

New data on wolf spiders (Araneae: Lycosidae) from Laos

Mikhail M. Omelko

Abstract. A new species, *Pardosa zhishengi*, new species, from the *P. nebulosa* species-group, is described from Laos on the basis of both sexes; it is related to *P. parathompsoni* Wang & Zhang, 2014, which is known from China and India. The female of *Arctosa delaportei* Omelko & Marusik, 2022 is described for the first time. The poorly known species *Wadicosa daliensis* Yin, Peng & Zhang, 1997 is redescribed. A new combination is established: *Wadicosa bleyi* (Dahl, 1908), new combination, ex *Pardosa*. *Trochosa bannaensis* Yin & Chen, 1995 and *T. ruricoloides* Schenkel, 1963 are reported from Laos for the first time and illustrated; the records of *W. daliensis* and *T. ruricoloides* are the southernmost within their known ranges.

Key words. new records, new species, new combination, redescription, Southeast Asia

INTRODUCTION

Lycosidae, commonly known as the wolf spiders, is the sixth largest spider family with 2,478 species in 133 genera distributed worldwide (WSC, 2024). On a global basis, the studies of this family have been uneven, with most taxonomic studies of Lycosidae focused on Holarctic species. Species from the Neotropical, Afrotropical, and Indomalayan realms remain poorly studied.

This is true not only for taxonomy but also for faunistic data: 17 species of wolf spiders are known in Bangladesh, 14 in Malaysia, ten species in Laos, nine in Thailand, one in Vietnam, and none reported from Cambodia (WSC, 2024). For a long time, the fauna of wolf spiders in Laos remained largely unstudied, and only one species, *Hippasa lycosina* Pocock, 1900, was known for the entire country. Recently, Omelko & Marusik (2020) expanded this list by adding 6 more species: *Passiena bayi* Omelko & Marusik, 2020, *Hippasa holmerae* Thorell, 1895, *Ovia macritchie* Lu, Koh, Zhang & Li, 2018, *Pardosa pseudoannulata* (Bösenberg & Strand, 1906), and *P. pusiola* (Thorell, 1891). Later, these same authors (Omelko & Marusik, 2022) revised Laotian *Arctosa* C. L. Koch, 1847 adding 4 more species: *A. delaportei* Omelko & Marusik, 2022, *A. depectinata* (Bösenberg & Strand, 1906), *A. kiangsiensis* (Schenkel, 1963) and *A. springiosa* Yin, Wang, Xie & Peng, 1993.

This work continues the exploration of the biodiversity of wolf spiders in Laos and presents some results from the study of the spiders collected by A.A. Komisarenko and me in the years 2013, 2016, and 2017. The goals of this paper are: 1) to describe *Pardosa zhishengi*, new species; 2) to describe the previously unknown female of *Arctosa delaportei*; 3) to redescribe *Wadicosa daliensis* Yin, Peng & Zhang, 1997, a poorly known species; 4) to report the remaining species as newly recorded from Laos.

MATERIAL AND METHODS

Specimens were photographed using a Nikon DSRi2 camera attached to a Nikon SMZ25 stereomicroscope at the Far Eastern Federal University (Vladivostok, Russia). Most photographs were taken in dishes filled with alcohol, with soft white paper or cotton at the bottom. Photos of embolic divisions were taken in small dishes filled with silicon-based lubricant to prevent unwanted motions during the shooting process. Digital images were montaged using Zerene Stacker (<https://zerenesystems.com/cms/stacker>) software package. Epigynes were cleared in ca. 30% KOH solution. The distribution map was produced using SimpleMapp (Shorthouse, 2010). All measurements are in millimetres. Lengths of leg segments were measured on the prolateral side. All examined material is deposited in the Far Eastern Federal University (FEFU; curator M.M. Omelko) and in the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU; curator K.G. Mikhailov). Abbreviations used in the text and the format of description follow Omelko & Marusik (2022) and Wang & Zhang (2014) with some modifications.

Eyes: ALE – anterior lateral eye, AME – anterior median eye, MOA – median ocular area, PLE – posterior lateral eye, PME – posterior median eye.

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Leg segments: Fe – femur, Mt – metatarsus, Pa – patella, Ti – tibia.

Spinination: d – dorsal, p – prolateral, r – retrolateral, v – ventral.

Copulatory organs: AE – extension of tegular apophysis, AP – anterior retrolateral process of tegulum, CC – cuticular cover of bulb, CD – copulatory duct, Co – conductor, Ed – retrolateral edge of tegulum, Em – embolus, FD – fertilisation duct, Fo – Fovea, Fv – foveolae (pockets), Gl – gland, Ho – hood, LB – lower branch of tegular apophysis, Pa – palea, Pe – paleal peack, PP – posterior retrolateral process of tegulum, Re – receptacle, SB – septal base, SD – sperm duct, Se – septum, SS – septal stem, St – subtegulum, SW – septal “wings”, TA – tegular apophysis, Te – tegulum, Tr – terminal apophysis, TW – tegular wrinkles, UB – upper branch of tegular apophysis.

TAXONOMY

Arctosa C. L. Koch, 1847

Type species. *Aranea cinerea* Fabricius, 1777, from France.

Comments. *Arctosa* C.L. Koch, 1847, with 168 species and two subspecies (WSC, 2024), is one of the largest genera of Lycosidae. It is a poorly defined and undoubtedly polyphyletic genus (Wang et al., 2012). *Arctosa* has an almost worldwide distribution, although it does not occur in Australia. The genus is relatively well studied in Europe (Lugetti & Tongiorgi, 1965; Almquist, 2005), the Nearctic (Dondale & Redner, 1983; Paquin & Dupérré, 2003), Japan (Tanaka, 2009) and Korea (Namkung, 2003).

Almost one-fifth (32) of all named *Arctosa* species occur in China (WSC, 2024). Chinese species have not been revised, and data regarding their taxonomy and distribution is scattered throughout numerous different papers (Song et al., 1999; Yin et al., 2012; Wang et al., 2012, 2021; Zhang et al., 2022, etc.).

The diversity of *Arctosa* in Southeast Asia was poorly studied until recently. Currently, five species of this genus are known from this region: *Arctosa tanakai* Barrion & Litsinger, 1995 (Philippines), *A. delaportei*, *A. depectinata*, *A. kiangsiensis*, and *A. springiosa* (Laos) (Barrion & Litsinger, 1995, Omelko & Marusik, 2022).

Arctosa delaportei Omelko & Marusik, 2022

(Figs. 1–5, 52–53)

Arctosa delaportei Omelko & Marusik, 2022: 398, f. 1, 7–8, 15–17, 26, male.

Material examined. 1 female (ZMMU), LAOS, Vientiane Prov., env. of Nam-Lik Eco-Village, 18°36'53.18"N 102°24'31.87"E, pitfall traps at forest's edge near paddy field, coll. M.M. Omelko, 22–26 May 2016.

Diagnosis. By the trapezoidal septum with short, wide stem and general conformation of epigyne, female of *Arctosa delaportei* is related to that of *A. gougu* Chen & Song, 1999, *A. springiosa*, and *A. ziyunensis* Yin, Peng & Bao, 1997. Besides the similarity in its epigyne's structure, the new species is close to *A. springiosa* in having very similar dark body colouration in dorsal view (cf. Fig. 1 and fig. 13B in Wang et al. (2021)). All these species are known from China (*A. springiosa* from China and Laos). Females of *A. delaportei* may be distinguished from *A. gougu* and *A. ziyunensis* by the presence of large round glands (Gl) on its copulatory ducts (vs. absent; cf. Figs. 3–4 and fig. 1A in Pan et al. (2016), fig. 406d in Yin et al. (2012)). It can be easily differentiated from *A. springiosa* by the strongly curved copulatory ducts (CD); (vs. straight; cf. Fig. 5 and fig. 13H in Wang et al. (2021)).

Description. Female (Figs. 1–2). Total length 5.47. Carapace 2.51 long, 1.58 wide. Opisthosoma 2.81 long, 1.65 wide. Colouration. Carapace dark brown, lacking distinct pattern, slightly lighter in central part. Lateral bands absent. Fovea almost invisible. Clypeus brown, chelicerae brown. Chelicera with 3 pro- and 3 retromarginal teeth. Labium and endites brown with yellowish outer edge. Sternum dark brown.

Eye sizes and interdistances: AME 0.09, ALE 0.08, PME 0.21, PLE 0.15; AME–AME 0.06, AME–ALE 0.02, PME–PME 0.10, PME–PLE 0.12, AME–PME 0.05, ALE–PME 0.05; clypeus height 0.08.

