2008. The Journal of Arachnology 36:502–512

Revision of the spider genus *Taira* (Araneae, Amaurobiidae, Amaurobiinae)

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Abstract. The cribellate amaurobiid genus *Taira*, which is suggested to be most similar to the genus *Amaurobius* and some other related genera, is revised based on genital characters. Eight species, one from Japan and seven from China, are included. Five new species from China are described: *T. cangshan*, *T. concava*, *T. latilabiata*, *T. obtusa*, and *T. sulciformis*. *Titanoeca decorata* Yin & Bao 2001 is newly transferred to this genus and its male is described for the first time. *Taira lunaris* Wang & Ran 2004 is newly synonymized with *T. liboensis* Zhu, Chen & Zhang 2004.

Keywords: Genital structures, new species, China, Japan, synonomy

The amaurobiid genus *Taira* Lehtinen 1967, with the type species *T. flavidorsalis* (Yaginuma 1964), is restricted to Japan and South China. Only three species have been previously included in the genus, the type species, *T. liboensis* Zhu, Chen & Zhang 2004 and *T. lunaris* Wang & Ran 2004, both from Libo County, Guizhou Province of China (Zhu et al. 2004; Wang & Ran 2004).

Because the phylogeny of the family Amaurobiidae is poorly understood, the relationships of *Taira* with other amaurobiid genera are ambiguous. The inclusion of *Taira* and *Tamgrinia* Lehtinen 1967 in the same tribe Tairini of the subfamily Amaurobiinae by Lehtinen (1967) was questioned by Wang (2000). After comparing the ultrastructures of *Taira* and *Tamgrinia* with other amaurobiid genera [*Arctobius* Lehtinen 1967 (Arctobiinae), *Amaurobius* C.L. Koch 1837 (Amaurobiinae), *Callobius* Chamberlin 1947 (Amaurobiinae), *Pimus* Chamberlin 1947 (Amaurobiinae), *Coelotes* Blackwall 1841 (Coelotinae), and *Rubrius* Simon 1887 (Macrobuninae)], Wang (2000) found that *Taira* is closer to *Ambaurobius* and allied genera (*Callobius* and *Pimus*) than *Tamgrinia*. The ultrastructural characters shared by *Taira* and *Amaurobius* and related genera that differ from those of *Tamgrinia* include: the striped small hood of the trichobothria, the presence of ''amaurobiid ALS spigots'' (named as ''modified spigots'' by Griswold et al. 2005) and the presence of paracribellar spigots on both the posterior lateral and posterior median spinnerets, while *Tamgrinia* have smooth small trichobothrial hoods and none of the spigots mentioned above (Wang & Ran 2004).

In this paper, the genus *Taira* is revised with particular attention to the genital structures. Eight species are recognized including five new species from China. The species *Titanoeca decorata* Yin & Bao 2001 is newly placed in this genus and its male is described for the first time. *Taira lunaris* is synonymized with *T. liboensis*.

METHODS

All specimens are preserved in 75% ethanol and were examined, illustrated, and measured using a Tech XTL-II stereomicroscope equipped with an Abbe drawing device. Eye sizes are measured as the maximum diameter from either above or in front. Leg measurements are shown as: total length (femur, patella and tibia, metatarsus, tarsus). All measurements are in millimeters.

The distribution map was generated using GIS ArcView software and the .dbf files of the studied species are downloadable from http://www.amaurobiidae.com, which is published and maintained by Xin-Ping Wang.

The following abbreviations are used: Museum of Hebei University, Baoding, China (MHBU); the Collection of the Arachnological Society of Japan (CASJ) at Otemon Gakuin University, Osaka; Hunan Normal University, Changsha, China (HNUC).

Abbreviations used in this study are: ALE = anterior lateral eye; AME = anterior median eye; MOA = median ocular area; PLE = posterior lateral eye; PME = posterior median eye; DTA = dorsal tibial apophysis; RTA = retrolaterial tibial apophysis.

TAXONOMY

Family Amaurobiidae Thorell 1870
Subfamily Amaurobiinae Thorell 1870
Taira Lehtinen 1967

Taira Lehtinen 1967:266, 340.

Type species.—*Amaurobius flavidorsalis* Yaginuma 1964, by original designation.

Diagnosis.—This genus is similar to *Amaurobius*, but can be distinguished from the latter by the small RTA, the big interior branch and the relatively small exterior branch of the DTA (versus the small interior and big exterior branches of the DTA), the absence of an embolic basal process (except *T. liboensis*) (versus a dorsally pointed process, also indicated by Thaler & Knaflach (2000:341, figs. 19–22)), the big double membranous conductor (versus a single membrane), the scimitar-shaped median apophysis with the inflated base, the big, anteriorly pointed tegular process of the male palp, the wide epigynal teeth, and the retrolaterally curved fertilization ducts of the female epigynum (Figs. 1–5).

Description.—Carapace pear-shaped, with many black hairs. Cephalic area more or less elevated. Fovea longitudinal. Cervical groove and radial furrow distinct. Anterior eye row slightly retrocurved and posterior one procurved. MOA trapeziform, longer than wide or as long as wide. Chilum undivided. Chelicerae with distinct lateral condyles, 3 or 4

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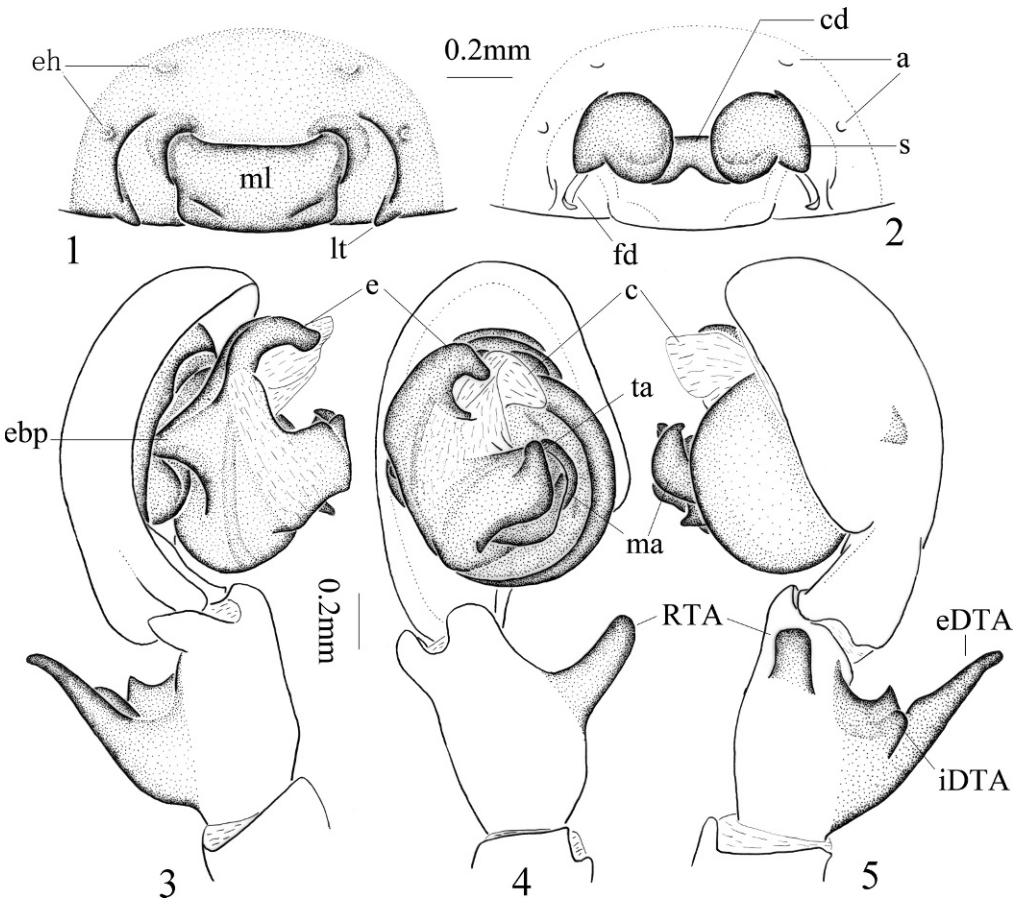


