A REVIEW OF THE CHINESE PSECHRIDAE (ARANEAE)

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ABSTRACT. The Chinese psechrid spiders of the genera Fecenia and Psechrus are reviewed. The species Fecenia hainanensis is newly synonymized with F. cylindrata. The species P. mimus is considered a nomen dubium. The species P. senoculata is regarded as a valid species. The male is newly described for P. tingpingensis. Three new species are described: P. jinggangensis new species, P. rani new species, and P. taiwanensis new species. In all, nine psechrid species are recognized from China. The spinnerets, trichobothria, and tarsal organ morphology of P. tingpingensis are presented. A key to Chinese Psechrus species is also provided.

Keywords: Psechridae, Psechrus, Fecenia, China

Psechrid species of the genera Fecenia Simon 1887 and Psechrus Thorell 1878 are widespread from China (north to Qinling Mt., Shaanxi) and southeast Asia to New Guinea, with approximately 19 valid species (Platnick 2000). A revision of this family was presented by Levi (1982), who gave detailed diagnoses, illustrations, and descriptions of the family, genera, and species. Levi’s revision (1982) enabled further work on the species of this family possible (e.g., Murphy 1986; Yin, Wang & Zhang 1985). To date, seven psechrid species have been reported from China (Song, Zhu & Chen 1999): P. ghecuanus Thorell 1897; P. kunmingensis Yin, Wang & Zhang 1985; P. minus Chamberlin 1924; P. sinensis Berland & Berland 1914; P. tingpingensis Yin, Wang & Zhang 1985; Fecenia cylindrata Thorell 1895; and F. hainanensis Wang 1990. The presence of P. torvus (O. P.-Cambridge 1869) in Taiwan (Lee 1966; Hu 1984) was shown to be a misidentification (Chen 1996; Song, Zhu & Chen 1999).

Further collection and study of Chinese psechrids made this revision possible. In this paper, nine psechrid species are recognized from China. The species Fecenia hainanensis is newly synonymized with F. cylindrata. The species P. mimus, which was described based on an unidentifiable juvenile female (Chamberlin 1924), is considered a nomen dubium, and therefore the species P. senoculata is removed from its synonymy. The male is newly described for P. tingpingensis. The female previously identified as P. sinus by Levi (1982) is shown to be a new species. Three new species described in this study are: P. jinggangensis; P. rani; and P. taiwanensis.

METHODS

All measurements are in mm. All scales are 0.2 mm length. Leg measurements are shown as: total length (femur, patella + tibia, metatarsus, tarsus). The terms used in the genitalic descriptions follow Levi (1982). Because of the similar body color pattern, stable number of cheliceral teeth, and similar leg spine distributional pattern at species-level, the species descriptions are focused on the male and female genitalic structures. The material used in this study was based on collections made available through the courtesy of the following individuals and institutions: N.I. Platnick, American Museum of Natural History, New York, USA (AMNH); J. Margerison, The Natural History Museum, London, UK (BMNH); C.M. Yin, Hunan Biological Institute, Changsha, Hunan, China (HBI);
SPINNERETS, TRICHOBOTHRIA AND TARSAL ORGAN MORPHOLOGY

A representative species, *Psechrus tingpingensis*, was chosen here for detailed spinnerets, trichobothria, and tarsal organ descriptions in order to form a basis for further comparison with other psechrids and also with other families in future study. This species was selected for the reason of well-preserved spinnerets in the examined psechrid species and large numbers of available specimens.

Cribellum large, divided, female with numerous spigots (Figs. 39, 40), male without spigots (Fig. 41). According to a study by Zhang et al. (1998) of the female juvenile cribellum of *P. mimus* (sensu Zhang et al. 1998), “there was still not any spigot visible on the seventh day of molting; there were few small spigots in the middle area of cribellum on the ninth day of molting, and many spigots appeared on the eleventh day juveniles but still no distinct segment.” Apex of anterior lateral spinneret (ALS) with two major ampullate spigots (MAP) at mesal margins, many short piriform spigots in both male and female; posterior median spinneret (PMS) strongly curved back anteriorly (Fig. 36), with spigots situated on distal half of the segment, one minor ampullate spigots (mAP) on distal end, 40–50 aciniform spigots in both male and female, and 11–12 cylindrical spigots (as shown in short arrows) in female arranged in two rows; posterior lateral spinneret (PLS) with approximately 30 aciniform spigots in both male and female, and at least 16 cylindrical spigots (as shown in short arrows) in female (Figs. 42–47). Trichobothrial base with hood transversely striated (Fig. 37). Tarsal organ oval to round (Fig. 38), situated dorsally on distal tarsus, slightly anterior of most distal trichobothrium.