Palpal femur dark brown; rest of segments brown. For palp and legs measurements see Table 1. Coxae I–IV yellow; femora I dark brown with yellow distal part, II–IV dark brown with yellow proximal part; patellae I–IV dark brown; tibiae I–IV dark brown with yellow ring in middle; metatarsi I–III dark brown with poorly visible annulation, IV dark brown with clearly visible annulation; tarsi I–IV light brown. For spinination of legs I–II see Table 2.

Abdomen dorsally dark grey, with poorly visible cardiac mark and irregular spots of short white setae. Lateral sides of the opisthosoma greyish. Ventral part dark brown. Spinnerets yellow.

Epigyne as shown in Figs. 3–5. Septum (Se) more or less trapezoidal in shape, covered with short, thick setae, septal stem (SS) short and wide. Hoods (Ho) large. Receptacles (Re) large, drop shaped, spaced by a distance 2 times their width. Copulatory ducts (CD) comparatively short, curved with pair of large round glands (Gl) clearly visible even on non-macerated epigyne.

Notes. *Arctosa delaportei* was described on the basis of two males only, the female was reported as unknown (Omelko & Marusik, 2022). While further studying spiders collected in Laos, I unexpectedly found a single female of this species which was lost among other wolf spiders during initial sorting. Correctness of male/female matching is confirmed by: 1) the fact that the female was collected in the same locality and habitat as the males 2) both sexes were collected during the



Figs. 1–5. Habitus (1–2) and epigyne (3–5) of *Arctosa delaporteii*, female. 1, 5 – dorsal; 2, 3, 4 – ventral. Scale: 1 mm (1–2), 0.2 mm (3–5). Abbreviations: CD – copulatory duct, FD – fertilisation duct, Gl – gland, Ho – hood, Re – receptacle, Se – septum, SS – septal stem.

same period of the year (summer) and 3) the female has the exact same colouration as the male.

Distribution. Type locality in Laos only (Figs. 52–53).

Pardosa C. L. Koch, 1847

Type species. *Lycosa alacris* C. L. Koch, 1833, from Europe.

Comments. *Pardosa* is the largest genus of wolf spiders (Lycosidae), comprising 528 species (WSC, 2024). The genus has a worldwide distribution. *Pardosa* is undoubtedly a polyphyletic genus (Marusik & Ballarin, 2011; Wang & Zhang, 2014). Based on the study of Palearctic species, the genus was divided by Zyuzin (1979) into 22 species groups. The *Pardosa nebulosa*-group is one of the largest, yet poorly studied, species groups. Spiders of this group predominantly inhabit the southern Palearctic, Afrotropical, and Indomalayan regions. The group’s size is estimated differently by various authors. Initially, this group included only five species (Zyuzin, 1979). Later, this number was expanded to 23–26 species (Esyunin et al., 2007). Finally, Marusik & Ballarin (2011) reported the highest number of species for this group – “at least 66 species”. However, these authors did not provide a list of species they included in the group. In my calculations, this group can confidently include the following 37 species. From Africa: *Pardosa alticola* Alderweireldt & Jocqué, 1992, *P. evanescens*

Table 1. Length of palp and leg segments for the female of *Arctosa delaporteii*

	Fe	Pa	Ti	Mt	Ta	Total
Palp	0.82	0.41	0.43	–	0.55	2.21
I	1.56	0.77	1.20	1.17	0.75	5.45
II	1.36	0.66	1.00	1.10	0.70	4.82
III	1.28	0.70	0.77	1.26	0.70	4.71
IV	1.82	0.75	1.47	2.13	0.96	7.13

Table 2. Leg spination for the female of *Arctosa delaporteii*

	Fe	Pa	Ti	Mt
I	2d 1p	1p	1p 1-2v	2-2v
II	2d 1p	1p	1p 1v	2-2v

Alderweireldt & Jocqué, 2008, *P. gefsana* Roewer, 1959, *P. injucunda* (O. Pickard-Cambridge, 1876), *P. kavango* Alderweireldt & Jocqué, 1992, *P. lusingana* Roewer, 1959, *P. messingerae* (Strand, 1916), *P. naevia* (L. Koch, 1875), *P. nostrorum* Alderweireldt & Jocqué, 1992, and *P. thompsoni*

Alderweireldt & Jocqué, 1992. From Asia: *Pardosa apostoli* Barrion & Litsinger, 1995, *P. burasantiensis* Tikader & Malhotra, 1976 (here referring to spiders known by this name from China; Indian *P. burasantiensis* were transferred to *Draposa* (Dhali et al., 2012)), *P. caliraya* Barrion & Litsinger, 1995, *P. chambaensis* Tikader & Malhotra, 1976, *P. chapini* (Fox, 1935), *P. dabiensis* Chai & Yang, 1998 in Yang & Chai, 1998, *P. flata* Qu, Peng & Yin, 2010, *P. flavisterna* Caporiacco, 1935, *P. irriensis* Barrion & Litsinger, 1995, *P. jambaruensis* Tanaka, 1990, *P. latibasa* Qu, Peng & Yin, 2010, *P. mionebulosa* Yin, Peng, Xie, Bao & Wang, 1997, *P. nebulosa* (Thorell, 1872), *P. oriens* (Chamberlin, 1924), *P. parathompsoni* Wang & Zhang, 2014, *P. patapatensis* Barrion & Litsinger, 1995, *P. pseudochapini* Peng, 2011, *P. pusiola* (Thorell, 1891), *P. rhenockensis* (Tikader, 1970), *P. shyamae* (Tikader, 1970), *P. songosa* Tikader & Malhotra, 1976, *P. sumatrana* (Thorell, 1890), *P. takahashii* (Saito, 1936), *P. tschekiangiensis* Schenkel, 1963, *P. tuberosa* Wang & Zhang, 2014, *P. warayensis* Barrion & Litsinger, 1995, and *P. zhui* Yu & Song, 1988. In addition to the listed species, one species from the *nebulosa*-group was described from Taiwan but not formally named (Tso & Chen, 2004). Thus, species of the *nebulosa*-group are distributed mainly in the tropics and subtropics, while *Pardosa nebulosa* itself is known from the Palaearctic, from Western Europe to China.

Initially, Zyuzin (1979) included in this group species which have females that possess an anchor-shaped septum, and males with a horizontal, semi-transparent tegular apophysis. Later, Marusik & Ballarin (2011) expanded the original diagnosis by adding the following characteristics: 1) the inner side of the tegular apophysis has a furrow, 2) apical arm of the tegular apophysis absent, 3) the subtegulum large, shifted to the prolateral side, 4) posterior part of the palea with a lamina (peak), 5) embolus starting behind the bulb, 6) cymbium with two claws.

The *Pardosa nebulosa*-group has never been globally revised. Some species in the group are known only from the original descriptions, and most species have never been thoroughly redescribed. For most species, the structure of the embolic division of the bulbs and the shape of the terminal apophysis are not illustrated.

***Pardosa zhishengi*, new species.**

(Figs. 6–21, 52–53)

Material examined. Holotype: Male (ZMMU), LAOS, Champasak Prov., env. of Tad E-Tu resort, 15°11'37.40"N 106° 5'57.28"E, coll. M.M. Omelko, 1–6 November 2013. Paratypes: 2 males, 1 female (ZMMU), same place, dates and collector.

Etymology. The specific name is a patronym in honour of my colleague Zhi-Sheng Zhang (Chongqing, China), a prominent taxonomist for his contribution to the study of Asian spiders.

Diagnosis. By general appearance and structure of its copulatory organs (shape of cymbium, palea, tegular

apophysis, and septum) both sexes of *Pardosa zhishengi*, new species, are similar to *P. parathompsoni* known from south China and India. Males of new species may be distinguished by the following features: 1) sperm duct (SD) is bent at an angle of almost 90° in ventral view (vs. almost straight, cf. Figs. 10, 13 and figs. 2D, F in Wang & Zhang (2014)), 2) tegular apophysis (TA) pointing prolaterally (vs. anterio-prolaterally, Figs. 10, 13 and fig. 2D, F in Wang & Zhang (2014)), 3) terminal apophysis (Tr) long (vs. short, cf. Figs. 14, 17, 18 and figs. 1C, 2 G–H in Wang & Zhang (2014)). Females of new species may be distinguished by: 1) base of septum (SB) with semi-transparent “wings” (SW) on its anterior edge (vs. lacking such structures, cf. Figs. 19–20 and figs. 1D, 2I in Wang & Zhang (2014)), 2) receptacles (Re) with a strong constriction in the middle part (vs. of almost uniform width, cf. Fig. 21 and figs. 1E, 2J in Wang & Zhang (2014)).

