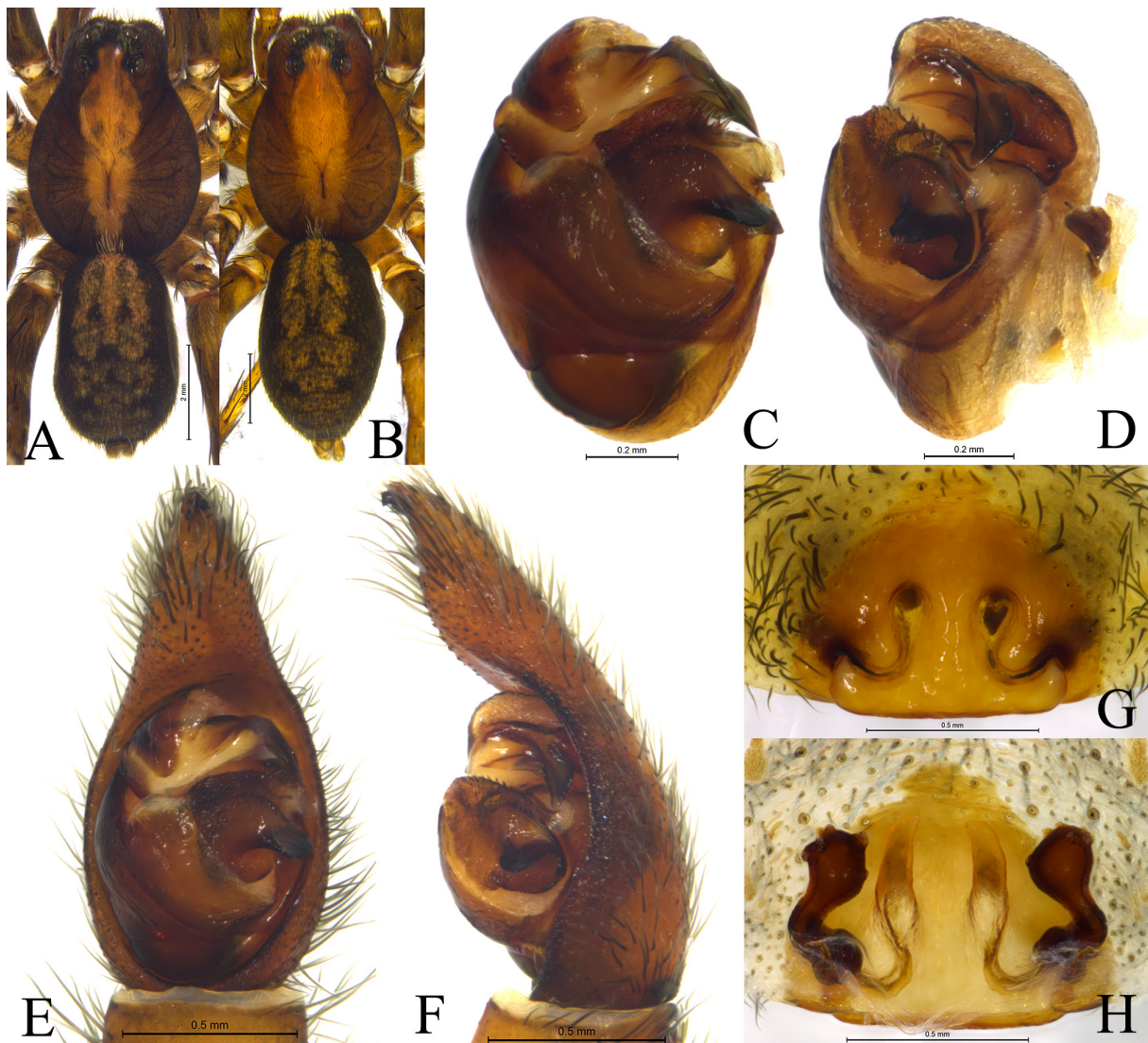


**Fig. 2.** *Serratacosa medogensis* gen. et sp. nov. **A–B.** Holotype, ♂ (SWUC-T-LY-12-01). **C–D.** Paratype, ♀ (SWUC-T-LY-12-08). **A.** Left pedipalp, ventral view. **B.** Left pedipalp, retrolateral view. **C.** Epigyne, ventral view. **D.** Vulva, dorsal view.