KEYS TO CHINESE *PSECHRUS* SPECIES

Males

1. Palpal femur modified with notch (Figs. 21, 26, 33) .................................. 2
   Palpal femur without such modification .......................................................... 4
2. Conductor base enlarged, with small tubercles (Fig. 19) .............................. *senoculata*
   Conductor base not enlarged, without tubercles ............................................. *tingpingensis*
3. Embolic base with 2 teeth (Figs. 31, 32) ..................................................... *tingpingensis*
   Embolic base with only 1 tooth (Figs. 24, 25) ............................................. *sinensis*
4. Embolus short, much shorter than the bulb length (Figs. 5, 6) ..................... *ghecuanus*
   Embolus long, at least the bulb length (Figs. 13, 14) ..................................... *rani* new species

Females

1. Ventral abdomen with distinct white spot in front of cribellum .......................... 2
   Ventral abdomen without distinct white spot in front of cribellum ..................... 7
2. Epigynum with slits more or less parallel (Fig. 29) ..................................... *taiwanensis* new species
   Epigynum otherwise (Figs. 9, 11, 22, 27, 34) ............................................ *tingpingensis*
3. Epigynal median sclerite lobed on sides, spermathecal heads situated laterad of spermathecae (Figs. 9, 10) ................................................................. *kunmingensis*
   Epigynal median sclerite not lobed, spermathecal heads situated mesad of spermathecae (Figs. 11, 12, 22, 23, 27, 28, 34, 35) ................................................................. *tingpingensis*
4. Slits of epigynum wider apart anteriorly than posteriorly (Figs. 11, 22) ............. *senouculata*
   Slits of epigynum wider apart posteriorly than anteriorly (Figs. 27, 34) ............... *jinggangensis* new species
5. Posterior copulatory ducts much larger than spermathecae (Fig. 23) ................. *senoculata*
   Posterior copulatory ducts much smaller than spermathecae (Fig. 12) .... *jinggangensis* new species
6. Anterior epigynum strongly narrowed, width approximately ¼ of posterior (Fig. 27) .... *sinensis*
   Anterior epigynum moderately narrowed, width at least ½ of posterior (Fig. 34) .... *tingpingensis*
7. Spermathecal heads situated mesad of spermathecae (Fig. 16) ......................... *rani* new species
   Spermathecal heads situated anterad of spermathecae (Fig. 8) ......................... *ghecuanus*
TAXONOMY

Fecenia cylindrata Thorell
Fig. 1–4, Map 1


Fecenia hainanensis Wang 1990: 257, figs. 1–3 (female holotype from Tongqian City, Hainan, China, in HBI, examined). Song, Zhu & Chen 1999: 397. NEW SYNONYMY.

Synonymy.—This species was erroneously described as F. hainanensis with one female specimen from Hainan, China. The only difference between F. hainanensis and F. cylindrata, according to Wang (1990), was the presence of a pair of long, oval, white spots on ventral abdomen. Apparently, such spots are present in F. cylindrata and other Fecenia species (Levi 1982). Later collection of F. cylindrata with both males and females from the same locality (Yang & Wang 1993) further showed that F. hainanensis is in fact a junior synonym of F. cylindrata. The species F. cylindrata was collected from Tongqian and Qionghai, Hainan, China (Wang 1990; Yang & Wang 1993). It is widespread and occurs in large numbers in Qionghai (Yang & Wang 1993).

Map 1.—Distribution of Fecenia cylindrata, Psechrus ghecuanus, P. kunmingensis and P. jinggangensis new species in China.
Diagnosis.—This species can be distinguished from others by the presence of a median depression on the epigynum, and by the shape and transverse direction of the median apophysis (Figs. 1–4).


Material examined.—CHINA: Hainan: Jianfeng, 6 August 1990, 1 male and 1 female (M.B. Gu, HTU); Tongqian, 1 July 1984, female holotype of *F. hainanensis* Wang 1990 (M.Y. Liu, HBI).