Figures 1–5.—*Amaurobius fenestralis* (Ström 1768). Males and females from Denmark and Sweden (loaned from Zoological Museum, University of Copenhagen, Denmark and Naturhistorska Riksmuseum, Stockholm, Sweden) 1. Female, epigynum. 2. Same, vulva. 3. Left palp of the male, prolateral view. 4. Same, ventral view. 5. Same, retrolateral view. Abbreviations: a = atrium; c = conductor; cd = copulatory duct; e = embolus; ebp = embolic basal process; eDTA = exterior branch of dorsal tibial apophysis; eh = epigynal hood; fd = fertilization duct; iDTA = interior branch of dorsal tibial apophysis; lt = laterial teeth; ma = median apophysis; ml = median lobe; ta = tegular apophysis; s = spermatheca; RTA = retrolateral tibial apophysis.

promarginal and 3 or 4 retromarginal teeth. The second promarginal tooth largest. Legs slightly slender (especially those of males), with 3 claws on the tarsi, many spines on femora, tibiae, and metatarsi. Metatarsus IV with a single row of setae making up the calamistrum (about half the length of the metatarsus IV), calamistrum of male more or less reduced. Leg formula: 1423 or 1243. Female palp with two claws on the end of tarsi, one of the paired claws lost. Abdomen oval, with some irregular black markings. Cribellum of female obviously divided and narrower than the width of anterior lateral spinnerets. Male cribellum somewhat reduced. Male palpal tibia with a strong RTA and a branched DTA. The interior branch of DTA well developed, sometimes with a groove on the prolateral view of left palp. And the exterior branch of it small, often depressed prolaterally. The cymbium modified retrolaterally, with a slightly narrow base and a blunt process pointing retrolaterally. Embolus wide, short, and flat, with slightly thin apex. Conductor membranous, doubled. Median apophysis scimitar-shaped, with an inflated base, originating on a membranous area of tegulum posteriorly. Tegulum with one or two big, anteriorly pointed processes. Female epigynum with two small hoods, a wide median lobe, and a pair of epigynal teeth (the projections of epigynal cuticle) originating on the outside of median lobe. A pair of pores can be definitely located on the dorsal view of epigynum. Copulatory ducts lying between spermathecae and connected with each other. Spermathecae ball-like. Fertilization ducts originating behind the spermathecae and curved outwards.

Biology.—Species of this genus can be found under stones, tree bark, and caves or in rock crevices. The web is small, with one or more retreat(s) on the web mesally.

Distribution.—Members of the genus *Taira* are restricted to East Asia, including South China and Japan (Fig. 41).

Relationships with other amaurobiine genera.—In order to evaluate the relationships of *Taira* and other amaurobiine genera, some specimens of *Amaurobius*, *Callobius*, and *Tamgrinia* were examined, as well as some literature sources (e.g., Lehtinen 1967; Leech 1972; Wang 2000).

We support the conclusion of Wang (2000) that the genus *Taira* is phylogenetically far from *Tamgrinia* and more similar to *Amaurobius*, *Callobius*, and *Pimus*. Wang & Ran (2004) indicated that the genus *Taira* can be distinguished from *Tamgrinia* at least by the following characters: the undivided chilum, the transversely striped cephalothorax, the large

trichobothrial hoods, the presence of ''modified spigots,'' and the paracribellar spigots. As far as genital characters are concerned, the differences between *Taira*, *Amaurobius*, *Callobius*, and *Pimus* with *Tamgrinia* include: the absence of an embolic supporter and tegular membranous apophysis, the unsclerotized conductor of the male palp, the epigynal atrial split, the absence of a septal sclerite, the connected copulatory ducts, and the nearly ball-like spermathecae of the female epigynum.

The features shared by *Taira*, *Amaurobius*, *Callobius*, and *Pimus* are: the striped small hood of the trichobothria, the presence of ''modified spigots,'' and the presence of paracribellar spigots on both posterior lateral spinnerets and posterior median spinnerets (Wang & Ran 2004). Another structure shared by these genera is the undivided chilum.

After comparing the genital structures of *Taira* with *Amaurobius*, *Callobius*, and *Pimus*, we regard *Taira* as most similar to *Amaurobius* because of the following shared characters: the presence of RTA and the branched DTA, the short embolus, the membranous conductor, the posteriorly originated median apophysis, the presence of a tegular process on the male palp, the wide median lobe, the presence of epigynal teeth, the nearly spherical shaped spermathecae and the positions of the copulatory ducts of the female epigynum.

KEY TO SPECIES OF THE GENUS *TAIRA*

1. Female . . . 2
   Male (those of *T. obtusa* and *T. latilabiata* unknown) . . . 9
2. Median septum with width less than 2 times length (Figs. 7, 36) . . . 3
   Median septum with width at least 2 times length (Figs. 12, 17, 22, 27, 29, 34) . . . 4
3. Median septum with the widest mid-part (Fig. 36) . . . *T. sulciforis*
   Median septum with the widest anterior edge (Fig. 7) . . . *T. flavidorsalis*
4. Median septum with width about 4 times length (Fig. 12) . . . *T. cangshan*
   Median septum with width less than 3 times length (Figs. 17, 22, 27, 29, 34) . . . 5
5. Median septum small, slightly pointed posteriorly (Fig. 17) . . . *T. concava*
   Median septum large, not pointed posteriorly (Figs. 22, 27, 29, 34) . . . 6
6. Spermathecae small, widely separated (Fig. 28) . . . *T. latilabiata*
   Spermathecae big, narrowly separated (Figs. 23, 30, 35) . . . 7
7. Epigynal teeth with wide posterior margin (Fig. 34) . . . *T. obtusa*
   Epigynal teeth with a tip end (Figs. 22, 29) . . . 8
8. Spermathecae with sharp anterior margin (Fig. 23) . . . *T. decorata*
   Spermathecae with blunt anterior margin (Fig. 30) . . . *T. liboensis*
9. DTA far away from tibia (Figs. 11, 21, 26, 33, 40) . . . 10
   DTA close to tibia (Fig. 16) . . . *T. cangshan*
10. DTA with sharp exterior branch and normal interior one (Fig. 31) . . . *T. liboensis*
    DTA not with sharp exterior branch, with grooved interior one (Figs. 9, 19, 24, 38) . . . 11
11. DTA with interior branch as long as wide (Fig. 38) . . . *T. sulciformis*
    DTA with interior branch much longer than wide (Figs. 9, 19, 24) . . . 12
12. RTA big (Figs. 20, 21) . . . *T. concava*
    RTA small (Figs. 10, 25) . . . 13
13. Embolic end wide (Fig. 25) . . . *T. decorata*
    Embolic end narrow (Fig. 10) . . . *T. flavidorsalis*

Taira flavidorsalis (Yaginuma 1964)
Figs. 6–11, 41

Amaurobius flavidorsalis Yaginuma 1964:20, figs. 1–5; Yaginuma 1971:128, figs. 107.1–3; Yaginuma 1986:9, fig. 7.3; Chikuni 1989:21, fig. 1.

Taira flavidorsalis (Yaginuma): Lehtinen 1967:266, figs. 204, 207.

Material examined.—*Holotype:* JAPAN: *Hiroshima Prefecture*: male, Mt. Azuma (35°00′N, 133°00′E), 15 August 1963, Y. Morinaga (CASJ).

Paratype: JAPAN: *Tottori Prefecture*: 1 female, Mt. Daisen (35°12′N, 133°21′E), July 1937, M. Tanaka (CASJ).

Diagnosis.—This species is similar to *T. concava* (Figs. 17–21), but can be distinguished from the latter by the small and ventrally originated RTA, the narrow furrow of interior branch of DTA, the less depressed exterior branch of DTA, the thin apex of embolus, the small conductor, the slightly inflated base of median apophysis, and the sunken apex of tegular process of male palp. Also, the same relative shape of the median lobe, the mesally situated copulatory ducts, and the nearly elliptical spermathecae of the female epigynum.