Description. Male (holotype) (Figs. 6–7). Total length 6.12. Carapace 3.21 long, 2.38 wide. Opisthosoma 2.89 long, 1.65 wide. Colouration. Carapace black with yellow median band widened near eye field. Widened part of median band with couple of black spots. Eye field black. Lateral bands yellow, distinct. Fovea thin, black. Clypeus and chelicerae black. Labium and endites black with yellow edges. Sternum black with yellow longitudinal stripe and three pairs of yellow spots near its edges.

Eye sizes and interdistances: AME 0.14, ALE 0.12, PME 0.31, PLE 0.26; AME–AME 0.08, AME–ALE 0.04, PME–PME 0.27, PME–PLE 0.33, AME–PME 0.12, ALE–PME 0.16; clypeus height 0.16.

Palpal femur black; patella dark brown; tibia and cymbium black. For palp and leg measurements, see Table 3. Coxae I light brown ventrally and black laterally, II–IV light brown; femora I dorsally brown, laterally and ventrally black with yellow proximal and distal parts, femora I dorsally and ventrally brown, laterally black with yellow proximal and distal parts; III–IV brown with irregular black spots; patellae I–IV light brown; tibiae and metatarsi I–IV yellowish, without annulation; tarsi I–IV yellowish. For leg spination, see Table 4.

Dorsal part of the opisthosoma black, with black cardiac mark bordered with yellow stripes and series of yellow spots posteriorly. Lateral sides of the opisthosoma black with lots of white spots. Ventral part light brown with grey longitudinal stripe. Spinnerets brown.

Palp as shown in Figs. 10–18. Cymbium ca. 1.92 times longer than bulb. Tegulum (Te) with several wrinkles (TW) on its retrolateral side. Subtegulum (St) oval, located prolaterally. Tegular apophysis (TA) large, widened proximally with pointed tip curved ventrally. Terminal apophysis (Tr) long, crescent-like, sharply pointed. Conductor (Co) thin, semi-transparent. Palea (Pa) large, chitinised prolaterally with semi-transparent peak (Pe). Embolus (Em) long, thin, wavy near its tip.



Figs. 6–9. Habitus of *Pardosa zhishengi*, new species. 6 – male, dorsal; 7 – ditto, ventral; 8 – female, dorsal; 9 – ditto, ventral. Scale: 2 mm.

Table 3. Length of palp and leg segments for the male of *Pardosa zhishengi*, new species.

	Fe	Pa	Ti	Mt	Ta	Total
Palp	1.35	0.66	0.88	–	1.09	3.98
I	2.42	1.06	2.18	2.07	1.46	9.19
II	2.33	1.03	1.99	1.94	1.31	8.6
III	2.28	0.94	1.91	2.15	1.19	8.47
IV	2.92	1.03	2.57	3.49	1.67	11.68

Female (one of the paratypes) (Figs. 8–9). Total length 6.78. Carapace 3.39 long, 2.44 wide. Opisthosoma 3.61 long, 2.09 wide. Colouration. Carapace dorsally like in male but much lighter. Clypeus yellow, chelicerae light brown. Labium grey with light brown outer edge. Endites light brown. Sternum light brown without pattern.

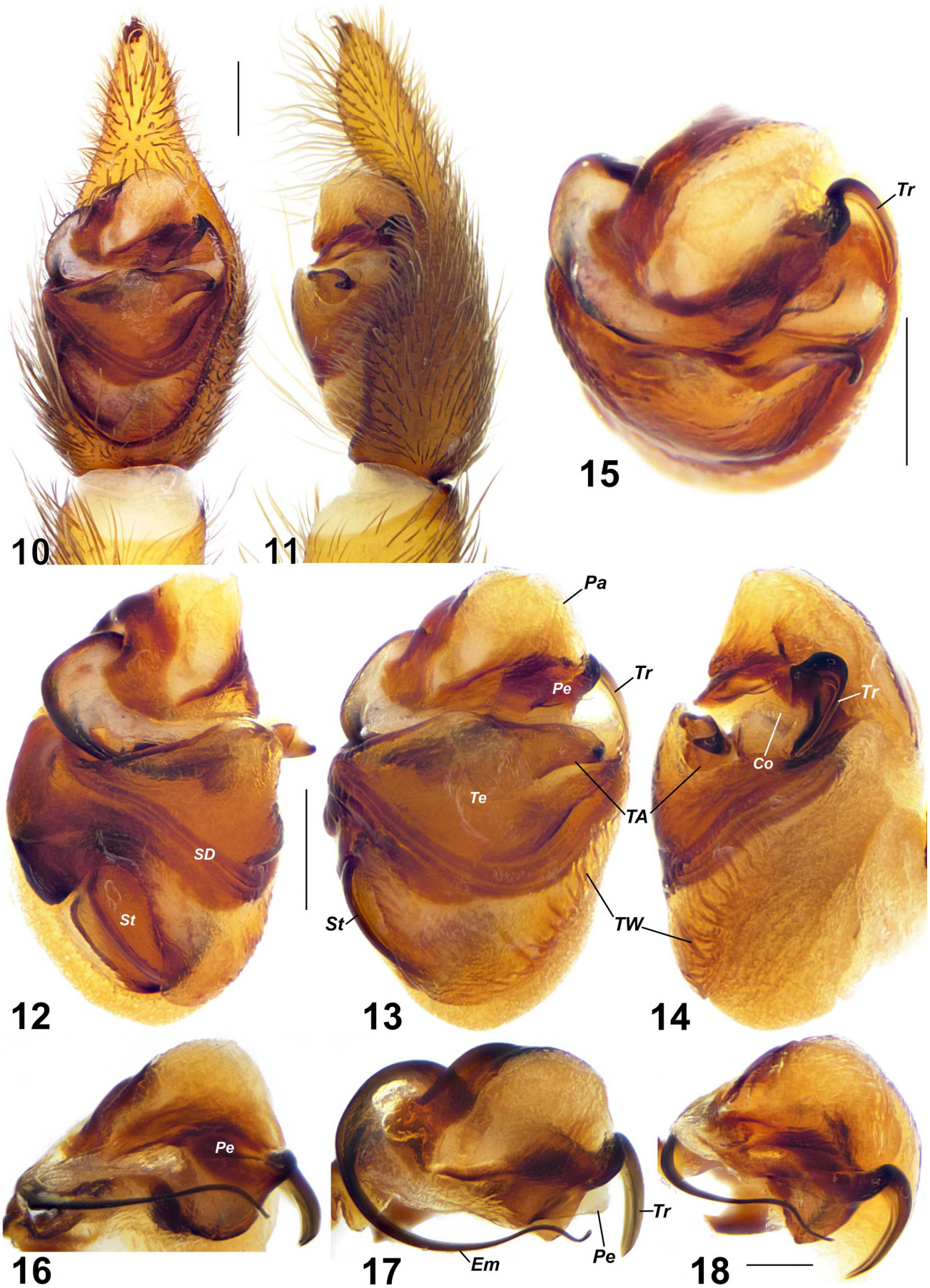
Eye sizes and interdistances: AME 0.12, ALE 0.10, PME 0.36, PLE 0.31; AME–AME 0.12, AME–ALE 0.05, PME–

Table 4. Leg spination for the male of *Pardosa zhishengi*, new species.