Distribution.—China (Hainan) (Map 1), Myanmar.

*Psechrus ghecuanus* Thorell
Figs. 5–8; Map 1


Diagnosis.—This species is similar to *P. torvus* but can be distinguished by the short embolus, the simple embolic base (Figs. 5, 6), and the more or less parallel epigynal slits (Figs. 7, 8).

Male.—See description of Yin, Wang & Zhang (1985). White spot in front of cribellum absent. Male palpal femur without modification; palpal bulb duct more or less strongly curved, U-shaped; conductor long, lamella shaped; embolus short, slender; embolic base simple, not rectangular, but slightly triangular (Figs. 5, 6).

Female.—See descriptions of Thorell (1897), Levi (1982), and Yin, Wang & Zhang (1985). White spot in front of cribellum absent. Epigynal slits more or less parallel; epigynal median sclerite wide, width about 1.25 × length; copulatory ducts short, not distinct; spermathecal heads apparent, situated anteriorly; spermathecae rounded, large, widely separated (Figs. 7, 8).

Material examined.—CHINA: Yunnan: Mengla, 21 March 1978, 1 male and 1 female (J.F. Wang, HBI); Mengluo, 31 July 1981, 2 females (J.F. Wang, HBI); Menghai, 23 March 1978, 1 male and 1 female (J.F. Wang, HBI).
Figures 9, 10.—Psechrus kunmingensis, female. 9. Epigynum; 10. Vulva.

**Distribution.**—China (Yunnan) (Map 1), India, Thailand, Myanmar.

*Psechrus kunmingensis* Yin, Wang & Zhang
Figs. 9, 10; Map 1

*Psechrus kunmingensis* Yin, Wang & Zhang 1985:
25, fig. 5(A-D) (female holotype and 3 female paratypes from Kunming, Yunnan, China, in HBI, examined). Song, Zhu & Chen 1999: 397, figs. 232C-D, O-P (male and female).

*Psechrus tienpinensis*: Feng 1990: 34, fig. 9 (male only) (misidentification).

**Diagnosis.**—This species can be easily distinguished by the laterally lobed epigynal median sclerite, the lateral placement of the spermathecal heads, the shape of spermathecae (Figs. 9, 10) and the presence of strong apophyses at embolic base.

**Female.**—Described by Yin, Wang & Zhang (1985). White spot in front of cribellum present. Epigynal slits not parallel; epigynal median sclerite elongated, with lateral margins lobed; copulatory ducts long, distinct, widely separated; spermathecal heads apparent, situated laterally, curved anteriorly; spermathecae transversely extended, large, widely separated (Figs. 9, 10).

**Male.**—Illustrated by Song, Zhu & Chen (1999), but not described. The male specimens are not available in this study. Judging from the illustrations by Song, Zhu & Chen (1999), male palpal bulb duct only slightly U-shaped; conductor long, lamella shaped; embolus short, slender; embolic base with strong apophyses (figs. 232O-P in Song, Zhu & Chen 1999).

**Material examined.**—CHINA: Yunnan: Kunming, 5 April 1979, female holotype (J.F. Wang, HBI); Kunming, July 1983, 2 female paratypes (M.Y. Liu, HBI); Kunming, 21 July 1981, 4 females (J.F. Wang, HBI); Kunming, 30 June 1999, 1 female (X. Xu, HBI).

**Distribution.**—China (Yunnan) (Map 1).

*Psechrus jinggangensis* new species
Figs. 11, 12; Map 1

**Types.**—Female holotype from Jinggangshan (N26.5E114.1), Jiangxi, China (4 October 1996; C.M. Yin), deposited in HBI.

**Etymology.**—The specific name refers to the type locality.

**Diagnosis.**—This species is similar to *P. kunmingensis* but can be distinguished by the laterally concaved epigynal median sclerite, the rounded spermathecae, and the mesal placement of the spermathecal heads (Figs. 11, 12).