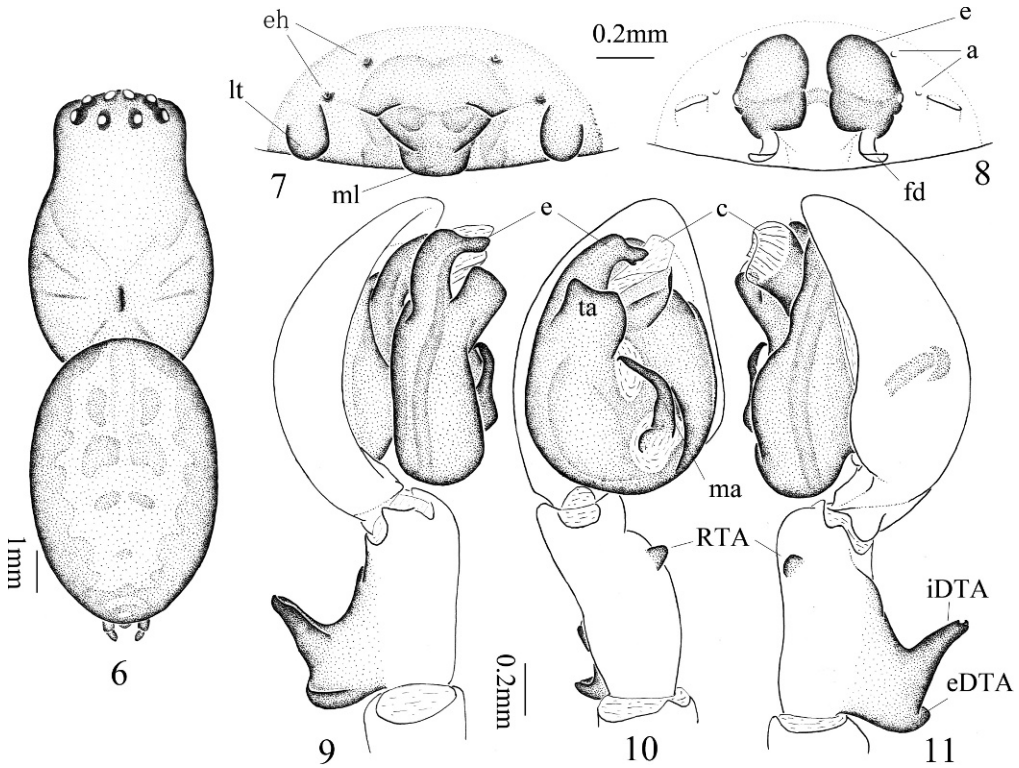
Redescription.—Cheliceral promargin with three teeth, retromargin with four.

Male palp (Figs. 9–11) with a small and ventrally originated RTA and a big DTA. The interior branch of DTA long, anterodorsally pointed, with a narrow furrow. The exterior branch of DTA small, depressed prolaterally and pointed dorsally. The base of cymbium narrow and modified retrolaterally. Embolus originated prolaterally, short, flat and slightly curved, with a thin apex. Conductor membranous and doubled. Median apophysis situated posteriorly, with an acute tip and inflated base. Tegular process close to the base of embolus, with a sunken apex.

Female epigynum (Figs. 7–8) with a big median lobe. Epigynal teeth originated retrolaterally, with blunt apex. Copulatory ducts small, between the spermathecae. Spermathecae nearly elliptical.

For further detail, see Yaginuma (1964).

Distribution.—This species has been found in Japan (Hiroshima, Tottori) (Fig. 41).



Figures 6–11.—*Taira flavidorsalis* (Yaginuma 1964). 6. Male body, dorsal view. 7. Female, epigynum. 8. Same, vulva. 9. Left palp of the male, prolateral view. 10. Same, ventral view. 11. Same, retrolateral view.

Remarks.—Judging from the publication (Wang & Ran 2004: 31, figs. 5–6), the specimen illustrated as *T. flavidorsalis* is misidentified. Further examination of this specimen is badly needed in order to determine its species status.

Taira cangshan new species
Figs. 12–16, 41

Material examined.—*Holotype:* CHINA: *Yunnan*: male, Dali, Mt. Cangshan (25°58′N, 99°52′E), Yudailu, elev. 2400 m, 1 January 2004, Zi-Zhong Yang (MHBU).

Paratypes: CHINA: *Yunnan*: two females, the same location as holotype, 24 October 2004, Hai-bo Pu and Zi-Zhong Yang (MHBU).

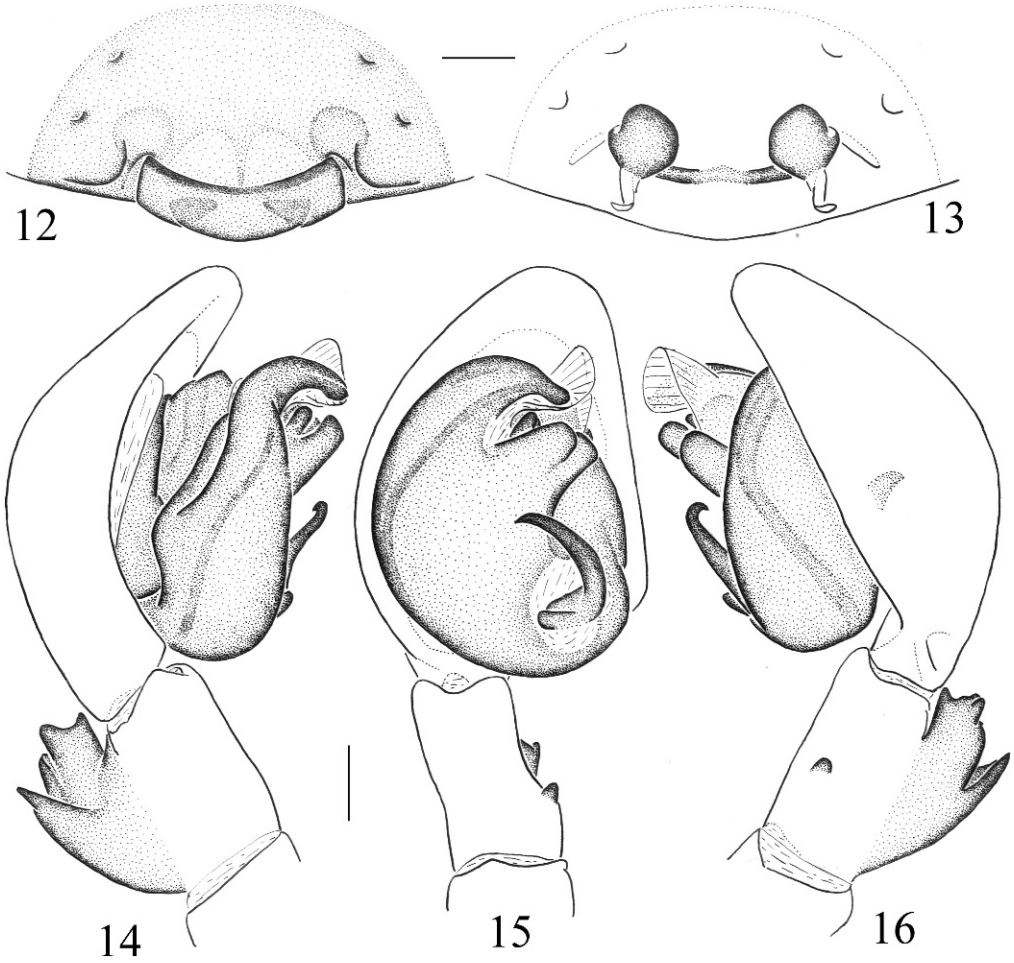
Other material examined: 7 ♀, Lushui, Pianma (26°01′N, 98°37′E), elev. 2200 m, Yunnan, 9 May 2004, Zhi-Sheng Zhang and Zi-Zhong Yang (MHBU).

Etymology.—The specific name refers to the type locality and is a noun in apposition.

Diagnosis.—The male palpal tibial apophyses of the new species are different from other *Taira* species: RTA small, DTA located distally. But the palpal organ and epigynum are similar to the others. It can be distinguished from the type species, *T. flavidorsalis* (Figs. 7–11) by the blunt apex of embolus, the acute tip of median apophysis, the bifurcated tegular apophysis of male palpal bulb; the epigynal median lobe that is four times wider than long and procurved, the wide base of the epigynal teeth, the slender copulatory ducts and the small spermathecae.