95°11.022' E; alt. 924 m; 23 May 2019; L.Y. Wang, P. Liu, T. Yuan and H. Wang leg; SWUC-T-LY-12-23 to 12-27 • 4 ♂♂, 1 ♀; Medog County; 29°19.470' N, 95°19.618' E; alt. 1116 m; 23 May 2019; L.Y. Wang, P. Liu, T. Yuan and H. Wang leg.; SWUC-T-LY-12-28 to 12-32 • 1 ♀; Medog County, Medog Town, Yarang Village; 29°17.758' N, 95°16.827' E; alt. 761 m; 28 Jun. 2018; L.Y. Wang, Z.S. Wu and Y.N. Mu leg.; SWUC-T-LY-12-33 • 4 ♀♀; Medog County, Beibeng Township; 29°14.376' N, 95°10.675' E; alt. 894 m; 28 Jun. 2018 L.Y. Wang, Z.S. Wu and Y.N. Mu leg.; SWUC-T-LY-12-34 to 12-37 • 1 ♀; Medog County; 29°19.470' N, 95°19.618' E; alt. 1116 m; 28 Jun. 2018; L.Y. Wang, Z.S. Wu and Y.N. Mu leg.; SWUC-T-LY-12-38.

## Description

Male (holotype, Fig. 3A)



**Fig. 3.** *Serratacosa medogensis* gen. et sp. nov. **A, E–F.** Holotype, ♂ (SWUC-T-LY-12-01). **B.** Paratype, ♀ (SWUC-T-LY-12-08). **C–D.** Paratype, ♂ (SWUC-T-LY-12-02). **G–H.** Paratype, ♀ (SWUC-T-LY-12-08). **A.** Male habitus, dorsal view. **B.** Female habitus, dorsal view. **C.** Left pedipalp, bulbus, ventral view. **D.** Left pedipalp, bulbus, retrolateral view. **E.** Left pedipalp, ventral view. **F.** Left pedipalp, retrolateral view. **G.** Epigyne, ventral view. **H.** Vulva, dorsal view.

MEASUREMENTS. Total length 9.03. Carapace 5.13 long, 3.69 wide; opisthosoma 4.09 long, 2.68 wide. Eye sizes and interdistances: AME = 0.21, ALE = 0.17, PME = 0.49, PLE = 0.39; AME–AME = 0.11, AME–ALE = 0.09, PME–PME = 0.32, PME–PLE = 0.35. Clypeus height 0.16.

LEG MEASUREMENTS. I = 13.35 (3.81, 4.33, 3.01, 2.20); II = 12.75 (3.55, 4.33, 2.95, 1.92); III = 11.82 (3.33, 3.65, 3.11, 1.73); IV = 16.98 (4.50, 4.84, 5.26, 2.38).

MALE PEDIPALP (Figs 1, 2A–B, 3C–F). Subtegulum distinct in ventral view, located baso-prolaterally. Embolus slender and slightly sinuous. Conductor small and membranous. Median apophysis serrated, ventral surface with semicircular protruding lobe, strongly sclerotized, dorsal surface with oval sclerite. Terminal apophysis strong twisted, distal end grooved.

#### Female (SWUC-T-LY-12-02, Fig. 3B)

MEASUREMENTS. Total length 12.36. Carapace 6.65 long, 4.49 wide; opisthosoma 6.06 long, 3.69 wide. Eye sizes and interdistances: AME = 0.28, ALE = 0.21, PME = 0.58, PLE = 0.48; AME–AME = 0.19, AME–ALE = 0.10, PME–PME = 0.43, PME–PLE = 0.44. Clypeus height 0.28.

LEG MEASUREMENTS. I = 14.82 (4.34, 4.88, 3.20, 2.40); II = 14.17 (4.06, 4.79, 3.14, 2.18); III = 13.57 (3.84, 4.22, 3.43, 2.08); IV = 19.17 (4.98, 6.01, 5.59, 2.59).