**Female.**—Total length 24.5. Carapace 9.0 long, 7.8 wide. Abdomen 15.5 long, 9.0 wide. Leg measurements: I: 63.2 (18.5, 22.2, 15.1, 7.4); II: 47.3 (13.0, 16.5, 12.0, 5.8); III: 33.5 (10.0, 10.5, 8.5, 4.5); IV: 46.0 (14.0, 15.5, 21.5, 4.5).
White spot in front of cribellum present. Epigynal slits not parallel; epigynal median sclerite elongated, with lateral margins concave; copulatory ducts widely separated anteriorly, approaching each other posteriorly; spermathecal heads apparent, situated mesally; spermathecae rounded, widely separated (Figs. 11, 12).

**Male.**—Unknown.

**Other material examined.**—None.

**Distribution.**—China (Jiangxi) (Map 1).

**Psechrus rani** new species
Figs. 13–18; Map 2

**Types.**—Male holotype from Sanchahe, Maolan National Nature Reserve, Libo, Guizhou, China (6 October 1997; X.P. Wang); female paratype from Xiaoqikong, Libo, Guizhou, China (2 March 1995; J.C. Ran), deposited in IZB.

**Etymology.**—The specific name is a patronym in honor of Mr. Jing-Cheng Ran of the research department, Maolan National Natural Reserve, Guizhou, China, the collector of the paratype female.

**Notes.**—The male and female are matched because their localities are close together and also the similar size.

**Diagnosis.**—This new species seems closest to *P. torvus* but can be distinguished by the simple, small embolic base, the enlarged conductor base (Figs. 13, 14), and the more or less parallel lateral margins of epigynal median sclerite, and the shape of spermathecae (Figs. 15, 16).

**Male.**—Total length 18.0. Carapace 7.2 long, 5.6 wide. Abdomen 10.8 long, 4.8 wide. Leg measurements: I: 69.6 (18.4, 23.2, 19.2, 8.8); II: 53.4 (14.4, 18.0, 14.0, 7.0); III: 33.6 (9.6, 11.2, 9.2, 3.6); IV: 54.8 (15.2, 17.0, 15.0, 7.6). White spot in front of cribellum absent. Male palpal femur without modification; palpal bulb duct simply curved, slightly U-shaped; conductor long, lamella shaped, with enlarged base; embolus long, slender; embolic base simple, small, not rectangular (Figs. 13, 14).

**Female.**—Total length 21.6. Carapace 8.0 long, 6.0 wide. Abdomen 13.6 long, 8.0 wide. Leg measurements: I: 54.8 (14.8, 18.4, 14.4, 7.2); II: 44.2 (12.4, 15.2, 11.0, 5.6); III: 31.2 (9.2, 9.6, 8.0, 4.4); IV: 46.2 (12.8, 14.4, 12.0, 7.0). White spot in front of cribellum absent. Epigynal slits more or less parallel; epigynal median sclerite with lateral margins wide apart medially, posteriorly, approaching each other anteriorly; width of epigynal median sclerite approximately 1.5× length; copulatory ducts short but clearly visible; spermathecal heads apparent, short, situated mesally; spermathecae rounded, widely separated (Figs. 15, 16).

**Penultimate instar.**—As indicated by Levi (1982), some sclerotized sculpturing occurs in the genital area in the penultimate instar. In
the penultimate instar, the epigynum and vulva (Figs. 17, 18) are clearly apparent and may be confused with adults stage (Figs. 15, 16), if no adults are collected and compared with it. Compared to the adult stage, the longitudinal grooves of the epigynum of the penultimate instar are much shorter and not well developed, and the spermathecae and spermathecal heads are weaker, although the copulatory ducts and fertilization ducts are as well developed as the adult stage. Perhaps this is one reason why the psechrid female genitalia appear so variable. According to our collection of *P. senoculata* from various places in China, including Shaanxi, Hubei, Sichuan, Hunan, and Guizhou Province, all adult female genitalia are stable, particularly the vulva.

**Other material examined.**—**CHINA:** Guizhou: Libo, Maolan National Nature Reserve, Yaozai, 7 October 1997, 1 female penultimate instar (X.P. Wang, IZB).

**Distribution.**—China (Guizhou) (Map 2).

*Psechrus senoculata* Yin, Wang & Zhang

Figs. 19–23; Map 2

Psechrus minus: Xu & Wang 1983: 35, figs. 1–7 (male and female); Song 1987: 68, figs. 34A-D (male and female); Song 1988: 33; Chen & Zhang 1991: 40, fig. 31 (male and female); Zhang
Map 2.—Distribution of *Psechrus rani* new species and *P. senoculata* in China.