Description.—*Male (holotype):* Total length 6.43: prosoma 3.16 long, 2.24 wide; opisthosoma 3.57 long, 2.50 wide. Prosoma yellow, with yellow brown anterior and retrolateral areas. Eye sizes and interdistances: AME 0.15, ALE 0.15, PME 0.13, PLE 0.15; AME–AME 0.05, AME–ALE 0.10, PME–PME 0.20, PME–PLE 0.25, ALE–PLE 0.08. MOA 0.50 long, front width 0.33, base width 0.45. Clypeus height 0.25. Chelicerae brown, with 4 promarginal and 3 retromarginal teeth. Labium brown. Endites yellow brown. Sternum deep yellow. Leg measurements: I 14.28 (4.59, 4.79, 3.37, 1.53), II 9.49 (2.86, 3.37, 2.14, 1.12), III 7.86 (2.45, 2.65, 1.84, 0.92), IV 9.58 (2.75, 3.26, 2.45, 1.12). Leg formula: 1423. Opisthosoma gray yellow, with indistinct 3 chevron-like markings dorsally. Palp (Figs. 14–16) with a small RTA, located near the base of tibia. DTA relatively small, close to the anterior part of tibia dorsally. Interior branch short and strong, with a bifurcated apex. Exterior branch small, with an acute tip, pointing anterodorsally. The anterior part of embolus relatively thin. Conductor membranous and doubled. Median apophysis with a bulbous base and arcuate anterior part. Tegulum bifurcated, pointing antero-retrolaterally.

Female: Total length 6.83–8.77. A female (one of the paratypes) total length 8.06: prosoma 3.57 long, 2.55 wide; opisthosoma 4.79 long, 3.26 wide. Eye sizes and interdistances: AME 0.15, ALE 0.18, PME 0.13, PLE 0.15; AME–AME 0.08, AME–ALE 0.20, PME–PME 0.28, PME–PLE 0.38, ALE–PLE 0.10. MOA 0.55 long, front width 0.38, back width 0.53. Clypeus height 0.33. Leg measurements: I 10.51 (2.96, 3.67, 2.45, 1.43), II 8.47 (2.45, 3.06, 1.84, 1.12), III 7.24 (2.24, 2.45, 1.63, 0.92), IV 9.07 (2.65, 3.16, 2.24, 1.02). Leg formula and other characters as the male holotype. Epigynum (Figs. 12, 13) with a wide median lobe, 4 times wider than long and curved posteriorly. Epigynal teeth with wide base. Copulatory ducts slender, between spermathecae. Spermethecae ball-like, widely separated.



Figures 12–16.—*Taira cangshan* new species. 12. Female, epigynum. 13. Same, vulva. 14. Left palp of the male, prolateral view. 15. Same, ventral view. 16. Same, retrolateral view. Scale lines: 0.2 mm.

Distribution.—*Taira cangshan* is found in China (Yunnan) (Fig. 41).

Habitat.—Specimens have been found under stones, with a small irregular web.

Taira concava new species
Figs. 17–21, 41

Material examined.—*Holotype:* CHINA: *Sichuan*: male, Mt. Emei (29°32′N, 103°19′E), elev. ~ 1600 m, 16 September 2004, matured at the end of October 2004, Zhi-Sheng Zhang (MHBU).

Paratype: CHINA: *Sichuan*: 1 female, collected with holotype (MHBU).

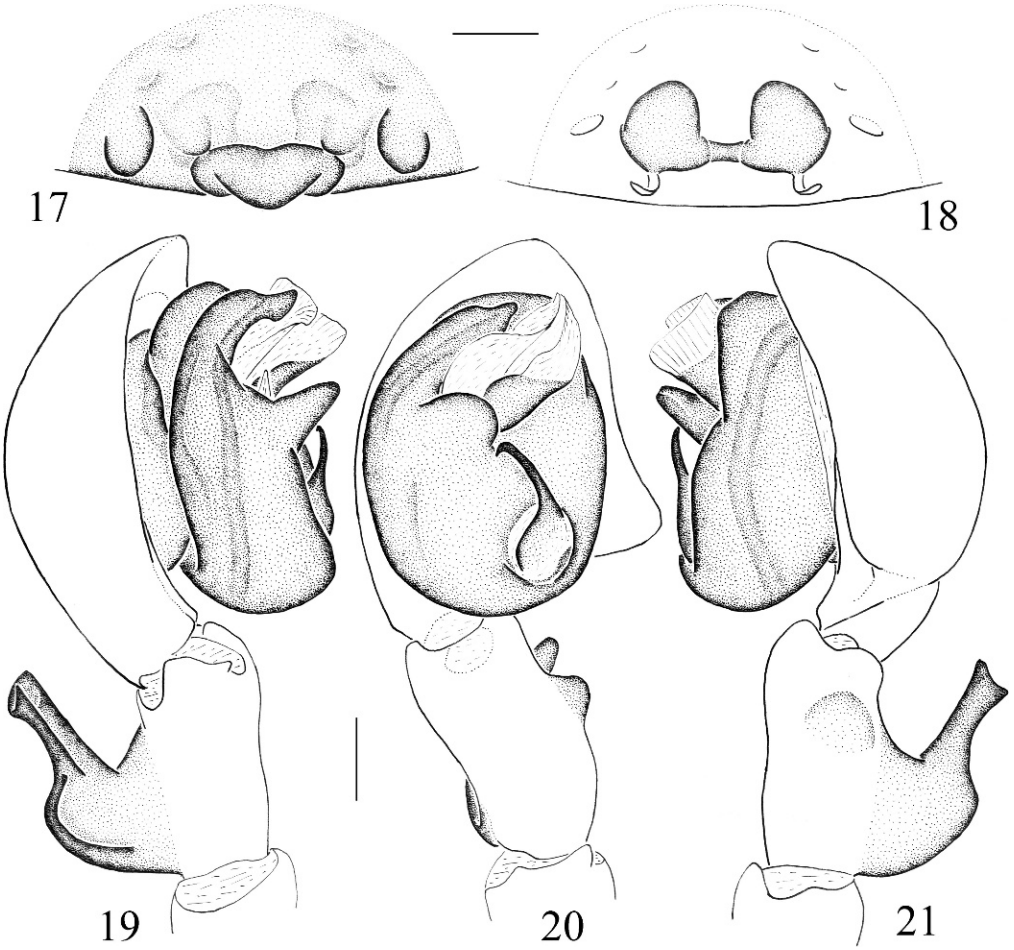
Etymology.—The specific name is Latin, meaning depressed and refers to the depressed exterior branch of DTA.

Diagnosis.—The new species is similar to *T. sulciformis* (Figs. 36–40), but can be distinguished from the latter by the narrow interior branch of DTA, obviously depressed exterior branch of DTA, the relatively thin and long median apophysis, the blunt tegular apophysis of male palp; the wider than long median lobe and the short copulatory ducts of female epigynum.

Description.—*Male holotype:* Total length: 4.74, prosoma 2.19 long, 1.58 wide; opisthosoma 2.70 long, 1.79 wide. Prosoma yellow, with many tiny black markings. Eye sizes and interdistances: AME 0.08, ALE 0.13, PME 0.10, PLE 0.10. AME–AME 0.10, AME–ALE 0.10, PME–PME 0.13, PME–PLE 0.20, ALE–PLE 0.05. MOA 0.33 long, front width 0.25, back width 0.33. Clypeus height 0.20.

Chelicerae yellow brown, with 4 promarginal and 3 retromarginal teeth. Endites deep yellow, labium dark yellow. Sternum dark yellow. Leg measurements: I 10.51 (2.75, 3.67, 2.81, 1.28), II 7.85 (2.24, 2.65, 1.99, 0.97), III 6.23 (1.84, 2.04, 1.58, 0.77), IV 7.55 (2.19, 2.45, 1.99, 0.92). Leg formula: 1243. Opisthosoma grey brown, with a pair of sigilla and indistinct 3 chevron-like markings. Palpal tibia with a big, ball-like RTA and wide DTA. The interior branch of DTA long and thin, with a furrow and the exterior branch of it wide, with an obvious pit. The base of cymbium narrow and modified. Embolus with thin apex. Conductor big, membranous and doubled. Median apophysis slender, with an inflated base. Tegulum with a blunt process (Figs. 19–21).