EPIGYNE (Figs 2C–D, 3G–H). Epigyne with inverted T-shaped septum, median part wider than long. Copulatory openings located on shoulders of septum. Spermathecal heads large and spherical, with several small buds. Spermathecal stalks short, curved. Fertilization ducts hook-like.

#### Distribution

China (Tibet, Medog County) (Fig. 6).

*Serratacosa multidontata* (Qu, Peng & Yin, 2010) comb. nov.

<http://zoobank.org/f5b258d3-c866-4d01-9324-1fb7bec017e4>

Figs 4–6

*Pardosa multidontata* Qu, Peng & Yin, 2010: 392, figs 5a–b, 11a–e (♂♀).

#### Diagnosis

This species resembles *S. medogensis* gen. et sp. nov. (Figs 1–3), but differs by having the distal end of the lateral projection of the median apophysis truncate, almost overlapping the lateral edge of the cymbium in this species (Figs 4A–B, 5C–F), whereas this end is blunt, slightly touching the lateral edge of the cymbium in ventral view in *S. medogensis* gen. et sp. nov. (Figs 1C–D, 2A–B, 3C–F). The septum longer than wide and the spermathecal heads are oval with thick spermathecal stalks in this species (Figs 4C–D, 5G–H), whereas the septum is wider than long and the spermathecal heads are spherical with fine spermathecal stalks in *S. medogensis* gen. et sp. nov. (Figs 2C–D, 3G–H)

#### Material examined

##### Holotype

China • ♂; Yunnan Province, Gongshan County, Dulongjiang Township, Qing Lang Dang; 27°41.418' N, 98°16.740' E; alt. 1309 m; 31 Aug. 2006; P. Hu leg.; HNU.

##### Paratypes

China • 1 ♂, 4 ♀♀; same collection data as for holotype; HNU.

## Description

### Male (holotype, Fig. 5A)

MEASUREMENTS. Total length 10.04. Carapace 5.25 long, 4.01 wide; opisthosoma 4.83 long, 3.16 wide. Eye sizes and interdistances: AME = 0.26, ALE = 0.18, PME = 0.56, PLE = 0.46; AME–AME = 0.13, AME–ALE = 0.11, PME–PME = 0.34, PME–PLE = 0.44. Clypeus height 0.14.

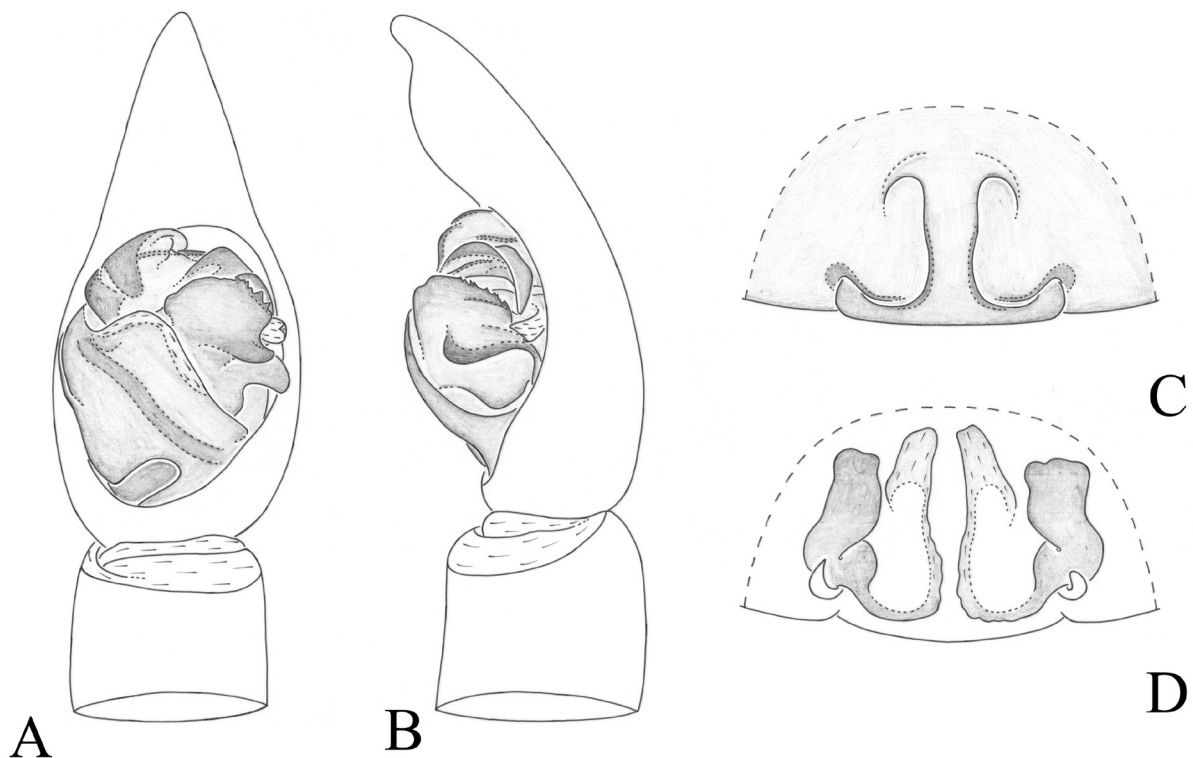
LEG MEASUREMENTS. I = 13.64 (3.63, 4.83, 3.02, 2.16); II = 12.71 (3.57, 4.10, 2.93, 2.11); III = 12.06 (3.25, 3.86, 3.16, 1.79); IV = 16.89 (4.34, 5.15, 5.12, 2.28).