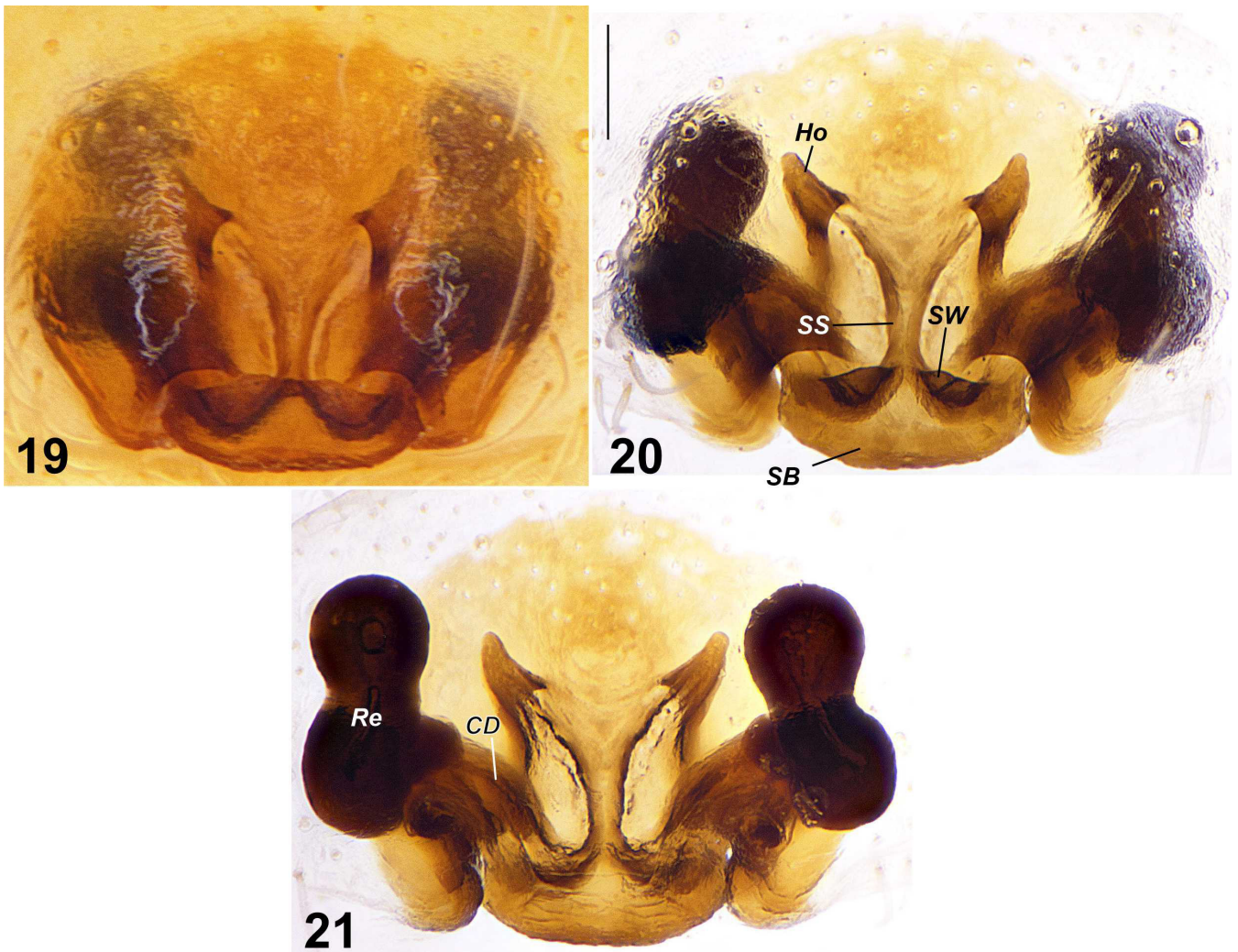
	Fe	Pa	Ti	Mt
I	3d 2p 2(3)r	1p 1r	2p 2r 2-2v	2p 2r 2-2v
II	3d 2p 2r	1p 1r	2p 2r 2-2v	2p 2r 2-2v
III	3d 2p 2r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 2-2v
IV	3d 2p 1r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 1-1-1-1v

PME 0.30, PME–PLE 0.39, AME–PME 0.15, ALE–PME 0.12; clypeus height 0.21.

Palpal femur light brown with grey spots distally; other segments light brown. For palp and legs measurements see Table 5. Coxae I–IV light brown; femora I–IV light brown with greyish spots; patellae I–IV light brown; tibiae and metatarsi I–IV light brown, without annulation; tarsi I–IV light brown. For leg spination see Table 6.



Figs. 10–18. Male palp (10–11), bulb (12–15) and embolic division (16–18) of *Pardosa zhishengi*, new species. 10, 13, 16 – ventral; 11, 14 – retrolateral; 12 – prolateral; 15, 17 – anterior; 18 – ventro-retrolateral. Scale: 0.2 mm (10–15), 0.1 mm (16–18). Abbreviations: Co – conductor, Em – embolus, Pa – palea, Pe – paleal peack, SD – sperm duct, St – subtegulum, TA – tegular apophysis, Te – tegulum, Tr – terminal apophysis, TW – tegular wrinkles.



Figs. 19–21. Epigyne of *Pardosa zhishengi*, new species. 19, 20 – ventral; 21 – dorsal. Scale: 0.1 mm. Abbreviations: CD – copulatory duct, Ho – hood, Re – receptacle, SB – septal base, SS – septal stem, SW – septal “wings”.

Table 5. Length of palp and leg segments for the female of *Pardosa zhishengi*, new species.

	Fe	Pa	Ti	Mt	Ta	Total
Palp	1.18	0.58	0.82	–	1.18	3.76
I	2.53	1.17	2.21	1.83	1.37	9.11
II	2.56	1.08	2.03	1.81	1.31	8.79
III	2.30	0.96	1.94	2.10	1.25	8.55
IV	3.08	1.09	2.74	3.64	1.79	12.34

Table 6. Leg spination for the female of *Pardosa zhishengi*, new species.

	Fe	Pa	Ti	Mt
I	3d 2p 3r	1p	2p 2r 2-2v	1p 1r 2-2v
II	3d 2p 3r	1p	2p 2r 2-2v	1p 1r 2-2v
III	3d 2p 2r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 2-2v
IV	3d 2p 1r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 2-2v

Dorsal part of the opisthosoma like in males but much lighter. Lateral sides of the opisthosoma light brown with grey spots. Ventral part light yellow. Spinnerets light brown.

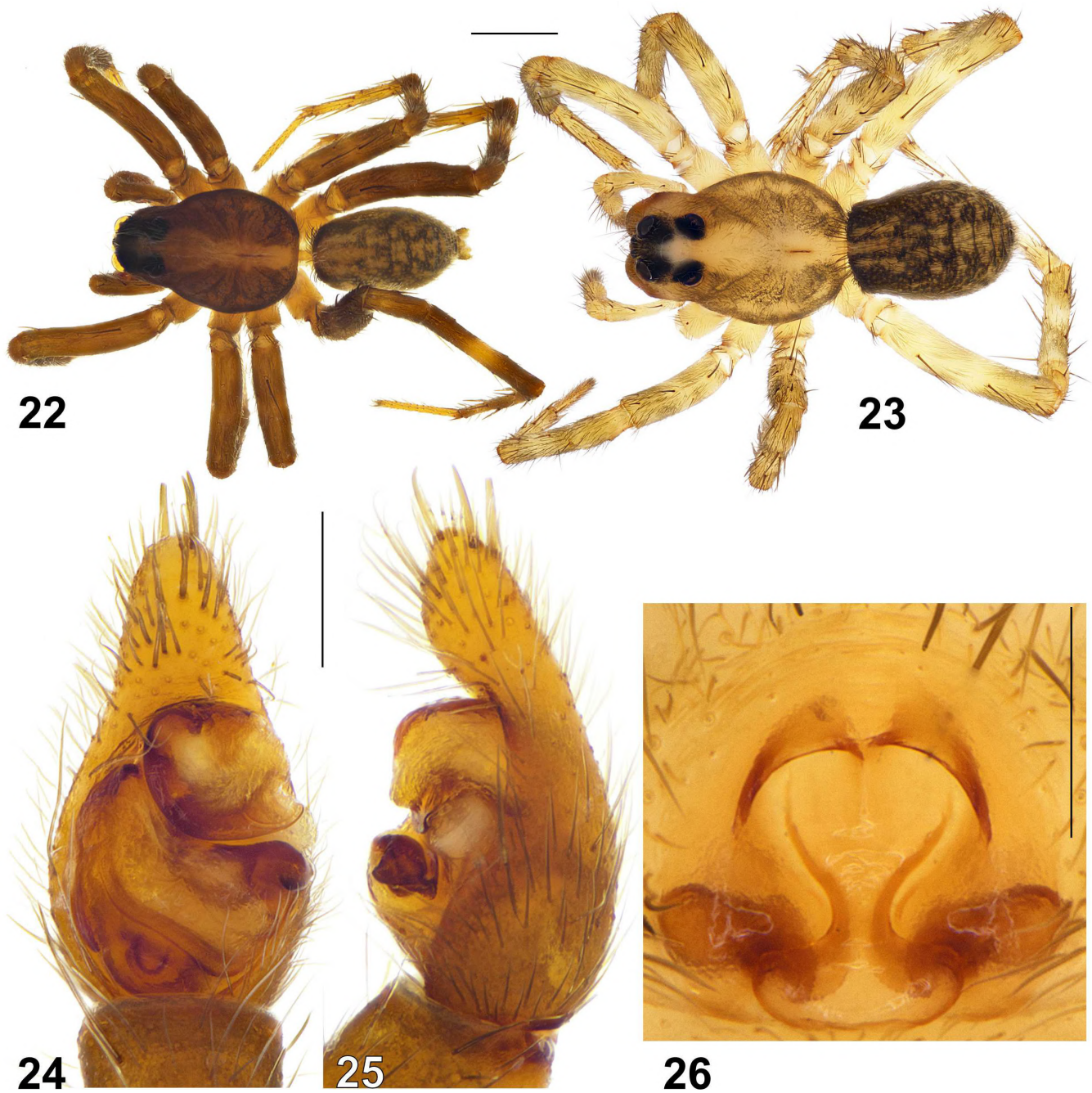
Epigyne as shown in Figs. 19–21. Septum anchor-shaped, septal base (SB) with kind of semi-transparent “wings” (SW) on its anterior edge, long stem (SS) narrowing posteriorly and widening anteriorly. Hoods (Ho) triangular, widely spaced (distance between hoods 1.4 times of hood length). Receptacles (Re) large, kidney-shaped with strong constriction in their middle part, spaced by a distance ca. 2.5 times their width. Copulatory ducts (CD) shorter than receptacles’ length, slightly curved.