Female paratype: Total length 5.30: prosoma 2.30 long, 1.58 wide; opisthosoma 3.16 long, 2.30 wide. Eye area too badly damaged to be measured. Leg measurements: I 6.07 (1.73, 2.14, 1.38, 0.82), II 4.84 (1.43, 1.68, 1.07, 0.66), III 4.18 (1.27, 1.43, 0.92, 0.56), IV 5.25 (1.58, 1.84, 1.17, 0.66). Leg formula: 1423. Epigynum with a small median lobe that is far wider than long. Epigynal teeth widely separated, with blunt apex.



Figures 17–21.—*Taira concava* new species. 17. Female, epigynum. 18. Same, vulva. 19. Left palp of the male, prolateral view. 20. Same, ventral view. 21. Same, retrolateral view. Scale lines: 0.2 mm.

Copulatory ducts thin and short. Spermathecae ball-like (Figs. 17, 18).

Distribution.—This species is found in China (Sichuan) (Fig. 41).

Habitat.—Specimens have been found within crevices of cliffs or under rocks.

***Taira decorata* (Yin & Bao 2001)** new combination
Figs. 22–26, 41

Titanoeca decorata Yin & Bao 2001:60, figs. 2a–e.

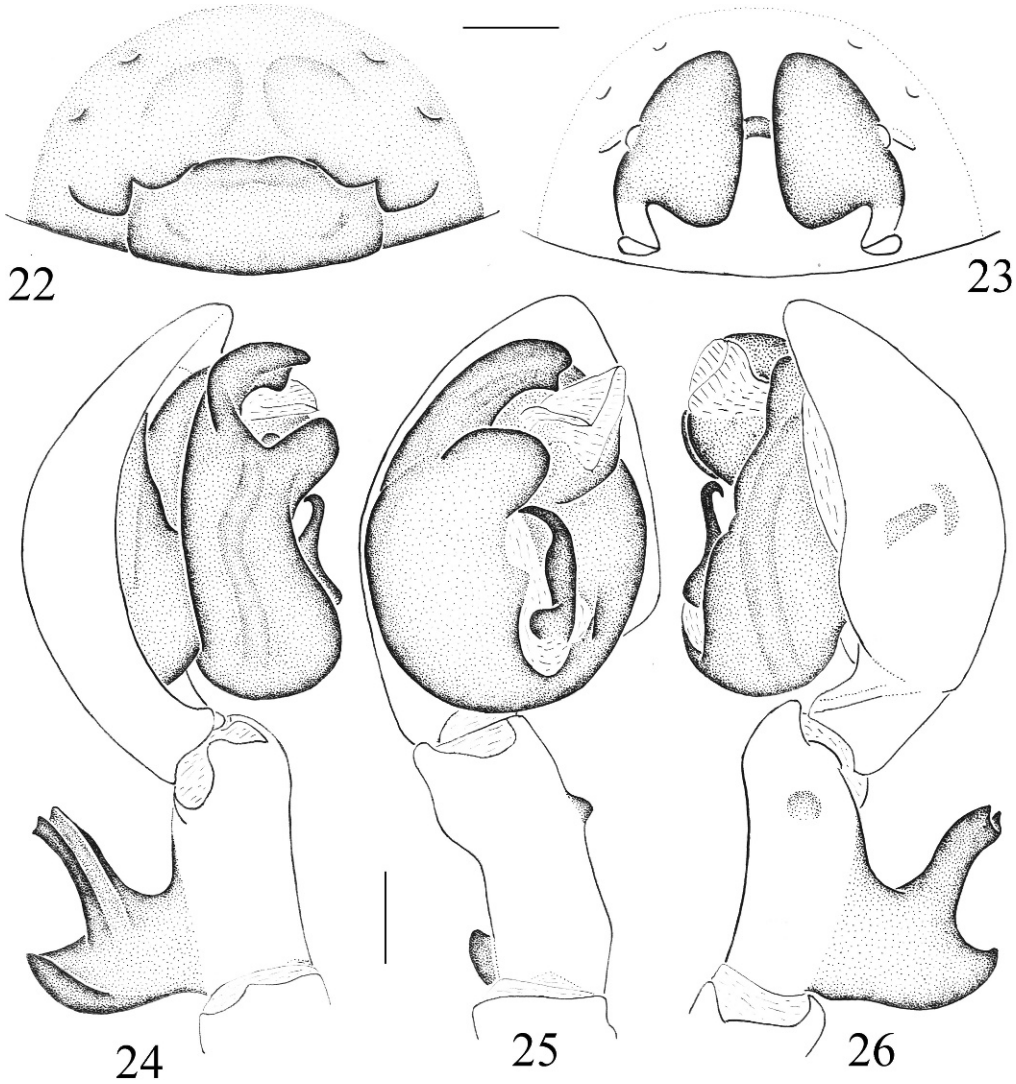
Type specimens.—*Holotype:* CHINA: *Hunan*: female, Mt. Mangshan, Yizhang County, (24°59′N, 112°50′E), 18 May 1999, Jian-Hui Yang (HNUC) (not examined).

Material examined.—CHINA: *Fujian*: 1 ♂, 3 ♀, Moshikeng, Mt. Wuyi (26°54′N, 116°42′E), 20 May 2004, Feng Zhang (MHBU); 1 ♂, 8 ♀, between Guadun and Tongmu, Mt. Wuyi, 24 May 2004, Feng Zhang (MHBU); 6 ♀, Guadun, Mt. Wuyi, 23 May 2004, Feng Zhang (MHBU); 3 ♀, Mt. Wuyi, 10 July 1986, Ming-Sheng Zhu (MHBU).

Diagnosis.—This species is similar to *T. flavidorsalis* (Figs. 7–11), but can be distinguished from the latter by the narrow sulciform interior branch of DTA, the slightly bifurcated embolus, the prolaterally outstanding median part of median apophysis, the blunt tegulum of male palp; the wide median lobe of epigynum, the small epigynal teeth, the epigynal hood far away from the epigynal teeth and the slightly peaked spermathecae anteriorly.

Description.—*Male:* Total length: 4.18–4.44. One male total length 4.44: prosoma 2.40 long, 1.79 wide; opisthosoma 2.14 long, 1.53 wide. Prosoma yellow, with dark yellow Cephalic area. Eye sizes and interdistances: AME 0.10, ALE 0.15, PME 0.13, PLE 0.15; AME–AME 0.08, AME–ALE 0.10, PME–PME 0.15, PME–PLE 0.20, ALE–PLE 0.08. MOA 0.43 long, front width 0.28, back width 0.40. Clypeus height 0.13. Chelicerae yellow brown, with 4 promarginal and 3 retromarginal teeth. Labium and endites deep yellow. Sternum yellow, with deep yellow lateral margin. Leg measurements: I 11.63 (3.11, 4.08, 3.11, 1.33), II 7.75 (2.24, 2.70, 1.99, 0.82), III 6.22 (1.89, 2.04, 1.58, 0.71), IV 7.70 (2.19, 2.60, 2.09, 0.82). Leg formula: 1243. Opisthosoma yellowish, with many white hairs and many irregular markings, a pair of yellow longitudinal markings and indistinct 4 chevron-like markings. Cardiac markings red. Palpal tibia with a small RTA, located on the anterior part of tibia. The interior branch of DTA with a narrow groove and the exterior branch depressed in prolateral view. Embolus bifurcated anteriorly. Conductor membranous and doubled. Median apophysis inflated in the middle part. Tegular process blunt (Figs. 24–26).

Female: Epigynum with wide median lobe. Epigynal teeth close to the lateral margins of median lobe. Copulatory ducts thin and short. Spermathecae peaked anteriorly. Fertilization



Figures 22–26.—*Taira decorata* (Yin & Bao 2001). 22. Female, epigynum. 23. Same, vulva. 24. Left palp of the male, prolateral view. 25. Same, ventral view. 26. Same, retrolateral view. Scale lines: 0.2 mm.

ducts originating on the spermathecae posteriorly and curved retrolaterally (Figs. 22, 23).

For further details, see Yin & Bao (2001).