MALE PEDIPALP (Figs 4A–B, 5C–F). Subtegulum distinct in ventral view, located baso-prolaterally. Embolus slender and slightly sinuous. Conductor small and membranous. Median apophysis serrated, ventral surface with semicircular protruding lobe, strongly sclerotized, dorsal surface with oval sclerite. Terminal apophysis strong, twisted, distal end grooved.

### Female (Fig. 5B)

MEASUREMENTS. Total length 13.14. Carapace 6.60 long, 4.95 wide; opisthosoma 6.92 long, 5.11 wide. Eye sizes and interdistances: AME = 0.33, ALE = 0.23, PME = 0.64, PLE = 0.57; AME–AME = 0.18, AME–ALE = 0.15, PME–PME = 0.44, PME–PLE = 0.53. Clypeus height 0.31.

LEG MEASUREMENTS. I = 15.53 (4.54, 5.56, 3.08, 2.35); II = 13.61 (4.21, 4.16, 3.14, 2.10); III = 13.53 (3.80, 4.44, 3.28, 2.01); IV = 20.23 (5.12, 6.49, 5.58, 3.04).



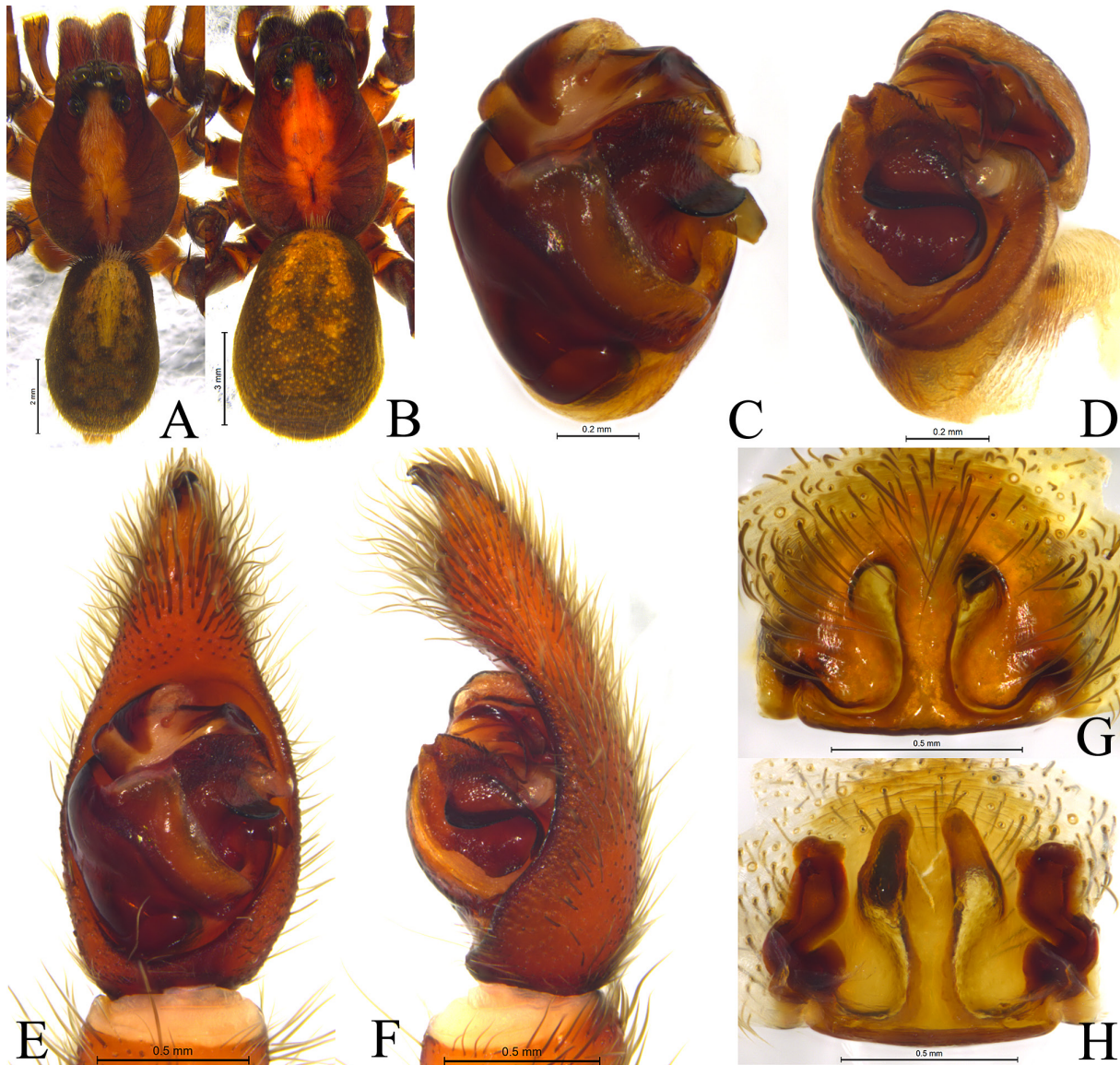
**Fig. 4.** *Serratacosa multidontata* (Qu, Peng & Yin, 2010) comb. nov. **A–B.** Paratype, ♂ (HNU). **C–D.** Paratype, ♀ (HNU). **A.** Left pedipalp, ventral view. **B.** Left pedipalp, retrolateral view. **C.** Epigyne, ventral view. **D.** Vulva, dorsal view.