Distribution. Only known from the type locality in Laos (Figs. 52–53).

***Trochosa* C. L. Koch, 1847**

Type species. *Aranea ruricola* De Geer, 1778, from the Palearctic.

Comments. *Trochosa* C. L. Koch, 1847, with 93 species (WSC, 2024), is a relatively large genus within Lycosidae.



Figs. 22–26. Male (22), female (23), male palp (24–25) and epigyne (26) of *Trochosa bannaensis*. 22, 23 – dorsal; 24, 26 – ventral; 25 – retrolateral. Scale: 1 mm (22–23), 0.2 mm (24–26).

The majority of species in this genus (33) are known from the Afrotropical realm, with only 17 species inhabiting the Indomalayan realm. Indomalayan *Trochosa* are recorded from India and Nepal (6 species combined), Indonesia (5 species), southern China (3 species), the Philippines (2 species), and 1 species, *Trochosa ruricoloides* Schenkel, 1963, is found throughout the entire Indomalayan realm. Until now, no species of this genus have been reported from Laos. The Indomalayan *Trochosa* remain poorly studied, with nearly half of the species (8) known only from one sex, primarily females. This may lead to identification challenges, as females in this genus are frequently almost indistinguishable. Almost all species from this region (14 out of 17) have been illustrated in 1–2 publications.

***Trochosa bannaensis* Yin & Chen, 1995, in Yin et al., 1995**

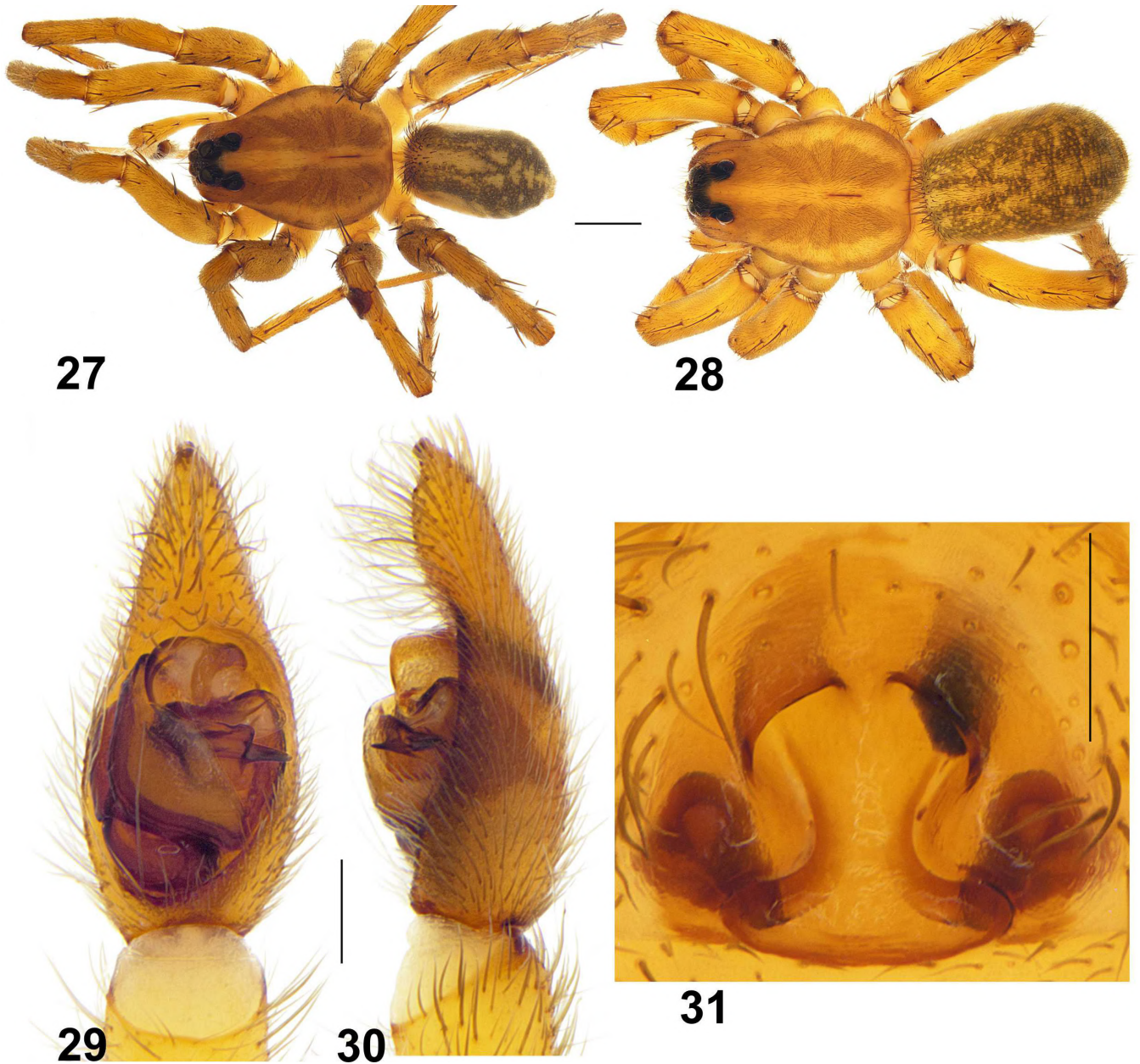
(Figs. 22–26, 52–53)

T. bannaensis: Pan et al., 2016: 410, fig. 4A–E, 5A–D, male and female.

T. bannaensis: Wang et al., 2021: 57, fig. 58A–H, 59A–C, 60A–D, male and female.

See the full list of references in WSC (2024).

Material examined. 52 males, 1 female (FEFU), LAOS, Vientiane Prov., env. of Nam-Lik Eco-Village, 18°36'53.18"N 102°24'31.87"E, pitfall traps in secondary forest and near rice field, coll. M.M. Omelko, A.A., Komisarenko, 23 May–12



Figs. 27–31. Male (27), female (28), male palp (29–30, cymbial claw is broken off) and epigyne (31) of *Trochosa ruricoloides*. 27, 28 – dorsal; 29, 31 – ventral; 30 – retrolateral. Scale: 1 mm (27–28), 0.2 mm (29–31).

June 2016; 4 males, 7 females (FEFU), same place, habitats and collectors, 4–26 June 2017.

Notes. I do not provide a redescription here because this species was well illustrated recently (see references above). It is important to note that the shape of the tegular apophysis slightly varies from male to male—such differences may lead to mistaken inferences of new undescribed species.

Distribution. China (Hainan, Yunnan) and Laos (new record; Figs. 52–53).

Trochosa ruricoloides Schenkel, 1963
(Figs. 27–31, 52–53)

T. ruricoloides: Marusik et al., 2020: 485, fig. 1d–e, 2e–f, 4d, male and female.

T. ruricoloides: Wang et al., 2021: 64, fig. 63A–H, 64A–E, 65A–D, male and female.

See the full list of references in WSC (2024).