Distribution.—*Taira decorata* has been found in China (Zhejiang, Fujian and Hunan) (Fig. 41).

Remarks.—This species was first described by Yin & Bao (2001) based on female specimens collected from Mt. Mangshan of Hunan Province and Mt. Fengyuan (28°06′N, 119°06′E) of Zhejiang Province and placed in the genus *Titanoeca* of the family Titanoecidae. After comparing the original figures with the specimens we collected from Mt. Wuyi of Fujian, we have determined that they are the same species though the type specimens are unavailable. Moreover, Mt. Wuyi is situated between Mt. Mangshan and Mt. Fengyuan.

Taira latilabiata new species
Figs. 27, 28, 41

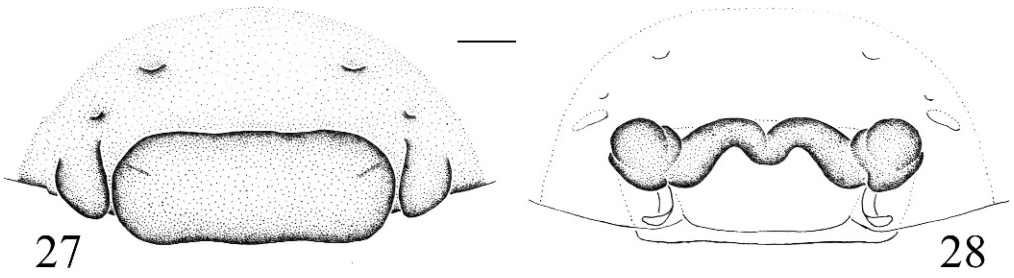
Material examined.—*Holotype:* CHINA: *Guizhou*: female, Weining, Chaohai National Natural Reserve (26°51′N, 104°15′E), 2 July 2005, Hui-Ming Chen (MHBU).

Paratypes: CHINA: *Guizhou*: 6 females, collected with holotype (MHBU).

Etymology.—The specific name, derived from Latin adjective "*latilabiatus*," refers to the wide and labiate median lobe of the female epigynum.

Diagnosis.—The new species is similar to *T. liboensis* (Figs. 29, 30), but differs from the latter by the wide epigynal median lobe, the long copulatory ducts and the relatively small spermathecae.

Description.—*Female:* total length 7.04–7.75. Holotype total length 7.75: prosoma 3.47 long, 2.35 wide; opisthosoma 4.39 long, 3.06 wide. Prosoma brown, with many black hairs and a "V" shaped yellow marking in front of the fovea and behind MOA. Eye sizes and interdistances: AME 0.15, ALE 0.18, PME 0.15, PLE 0.18; AME–AME 0.08, AME–ALE 0.13, PME–PME 0.20, PME–PLE 0.30, ALE–PLE 0.13. MOA 0.55 long, front width 0.35, back width 0.50. Clypeus height 0.20. Chelicerae brown, with 4 promarginal and 3 or 4 retromarginal teeth. Labium yellow brown. Sternum deep yellow. Legs yellow, with 2 blackish annular markings on



Figures 27, 28. *Taira latilabiata* new species. 27. Female, epigynum. 28. Same, vulva. Scale lines: 0.2 mm.

femora. Leg measurements: I 9.79 (2.75, 3.47, 2.14, 1.43), II 7.96 (2.35, 2.86, 1.63, 1.12), III 7.14 (2.24, 2.45, 1.53, 0.92), IV 9.07 (2.65, 3.16, 2.14, 1.12). Leg formula: 1423. Opisthosoma grey black, with yellowish markings and indistinct 3 chevron-like markings dorsally. Epigynum with a wide labiate median lobe and a pair of epigynal teeth. Two pairs of epigynal hoods situated in front of epigynal teeth. Copulatory ducts located between spermathecae and connected to each other. Spermathecae ball-like (Figs. 27, 28).

Male: unknown.

Distribution.—*Taira latilabiata* is known only from Guizhou province in China (Fig. 41).

Taira liboensis Zhu, Chen & Zhang 2004
Figs. 29–33, 41

Taira liboensis Zhu, Chen & Zhang 2004 (January):61, figs. 1A–F.

Taira lunaris Wang & Ran 2004 (March):31, figs. 1–4 (female holotype and paratype from Yueliang Cave, Libo, Guizhou, China, deposited in the Institute of Zoology, Beijing, China, not examined). **New synonymy**.

Material examined.—*Holotype:* CHINA: *Guizhou*: female, Shuijiang Cave, Libo (25°24′N, 107°52′E), 8 July 2001, Hui-Ming Chen (MHBU).

Paratypes: CHINA: *Guizhou*: 3 males, 2 females, same data as holotype (MHBU).

Other material: CHINA: *Guizhou*: 1 ♀, Shuijiang Cave, September 1998, Hui-Ming Chen (MHBU); 3 ♂, 1 ♀, Heshang Cave, Guiyang (26°35′N, 106°42′E), 13 May 1998, Hui-Ming Chen (MHBU); *Sichuan*: 1 ♂, 2 ♀, Mt. Emei (29°32′N, 103°19′E), elev. ~ 800 m, 16 September 2004, Zhi-Sheng Zhang (MHBU).

Diagnosis.—This species can be easily distinguished from the other *Taira* species by the indistinct RTA, the peaky interior branch of the DTA, the undepressed exterior branch of the DTA, the presence of the embolic process and two tegular processes of the male palp. It differs from *T. flavidorsalis* (Yaginuma 1964) (Figs. 7–11) by the wide apex of the male palpal embolus, the wide median lobe, and the long distances between the epigynal teeth and median lobe.

Redescription.—Cheliceral promargin with four teeth, retromargin with three.

Male: palp (Figs. 31–33) with indistinct RTA. Interior branch of DTA peaky, without groove, a small process located near the base of DTA in the prolateral view. Exterior branch of DTA small. Embolus with a basal process. Conductor membranous and doubled. Median apophysis thin, relatively long, arcuate curved, with an acute tip and an inflated base. Tegulum with two processes near the apex of median apophysis.

Female: epigynum (Figs. 29, 30) with a brownish labiate median lobe. Epigynal teeth with wide base and slightly peaky tip. Two pairs of hoods situated in front of the epigynal teeth. Copulatory ducts short, connected to each other. Spermathecae nearly elliptical.

For further details, see Zhu et al. (2004).

Distribution.—*Taira liboensis* has been found in China (Guizhou, Sichuan) (Fig. 41).

Remarks.—*Taira liboensis* and *T. lunaris* were both published in 2004 in different journals. The former was published in January 2004 (indicated in the page header of the printed paper), while the latter, published in the *Bulletin of the British Arachnological Society* was published in March 2004 (personal communication with Ian Dawson, the Secretary of the British Arachnological Society). Therefore, the latter is a junior synonym.