EPIGYNE (Figs 4C–D, 5G–H). Epigyne with inverted T-shaped septum, median part wider than long. Copulatory openings located on shoulders of septum. Spermathecal heads oval. Spermathecal stalks thick, short and curved. Fertilization ducts hook-like.

**Distribution**

China (Yunnan) (Fig. 6).



**Fig. 5.** *Serratacosa multidontata* (Qu, Peng & Yin, 2010) comb. nov. **A.** Holotype, ♂ (HNU). **B.** Paratype, ♀ (HNU). **C–F.** Paratype, ♂ (HNU). **G–H.** Paratype, ♀ (HNU). **A.** Male habitus, dorsal view. **B.** Female habitus, dorsal view. **C.** Left pedipalp, bulbus, ventral view. **D.** Left pedipalp, retrolateral view. **E.** Left pedipalp, ventral view. **F.** Left pedipalp, retrolateral view. **G.** Epigyne, ventral view. **H.** Vulva, dorsal view.

## Discussion

Based on the following characteristics, *Serratacosa* gen. nov. can be identified as a member of the subfamily Lycosinae: median apophysis transverse, with ventrally directed spur and dorsal surface with a sinuous channel; epigyne with an inverted ‘T-shaped’ median septum (Dondale 1986; Piacentini & Grismado 2009).