Material examined. Male (FEFU), LAOS, Champasak Prov., env. of Tad E-Tu resort, 15°11'37.40"N 106° 5'57.28"E, coll. M.M. Omelko, 1–6 November 2013; 2 males, 5 females, Vientiane Prov., env. of Nam-Lik Eco-Village, 18°36'53.18"N 102°24'31.87"E, pitfall traps at meadows and rice paddies, coll. M.M. Omelko, 19–24 November 2013; 13 males, 2 females (FEFU), same place and collector, 17 May–12 June 2016; 10 males, 5 females (FEFU), same place and collector, 30 May–27 June 2017.

Notes. I do not provide a redescription here because this species was well illustrated recently (see references above). A single male collected in Champasak Province is

noticeably larger than those from Vientiane Province and its palp structure is slightly different. There is a possibility that it represents an undescribed *Trochosa* species. Figs. 27, 29–30 show a typical male of *T. ruricoloides* from Vientiane Province.

Distribution. India, China (Hainan, Guangdong, Fujian, Yunnan, Jiangxi, Zhejiang, Hunan, Hubei, Sichuan, Tibet, Shaanxi), Taiwan, Thailand, Malaysia, Indonesia, Papua New Guinea, and Laos (new record; Figs. 52–53).

Wadicosa Zyuzin, 1985

Type species. *Lycosa fidelis* O. Pickard-Cambridge, 1872, from West Asia.

Comments. *Wadicosa* is a comparatively small genus of wolf spiders consisting of 17 named species (WSC, 2024) and one species from Borneo which was described but not formally named (Zehethofer, 1998). *Wadicosa* was established by Zyuzin (1985) as the only genus of Wadicossinae Zyuzin, 1985 with the type species *Lycosa venatrix* Lucas, 1846. The genus diagnosis was amended by Kronstedt & Zyuzin (2009) together with the fixation of *Lycosa fidelis* O. Pickard-Cambridge, 1872 as a new type species. Males of *Wadicosa* can be recognised by the palpal tegulum having an anterior retrolateral process. Some species also have a posterior retrolateral process. Females have epigyne with oval or rounded foveolae (pockets). For the full list of characters, see Kronstedt & Zyuzin (2009).

Most species are restricted in their distribution to the Afrotropical and Indomalayan realms (ten and four, respectively). One species is known from the Palearctic; three species, including the type species *Wadicosa fidelis*, are known across the Palearctic and Indomalayan realms. The actual range boundaries of *Wadicosa* distribution remain unclear; however, they are evidently much broader than currently known. As mentioned earlier, one unnamed species is known from Borneo, and another poorly known species, currently placed in *Pardosa* under the name of *P. bleyi* (Dahl, 1908) but undoubtedly belonging to *Wadicosa*, is described from Papua New Guinea (Dahl, 1908).

Almost all *Wadicosa* are known from both sexes. Exceptions are *W. russellsmithi* Kronstedt, 2015 and *W. prasantae* Ahmed, Anam, Saikia, Manthen & Saikia, 2014 which were described using females only. Most species are well-described/redescribed and depicted thanks to Kronstedt (2015, 2017, 2023) and Kronstedt & Zyuzin (2009). However, a few *Wadicosa* species are poorly studied, being known only from the original descriptions. One such species is *W. daliensis* which was only known from south China (Hainan, Guangdong, Yunnan Provinces) until the present study. Despite this species being depicted in several publications (Yin et al., 1997a; Yin et al., 1997b; Song et al., 1999) all its images were taken from the original description. Because these images are very schematic, bulb and embolic division have never been studied before and

the original diagnosis was made in Chinese only, I decided to redescribe this species in detail and re-diagnose it.

Wadicosa bleyi (Dahl, 1908) new combination

Lycosa bleyi Dahl, 1908: 233, fig. 12–13, male and female.
Pardosa bleyi Roewer, 1955: 185.

Notes. *Pardosa bleyi*, originally described by Dahl (1908) in *Lycosa* and known from the Bismarck Archipelago (east of Papua New Guinea), has never been revised. It was transferred to *Pardosa* by Roewer (1955). The original description includes only two black-and-white figures: one depicting the epigyne in ventral view, and the other depicting part of the bulb in retrolateral view. Although both figures are schematic, it is evident by the shape of copulatory organs that this species belongs to *Wadicosa*. Based on these considerations, the transfer of *P. bleyi* to *Wadicosa* is proposed here.

Wadicosa daliensis Yin, Peng & Zhang, 1997

(Figs. 32–53)

W. daliensis Yin et al., 1997: 99, fig. 1–6, male and female.
See the full list of references in WSC (2024).

Material examined. 7 males, 3 females (FEFU), LAOS, Vientiane Prov., env. of Nam-Lik Eco-Village, 18°36'53.18"N 102°24'31.87"E, hand picking and pitfall traps at river and lake banks, along roads, coll. M.M. Omelko, 7–25 November 2013; 1 male, same place and collector, 4–9 June 2016; 9 males, 1 female (FEFU), same place and collector, 14 June–25 July 2017.

Diagnosis. By general appearance, palp and structure of its copulatory organs (shape of tegulum, tegular apophysis, embolus, fovea, and receptacle) *Wadicosa daliensis* is closely related to *W. fidelis* and *W. okinawensis* (Tanaka, 1985). Males of *W. daliensis* may be differentiated from *W. fidelis* by: 1) a large posterior retrolateral process of tegulum (PP; vs. small, cf. Figs. 41–43 and figs. 1, 12 in Kronstedt & Zyuzin (2009)), 2) tegular apophysis (TA) strongly curved, widened medially in ventral view (vs. slightly curved, widened distally, cf. Figs. 39, 42 and fig. 1 in Kronstedt & Zyuzin (2009)); from *W. okinawensis* by: 1) dark carapace and abdomen coloration (vs. very light, cf. Figs. 32, 34 and figs. 69A in Wang et al. (2021)), 2) serrated retrolateral edge of tegulum (Ed; vs. smooth, cf. Fig. 43 and Figs. 69D, 70B in Wang et al. (2021)). Females of *W. daliensis* can be differentiated from those of *W. fidelis* by U-shaped receptacles (vs. rounded, cf. Fig. 51 and fig. 17 in Kronstedt & Zyuzin (2009)); from *W. okinawensis* by: 1) septal base (SB) width/height ratio ca. 2.9 (vs. 2.1, cf. Fig. 49–50 and fig. 69G in Wang et al. (2021)), 2) oval foveolae (Fv) (vs. almost round, cf. Figs. 49–50 and fig. 69G in Wang et al. (2021)).

Description. Male (Figs. 32–34). Total length 5.41. Carapace 3.01 long, 2.29 wide. Opisthosoma 2.42 long, 1.67 wide. Colouration. Carapace dark brown covered with more or



Figs. 32–37. Male (32–34), female (35–36) and male palp (37) of *Wadicosa daliensis*. 32, 34, 35 – dorsal; 33, 36 – ventral; 37 – prolateral. Scale: 1 mm (32–36), 0.2 mm (37).

Table 7. Length of palp and leg segments for the male of *Wadicosa daliensis*

	Fe	Pa	Ti	Mt	Ta	Total
Palp	1.09	0.52	0.66	–	1.23	3.5
I	2.27	0.98	2.15	2.03	1.36	8.79
II	2.21	0.90	1.86	2.02	1.27	8.26
III	2.04	0.92	1.59	2.22	1.12	7.89
IV	2.76	1.02	2.43	3.82	1.64	11.67

Table 8. Leg spination for the male of *Wadicosa daliensis*

	Fe	Pa	Ti	Mt
I	3d 2p 3r	1d 1p 1r	2p 2r 2-2v	2p 2r 2-2v
II	3d 2p 3r	2d 1p 1r	2p 2r 2-2v	2p 2r 2-2v
III	3d 2p 2(3)r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 2-2v
IV	3d 2p 1r	2d 1p 1r	2d 2p 2r 2-1-1v	2p 2r 1-1-1-1v

less dense (cf. Figs. 32 and 34) white setae, with yellow, star-like median band, eye field black. Lateral bands brown, indistinct, divided into several spots. Fovea thin, dark brown. Clypeus black, chelicerae dark brown, labium black. Endites dark brown with yellow outer edges. Sternum black with indistinct brown spots.

Eye sizes and interdistances: AME 0.14, ALE 0.11, PME 0.33, PLE 0.26; AME–AME 0.10, AME–ALE 0.03, PME–PME 0.33, PME–PLE 0.35, AME–PME 0.10, ALE–PME 0.09; clypeus height 0.22.