Taira obtusa new species
Figs. 34, 35, 41

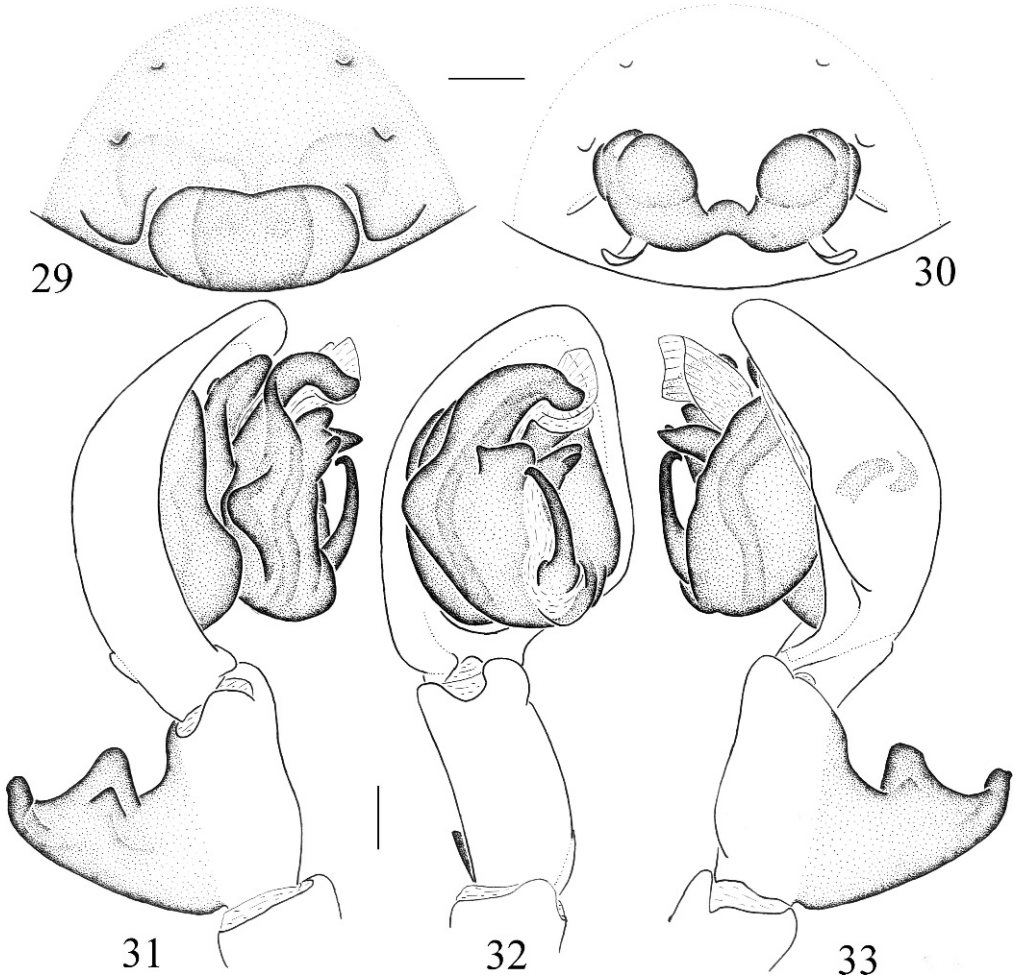
Material examined.—*Holotype:* CHINA: *Hubei*: female, Shennongjia National Nature Reserve (31°28′N, 110°22′E), Yazikou, 4 September 2004, Zhi-Sheng Zhang & Hui-Ming Chen (MHBU).

Paratypes: 11 females, collected with holotype (MHBU); *Guizhou*: 2 females, Mt. Fanjin (27°55′N, 108°41′E), Huixiangpin to Yu'ao, 2 August 2001, Jun-Xia Zhang & Zhi-Sheng Zhang (MHBU).

Etymology.—The specific name comes from the Latin word "*obtusus*," meaning "blunt," referring to the blunt end of the epigynal teeth.

Diagnosis.—The female of the new species is similar to that of *T. decorata* (Yin & Bao 2001) (Figs. 22, 23), but can be distinguished from the latter by the anteriorly and laterally extended median lobe of epigynum, the big blunt epigynal teeth, the wide copulatory ducts and the shape of the spermathecae.

Description.—*Female:* total length 6.50–7.50. Holotype total length 6.83: prosoma 3.06 long, 1.94 wide; opisthosoma 4.08 long, 2.96 wide. Prosoma yellow brown with dark brown lateral margins. Eye sizes and interdistances: AME 0.10, ALE 0.15, PME 0.13, PLE 0.15; AME–AME 0.08, AME–ALE 0.18, PME–PME 0.20, PME–PLE 0.25, ALE–PLE 0.08. MOA 0.48 long, front width 0.30, back width 0.43. Clypeus height 0.20. Chelicerae brown, with 4 promarginal and 3 retromarginal teeth. Endites dark yellow, labium brown. Sternum yellow, with yellowish margin. Leg measurements: I



Figures 29–33.—*Taira liboensis* Zhu, Chen & Zhang 2004. 29. Female, epigynum. 30. Same, vulva. 31. Left palp of the male, prolateral view. 32. Same, ventral view. 33. Same, retrolateral view. Scale lines: 0.2 mm.

8.47 (2.35, 2.96, 2.04, 1.12), II 6.73 (2.04, 2.24, 1.53, 0.92), III 5.51 (1.73, 1.84, 1.33, 0.61), IV 7.14 (2.04, 2.55, 1.73, 0.82). Leg formula: 1423. Opisthosoma yellowish, with many irregular black markings, a pair of cardiac markings and four indistinct chevron-like markings. Epigynum (Figs. 34–35) with anterolaterally extended trapeziform median lobe. Epigynal teeth with narrow base and wide body. Copulatory ducts located between spermathecae posteriorly. Spermathecae narrow anteriorly.

Male: unknown.

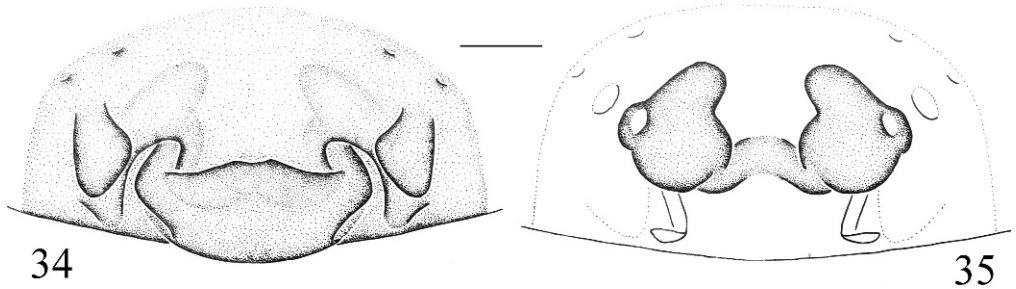
Distribution.—*Taira obtusa* is found in China (Hubei, Guizhou) (Fig. 41).

Habitat.—Specimens have been found within crevices of rocks.

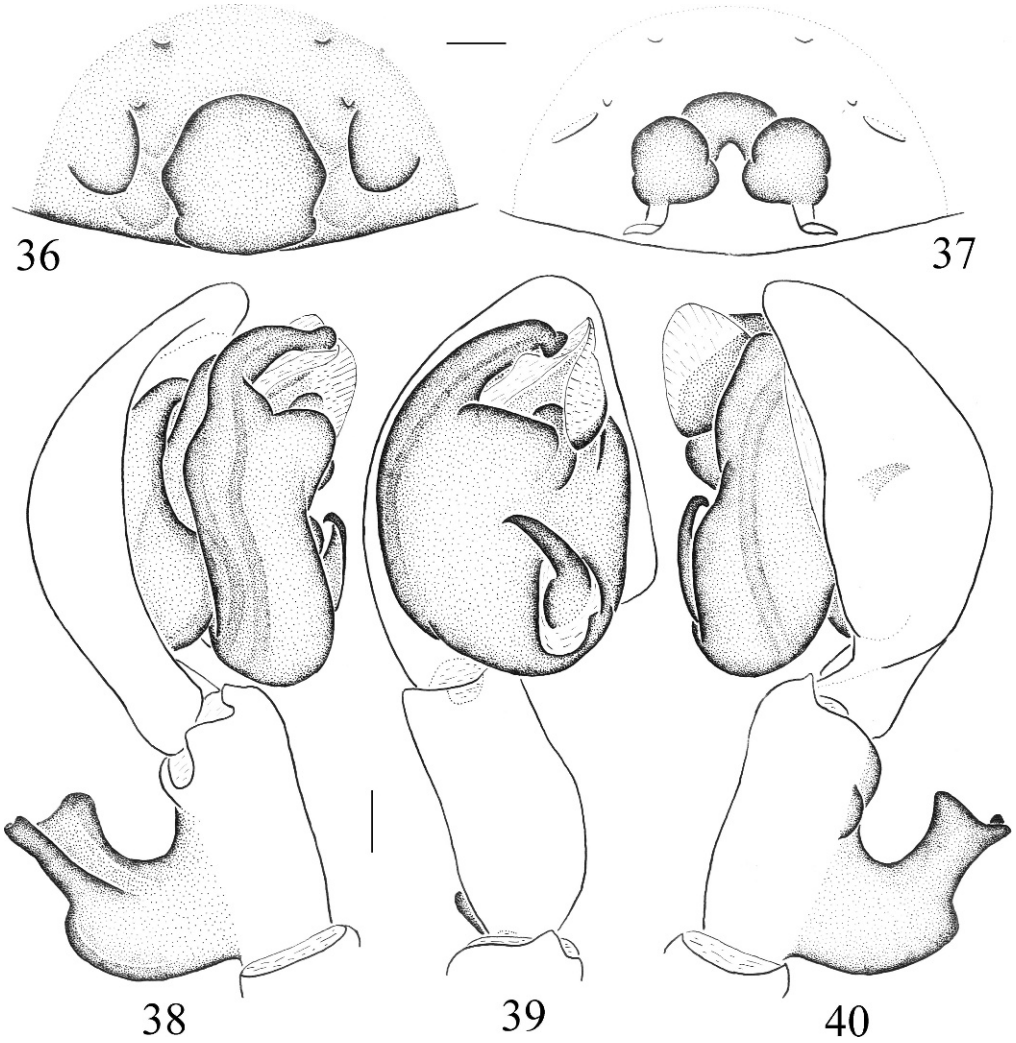
Taira sulciformis new species
Figs. 36–40, 41

Material examined.—*Holotype:* CHINA: *Fujian*: male, Mt. Wuyi (26°54′N, 116°42′E), Tongmu, 16 May 1985, Ming-Sheng Zhu (MHBU).