**Synonymy.**—The species *P. senoculata* has been treated as a junior synonym of either *P. mimus* (Song 1988) or identified as *P. sinensis* (see Hu 1984; Chen & Gao 1990). Chamberlin (1924) described *P. mimus* from an unidentifiable female juvenile from Su-

zhou, Jiangsu, China and should be considered as nomen dubium. Further study of the types of *P. sinensis* (two male syntypes from Guiyang, Guizhou, China, in MNHN, examined) showed that *P. senoculata* is a valid species rather than the synonym of *P. sinensis*.

**Diagnosis.**—This species can be easily distinguished from *P. sinensis* by the elongated, vase-shaped, anteriorly wider epigynal median sclerite (Fig. 22), the large, strongly expanded posterior part of copulatory ducts (Fig. 23), and the strongly enlarged, tuberculous conductor base (Fig. 19).

**Male.**—Described by Yin, Wang & Zhang (1985) and Song (1987). White spot in front of cribellum present. Palpal femur modified with notch (Fig. 21); palpal bulb duct U-shaped; conductor short, lamella shaped; conductor base strongly enlarged, with numerous small tubercles; embolus short, slender, with rectangular base (Figs. 19–21).

**Female.**—Described by Yin, Wang & Zhang (1985) and Song (1987). White spot in front of cribellum present. Epigynal slits wider apart anteriorly than posteriorly; epigynal median sclerite vase-shaped; copulatory ducts with posterior part enlarged, extending anteriorly; spermathecal heads apparent; spermathecae rounded, relatively small, close to each other (Figs. 22, 23).

**Material examined.**—**China:** Hunan: Sangzhi, 21 August 1984, female holotype (Y.J. Zhang, HBI); Daiyong, Zhangjiajan, 20 September 1984, male allotype (Y.J. Zhang, HBI); Chengbu, July 1982, 2 females (X.C. Ouyang, HBI); Liuyang, Mt. Dawei, 31 July 1994, 1 female (H.M. Yan, HBI); Changsha, Lukou, 30 June 1999, 1 female (Xu, HBI); Daoxian, 9 October 1991, 1 male (L.S. Gong,
Map 3.—Distribution of *Psechrus sinensis*, *P. taiwanensis* new species, and *P. tingpingensis* in China and Vietnam.


**Distribution.**—China (Hunan, Zhejiang, Hubei, Guizhou, Sichuan, Shaanxi) (Map 2).

*Psechrus sinensis* Berland & Berland 1914

Figs. 24–28, Map 3

*Psechrus sinensis* Berland & Berland 1914: 131, figs. 1–3 (two male syntypes from Guiyang, Guizhou, China, in MNHN, examined). Lehtinen 1967: 261, fig. 474 (male) (incorrectly synonymized with *P. singaporensis*); Levi 1982: 123, figs. 34, 35 (male only, female is *P. taiwanensis* sp. nov.); Song, Zhu & Chen 1999: 397, figs. 232G-H, S (male and female).


**Synonymy.**—Study of *P. sinensis* male types and further collections of psechrids in China shows that *P. guiyangensis* is a junior synonym of *P. sinensis* (Song, Zhu & Chen 1999). As suspected by Levi (1982), the female (from Taiwan) illustrated as *P. sinensis* in Levi’s (1982) paper is a new species *P. taiwanensis*, which will be described in this paper. Although Lehtinen (1967) listed *P. sinensis* as a junior synonym of *P. singaporensis*, this was not followed by later authors (Levi 1982; Platnick 1997; Platnick 2000). The species *P. sinensis* can be easily distinguished from *P. singaporensis* by the presence of white spot in front of cribellum, the strongly narrowed anterior part of epigynal median sclerite, the spermathecal shape, and the shape of conductor and embolic base.

**Diagnosis.**—This species is similar to *P. senoculata* but can be recognized by the
sence of tubercles on the conductor base, the different shape of the rectangular embolic base (Figs. 24, 25), and the anteriorly narrowed median epigynal sclerite, and the narrowly separated copulatory ducts (Figs. 27, 28).