Palpal femur black with yellow distal part; patella and tibia yellow covered with white setae; cymbium black with white setae proximally. For palp and legs measurements see Table 7. Coxae I–II dark grey, III–IV yellow; femora I dark brown dorsally and laterally, brown ventrally, II–IV light brown with grey annulation; patellae I–IV light brown; tibiae and metatarsi I–IV light brown with poorly visible greyish annulation; tarsi I–IV light brown. For leg spination see Table 8.

Dorsal part of the opisthosoma grey with dark brown cardiac mark and series of yellow spots. In some specimens these spots large, merging with each other (cf. Figs. 32 and 34). Lateral sides of the opisthosoma greyish with lots of yellow spots. Ventral part light brown with 4 sub-longitudinal lines consisting of tiny dark brown spots. Spinnerets light brown.

Palp as shown in Figs. 37–48. Tibia 1.6 times longer than wide. Cymbium 1.5 times longer than bulb and 1.5 times longer than tibia. Tegulum (Te) with heavily sclerotised lanceolate posterior retrolateral process (PP), conical anterior process (AP); retrolaterally with serrated edge (Ed). Subtegulum (St) prolaterally positioned, partly hidden by

Table 9. Length of palp and leg segments for the female of *Wadicosa daliensis*

	Fe	Pa	Ti	Mt	Ta	Total
Palp	1.11	0.55	0.75	–	1.02	3.43
I	2.30	1.02	2.14	1.87	1.32	8.65
II	2.13	1.06	1.87	1.81	1.20	8.07
III	2.06	0.87	1.55	2.06	1.09	7.63
IV	2.96	0.99	2.49	3.82	1.60	11.86

Table 10. Leg spination for the female of *Wadicosa daliensis*

	Fe	Pa	Ti	Mt
I	3d 2p 3r	1p 1r	2p 1r 2-2v	1p 1r 2-2v
II	3d 2p 3r	1p 1r	2p 2r 2-2v	2p 2r 2-2v
III	3d 3p 3r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 2-2v
IV	3d 2p 1r	2d 1p 1r	2d 2p 2r 2-2v	2p 2r 2-2v

large shell-like cuticular cover (CC). Tegular apophysis (TA) consists of two branches. Upper branch (UB) long, crescent-like in ventral view, strongly flattened in anterior view, with triangular extension (AE) medially. UB proximally covered with tiny spinulae barely visible in light microscope. Lower branch (LB) small, triangular. Conductor (Co) large, heavily sclerotised with hook-shaped tip in retrolateral view. Embolus (Em) long, forming large bend over tegular apophysis. Apical part of embolus widened, semi-transparent; embolic tip acute.

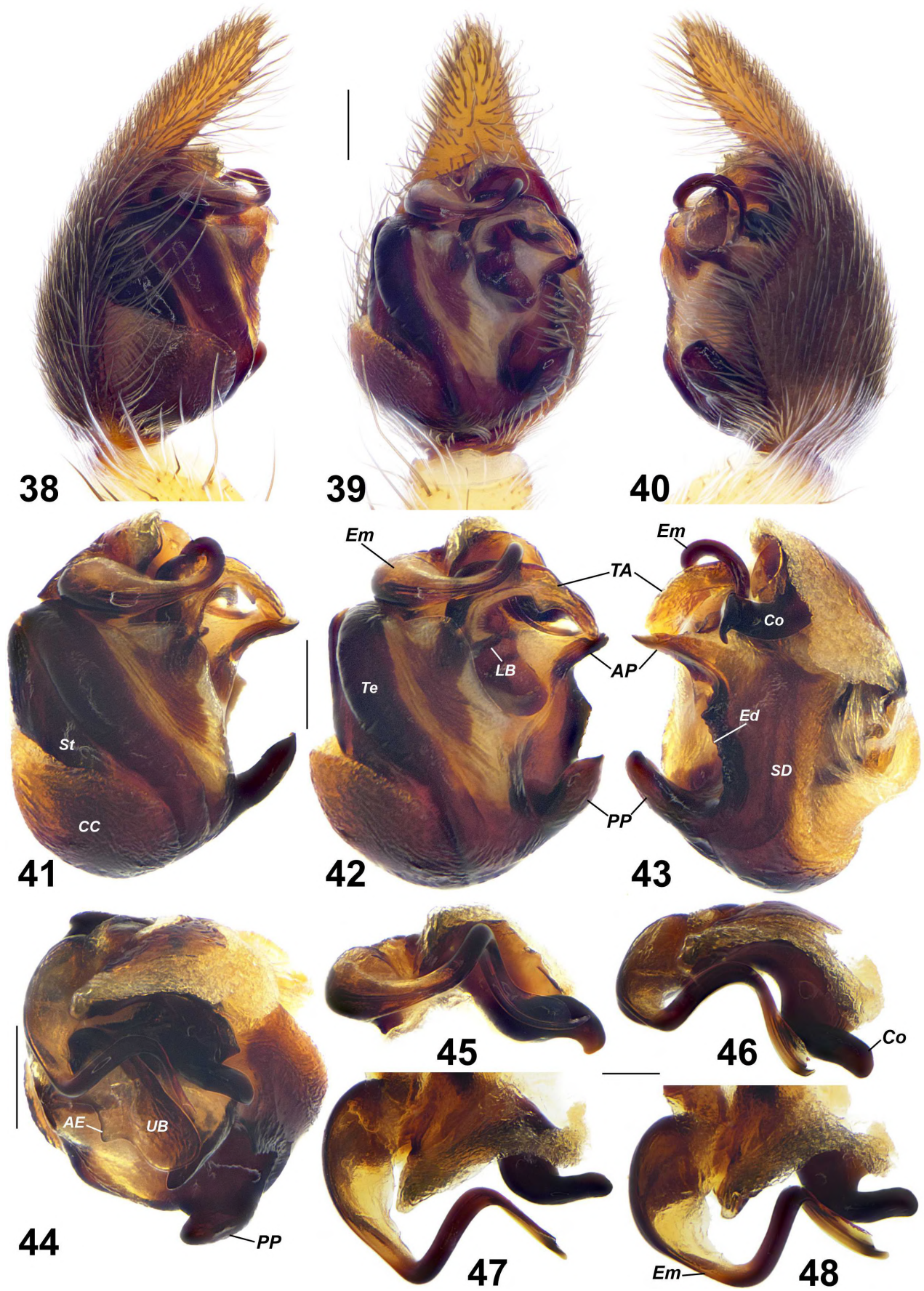
Female (Figs. 35–36). Total length 6.04. Carapace 2.88 long, 2.36 wide. Opisthosoma 3.13 long, 2.09 wide. Colouration. Carapace and opisthosoma like in male but somewhat lighter, white setae less visible. Clypeus and chelicerae light brown.

Eye sizes and interdistances: AME 0.16, ALE 0.11, PME 0.33, PLE 0.28; AME–AME 0.10, AME–ALE 0.04, PME–PME 0.31, PME–PLE 0.39, AME–PME 0.12, ALE–PME 0.11; clypeus height 0.26.