Paratypes: CHINA: *Fujian*: 1 male, 4 females, collected with holotype (MHBU); 1 female, Mt. Wuyi, Tongmu, 19 July 2003, Chao Zhang (MHBU).



Figures 34, 35.—*Taira obtusa* new species. 34. Female, epigynum. 35. Same, vulva. Scale lines: 0.2 mm.



Figures 36–40.—*Taira sulciformis* new species. 36. Female, epigynum. 37. Same, vulva. 38. Left palp of the male, prolateral view. 39. Same, ventral view. 40. Same, retrolateral view. Scale lines: 0.2 mm.

Etymology.—The specific name is a combination of ''*sulc*-'' and ''*-formis*.'' The former means ''groove,'' and the latter means ''with … shape.'' The combination refers to the obvious wide and big groove of the interior branch of DTA.

Diagnosis.—The new species is similar to *T. concava* (Figs. 17–21), but can be distinguished from the latter by the wide interior branch of DTA, indistinct depression of exterior branch of DTA prolaterally, the ventrally curved apex of embolus, the short median apophysis, the wide and flat tegular apophysis of the male palp; the longer median lobe, the wide and anteriorly curved copulatory ducts of female epigynum.

Description.—*Male:* total length 6.02–6.22. Holotype total length 6.22: prosoma 3.26 long, 2.24 wide; opisthosoma 3.26 long, 2.14 wide. Prosoma deep yellow. Eye sizes and interdistances: AME 0.15, ALE 0.18, PME 0.15, PLE 0.15. AME–AME 0.13, AME–ALE 0.15, PME–PME 0.23, PME–PLE 0.33, ALE–PLE 0.08. MOA 0.48 long, front width 0.38, back width 0.50. Clypeus height 0.23. Chelicerae red brown, with 4 promarginal and three retromarginal teeth. Endites and labium yellow. Sternum yellowish. Leg measurements: I 16.52 (4.28, 5.51, 4.69, 2.04), II 11.94 (3.37, 4.08, 3.06, 1.43), III 9.28 (2.75, 2.96, 2.45, 1.12), IV 11.72 (3.26, 3.98, 3.26, 1.22). Leg formula: 1243. Opisthosoma yellowish, with many black irregular markings, a pair of yellow longitudinal markings and four indistinct yellowish chevron-like markings. Palpal tibia with a dorso-lateral RTA. Interior branch of DTA wide, with an obvious groove prolaterally. Exterior branch of DTA small, blunt, and slightly depressed prolaterally. Apex of embolus thin and curved ventrally. Conductor membranous and doubled. Median apophysis relatively short, with an acute tip and an inflated base. Apex of tegular apophysis wide and flat (Figs. 38–40).

Female: total length 8.87–11.53. A female (one of paratypes) total length 11.53: prosoma 5.30 long, 3.67 wide; opisthosoma 6.53 long, 4.39 wide. Eye sizes and interdistances: AME 0.23, ALE 0.23, PME 0.18, PLE 0.20. AME–AME 0.18, AME–ALE 0.35, PME–PME 0.43, PME–PLE 0.63, ALE–PLE 0.13. MOA 0.83 long, front width 0.60, back width 0.78. Clypeus height 0.40. Leg measurements: I 13.88 (4.08, 4.49, 3.47, 1.84), II 11.83 (3.57, 4.08, 2.75, 1.43), III 10.10 (3.06, 3.57, 2.35, 1.12), IV 12.55 (3.57, 4.49, 3.16, 1.33). Leg formula: 1423. Epigynum (Figs. 36, 37) with the long median lobe and a pair of blunt epigynal teeth. Copulory ducts curved anteriorly. Spermathecae ball-like.

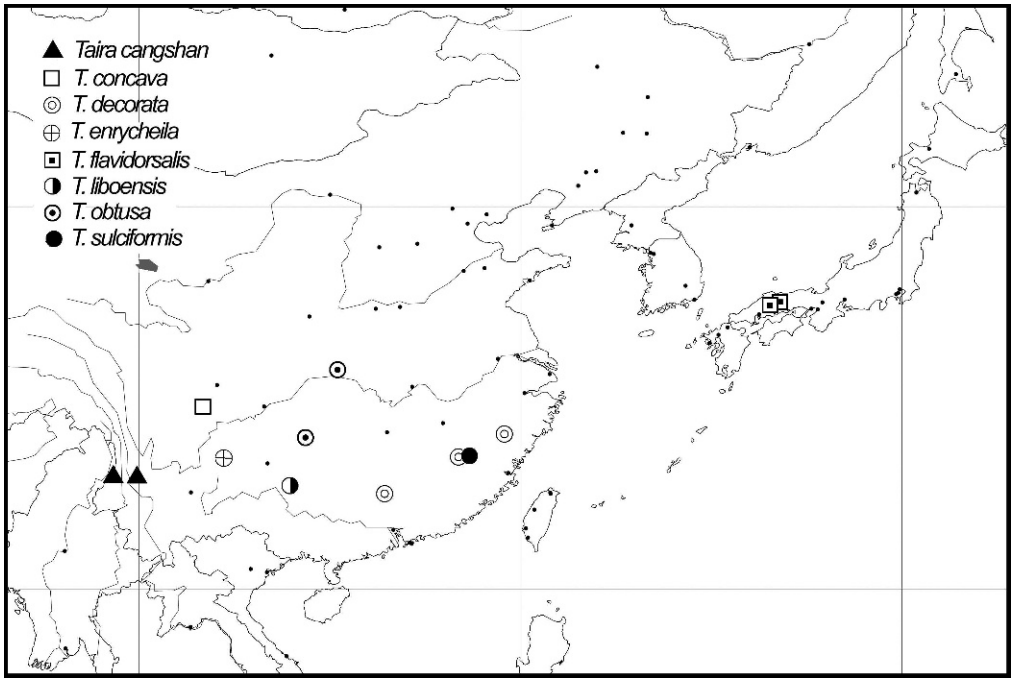


Figure 41.—Distribution of eight *Taira* species.

Distribution.—*Taira sulciformis* has been found in China (Fujian) (Fig. 41).

ACKNOWLEDGMENTS

We are grateful to Takahide Kamura (CASJ) for the loan of type specimens, Nikolaj Scharff (Zoological Museum, University of Copenhagen, Denmark) and Torbjorn Kronestedt (Naturhistorska Riksmuseum, Stockholm, Sweden) for the loan of valuable specimens. Thanks also due to our colleagues of Hebei University (Feng Zhang, Hui-Ming Chen, Jun-Xia Zhang, and Chao Zhang) and Zi-Zhong Yang (Dali University, China) for collecting valuable specimens. Xinping Wang (University of Florida, Gainesville, Florida, USA) and Hirotsugu Ono (National Science Museum, Tokyo) read the manuscript. This study was supported by the National Natural Science Foundation of China (NSFC No. 30499341, to Ming-Sheng Zhu) and Chinese Special Basic Scientific Research Project (2006FY120100, to Zhi-Sheng Zhang).

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Manuscript received 11 July 2007, revised 18 February 2008.