**Male.**—Described by Berland & Berland (1914) and Levi’s (1982). White spot in front of cribellum present. Palpal femur modified with notch (Fig. 26); palpal bulb duct simply curved, slightly U-shaped; conductor short, lamella shaped; conductor base normal, not enlarged; embolus short, slender; embolus with toothed rectangular base (Figs. 24–26).

**Female.**—See Yin, Wang & Zhang’s (1985) description of *P. guiyangensis*. White spot in front of cribellum present. Epigynal slits approach each other anteriorly; epigynal median sclerite wider posteriorly than anteriorly, with anterior part only about ¼ width of posterior part; copulatory ducts narrowly separated medially, with anterior and posterior part moderately separated; spermathecal heads apparent, situated mesally on spermathecae; spermathecae rounded, widely separated (Figs. 27, 28).

**Material examined.**—**CHINA**: Guizhou: Guiyang (Kouy-Tcheou, Env. De Kouy-Yang), 1909 and 1913, 2 male syntypes (Le P. Cavalerie, MNHN); Guiyang, 30 September 1997, 1 female (X.P. Wang, AMNH); Guiyang, 4 July 1983, female holotype and 4 female paratypes of *P. guiyangensis* (Y.J. Zhang, HBI); Anshun, 2 July 1999, 2 females (X. Xu, HBI).

**Distribution.**—China (Guizhou) (Map 3).

**Psechrus taiwanensis** new species

**Type.**—Female holotype from Taiwan (1894; Holst), deposited in BMNH, examined.

**Etymology.**—The specific name refers to the type locality.

**Diagnosis.**—This species is similar to *P. rani* new species, but can be distinguished by...
the depressed epigynal median sclerite, the posteriorly enlarged copulatory ducts, the small spermathecae of female (Figs. 29, 30).

**Female.**—For body measurements, see Levi’s (1982) description of female *P. sinensis*. White spot in front of cribellum present. Epigynal slits more or less parallel; epigynal median sclerite depressed, with width slightly longer than length; copulatory ducts apparent, widely separated, enlarged posteriorly; spermathecal heads apparent, situated mesally; spermathecae small, widely separated (Figs. 29, 30).

**Male.**—Unknown.

**Other material examined.** None.

**Distribution.**—China (Taiwan) (Map 3).

*Psechrus tingpingensis* Yin, Wang & Zhang
Figs. 31–47, Map 3

*Psechrus tingpingensis* Yin, Wang & Zhang 1985: 23, fig. 3 (female holotype and 2 female para-

**Diagnosis.**—The male of this species is similar to *P. sinensis* and *P. senoculata* in having a rectangular embolic base and modified femur (Fig. 33), but can be recognized by the slightly bifid conductor apex, and the presence of two apophyses on embolic base (Figs. 31–33). The female of this species is similar to *P. sinensis* but can be distinguished by the much wider anterior part of epigynal median sclerite, and the anteriorly spiral copulatory ducts (Figs. 34, 35).

**Male.**—Total length 16.0–18.0. One medium-sized specimen measured: Total length
Carapace 8.0 long, 4.5 wide. Abdomen 10.0 long, 4.0 wide. Leg measurements: I: 62.1 (17.0, 20.0, 17.5, 7.6); II: 46.0 (14.0, 15.0, 12.0, 5.0); III: 28.0 (9.0, 8.5, 6.5, 4.0); IV: 45.2 (13.0, 14.0, 12.0, 6.2). White spot in front of cribellum present. Palpal femur modified; palpal bulb duct U-shaped; conductor long, bifid, with dorsal apophysis sharp, highly sclerotized, ventral one broad, membranous; conductor base not enlarged, but with numerous small tubercles; embolus short, broad with sharp apex; embolic base broad, with two strongly sclerotized apophyses (Figs. 31, 32).

Female.—Described by Yin, Wang & Zhang (1985). White spot in front of cribellum present. Epigynal slits approaching each other anteriorly; epigynal median sclerite wider posteriorly than anteriorly, with anterior part about 1/2 width of posterior part; copulatory ducts spiral anteriorly, widely separated posteriorly; spermathecal heads apparent, situated mesally; spermathecae rounded, widely separated (Figs. 34, 35).


Distribution.—China (Hunan, Guangxi), Vietnam (Hanoi) (Map 3).

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LITERATURE CITED