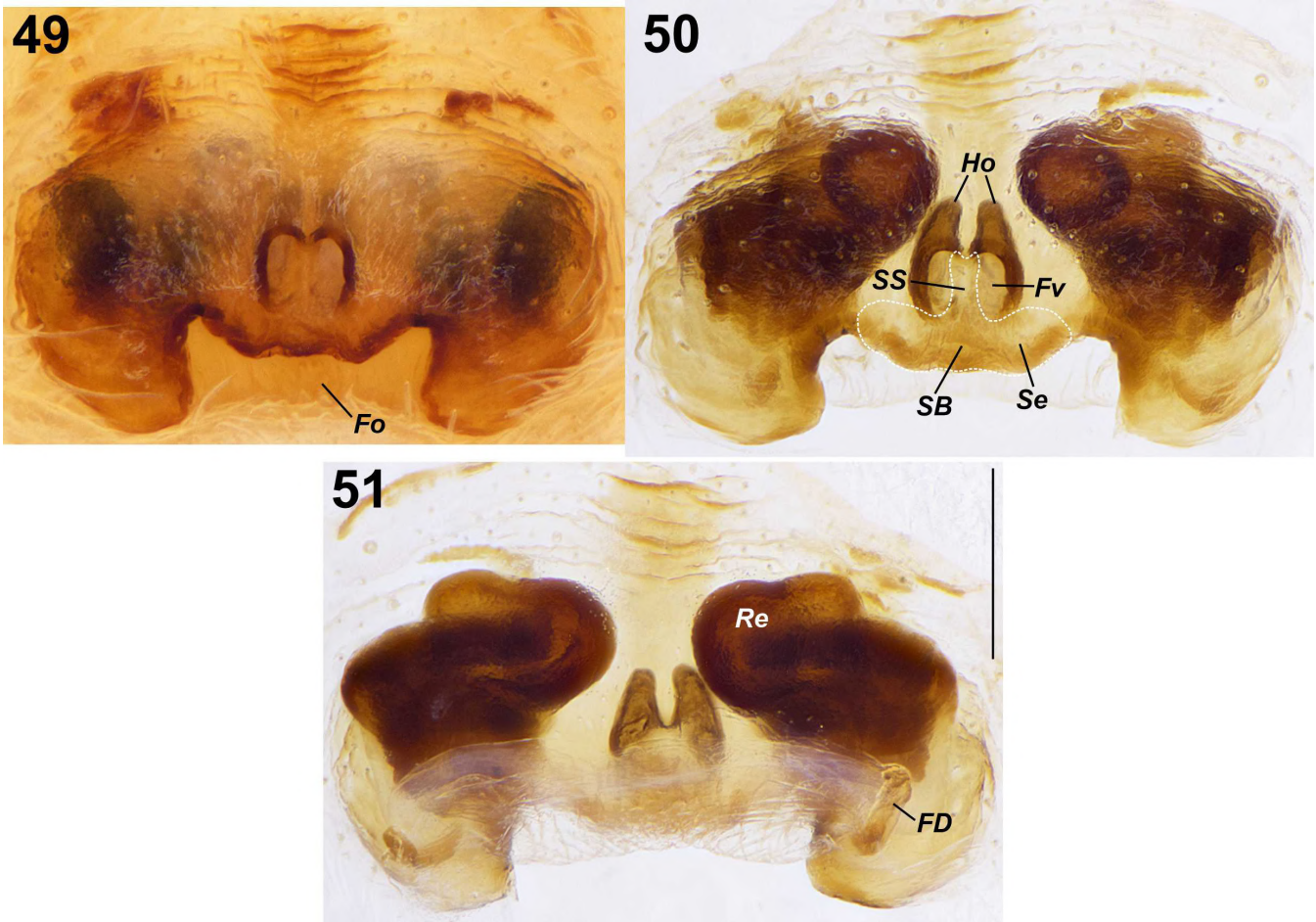
All segments of palp light brown. For palp and legs measurements see Table 9. Coxae I–IV yellowish. femora I–IV dorsally and laterally light brown with grey annulation, ventrally yellow; patellae I–IV light brown; tibiae and metatarsi I–IV light brown with poorly visible annulation; tarsi I–IV light brown. For leg spination see Table 10.

Lateral sides of the opisthosoma yellow with tiny grey spots. Ventral part yellow. Spinnerets light brown.

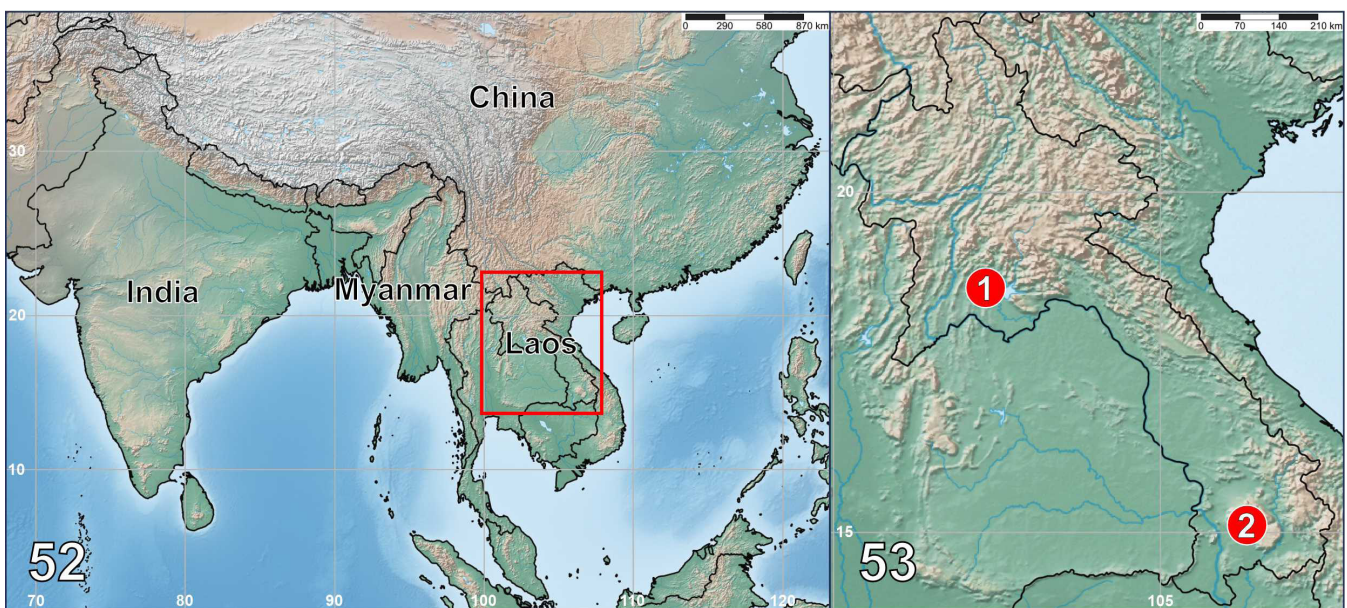
Epigyne as shown in Figs. 49–51. Fovea (Fo) ca. 2.2 times wider than long. Receptacles (Re) long, turned U-shaped. Septum (Se) triangular with wide base (SB) and short, poorly visible stem (SS). Foveolae (Fv; pockets) oval, ca. 2 times longer than wide, with large hoods (Ho).



Figs. 38–48. Male palp (38–40), bulb (41–44) and embolic division (45–48) of *Wadicosa daliensis*. 38, 41 – pro-lateral; 39, 42, 45 – ventral; 40, 43, 46 – retro-lateral; 44, 47 – anterior; 48 – pro-latero-anterior. Scale: 0.2 mm (38–44), 0.1 mm (45–48). Abbreviations: AE – extension of tegular apophysis, AP – anterior retrolateral process of tegulum, CC – cuticular cover of bulb, Co – conductor, Ed – retrolateral edge of tegulum, Em – embolus, LB – lower branch of tegular apophysis, PP – posterior retrolateral process of tegulum, SD – sperm duct, St – subtegulum, TA – tegular apophysis, Te – tegulum, UB – upper branch of tegular apophysis.



Figs. 49–51. Epigyne of *Wadicosa daliensis*. 49 – ventral, intact; 50 – ventral, macerated; 51 – dorsal. Scale: 0.2 mm. Abbreviations: FD – fertilisation duct, Fv – foveola (pocket), Fo – fovea, Ho – hood, Re – receptacle, SB – septal base, Se – septum (outlined by dashed line), SS – septal stem.



Figs. 52–53. Collecting localities of (1) *Arctosa delaporteii* Omelko & Marusik, 2022, *Trochosa bannaensis* Yin & Chen, 1995, *T. ruricoloides* Schenkel, 1963, *Wadicosa daliensis* Yin, Peng & Zhang, 1997, (2) *Pardosa zhishengi*, new species., *T. ruricoloides*.

Notes. As mentioned above, one of the species closest to *Wadicosa daliensis* is *W. okinawensis*. This species was described from southern Japan (Nansei islands; Tanaka (1985)) and later found in China (Hainan; Wang et al. (2021)). The original black and white drawings of the copulatory organs of *W. okinawensis* are highly schematic, and the colour photographs are of small size (Chikuni, 1989), making a careful comparison of the photos of my specimens of *W. daliensis* with the images of *W. okinawensis* from Japan impossible. For this reason, I only compare them with photos of *W. okinawensis* from China. However, live photographs of *W. okinawensis* from China differ significantly from those from Japan (cf. Figs. 2E–F in Wang et al. (2021) and fig. 35 in Chikuni (1989)). Additionally, noticeable differences exist in the structure of the female epigyne, such as the varying shape of the fovea and foveolae (pockets) (cf. fig. 69G in Wang et al. (2021) and fig. 35 in Chikuni (1989)). In my opinion, the spiders identified from China as *W. okinawensis* are likely not conspecific with those from Japan and may possibly be described as a new species in the future.

Distribution. China (Guangdong, Hainan, Yunnan Provinces), Laos (new record; Figs. 52–53).

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