Wolf spiders mainly live in open habitats (Jocqué & Alderweireldt 2005). *Serratacosa* gen. nov. is distributed from the southern slopes of the Eastern Himalayas to the very dense forests on the southern slopes. Both *S. medogensis* gen. et sp. nov. and *S. multidontata* (Qu, Peng & Yin, 2010) comb. nov. were found in dense forests. All three species addressed in this study have been recorded from the southern slopes of the Eastern Himalayas, which might indicate that the species differentiation of the members of the genus *Serratacosa* gen. nov. is closely related to the uplift of the Qinghai-Tibet Plateau. It can be proposed that there are still many undescribed species on the southern slopes of the Eastern Himalayas awaiting discovery and description.

## Acknowledgments

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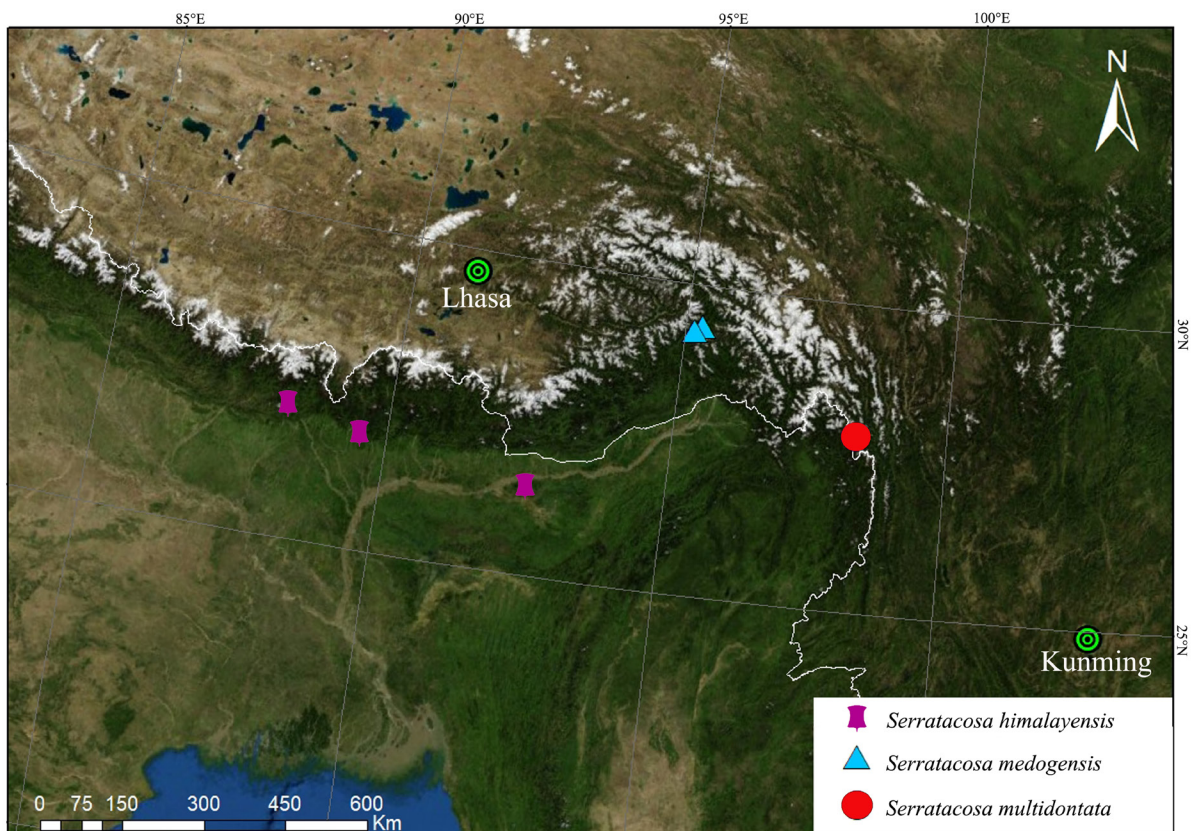


Fig. 6. Distribution of *Serratacosa* gen. nov.

(SWU120051), the National Natural Science Foundation of China (31672278, 31702005), the Key Natural Science Foundation of Chongqing (cstc2019jcyj-zdxmX0006) and the Investigation Project of Basic Science and Technology (2018FY100305) to Zhi-Sheng Zhang and Lu-Yu Wang.

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