

## Cave-inhabiting Neobisiidae (Arachnida: Pseudoscorpiones) from the Yunnan–Guizhou Plateau, with the description of twenty new species of *Bisetocreagris* Ćurčić

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**Abstract.** Twenty new species of the genus *Bisetocreagris* Ćurčić, 1983 are described from caves in the provinces of Guizhou (*B. baiyunensis* sp. nov., *B. baimensis* sp. nov., *B. bangenensis* sp. nov., *B. daxingensis* sp. nov., *B. diaojiangensis* sp. nov., *B. dongjiensis* sp. nov., *B. duolangpingensis* sp. nov., *B. ganxiaoensis* sp. nov., *B. guanyinensis* sp. nov., *B. matuoensis* sp. nov., *B. sanhensis* sp. nov., *B. shahensis* sp. nov., *B. shangshanensis* sp. nov. and *B. yaolinensis* sp. nov.), Yunnan (*B. mahnerti* sp. nov. and *B. tuanjiensis* sp. nov.), Sichuan (*B. tianyangensis* sp. nov.), Chongqing (*B. xianduhensis* sp. nov.), Hubei (*B. changchaoensis* sp. nov.) and Guangxi (*B. xiniuyanensis* sp. nov.). An identification key is provided to all known Chinese cave-inhabiting representatives of the genus *Bisetocreagris*.

**Keywords:** pseudoscorpion, taxonomy, identification key, China.

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<http://zoobank.org/References/1AFA6BA5-1A41-4DFA-A55A-8359EEF9CF11>

The Yunnan–Guizhou Plateau is located in southwestern China. It is one of the four major plateaus in China, bordered by Hunan Province and the Guangxi Zhuang Autonomous Region to the east; the Tibet Autonomous Region to the west; Sichuan Province and Chongqing city to the north; and Myanmar, Laos and Vietnam to the south. The main body of the plateau is located in Yunnan and Guizhou Provinces, with an average elevation of 2,000 m. It is mountainous and hilly with high elevations in the northwest and low elevations in the southeast. It is one of the world's biodiversity centers (Wang et al. 2019). The typical humid tropical-subtropical karst landform of this plateau creates a spectacular karst landscape, including the core area of the Southern China Karst Natural World Heritage Site. The geomorphic landscape formed by chemical dissolution of soluble carbonate rocks constitutes a unique surface ecosystem, while the complex and closed underground cave system includes many poorly known biological groups. Therefore, the Yunnan–Guizhou Plateau has special biological research value and requires ecological protection. Most areas of the Yunnan–Guizhou Plateau contain karst landforms that form numerous caves. However, only a small number of cave-dwelling species from the Plateau have been described to date.

The pseudoscorpion subfamily Microcreagrinae Balzan, 1892 belongs to the family Neobisiidae Chamberlin, 1930, the members of which vary from medium to large size (3–8 mm), mostly distributed in the Palearctic and Nearctic ecozones and divided into 25 genera (Nassirkhani et al. 2019; World Pseudoscorpiones Catalog 2022). Schiödt (1847) described the first cave species *Neobisium spelaeum* (as *Blothrus spelaeus*) from Slovenia (Postojnska Jama). At present, there are 286 known cave-inhabiting species belonging to 20 genera in the family Neobisiidae (Li, unpublished data), mostly concentrated in Mediterranean Europe, the Balkans and Romania. However, there has been very limited

investigation of cave-inhabiting Neobisiidae in China. Only *Parobisium* Chamberlin, 1930 and *Bisetocreagris* Ćurčić, 1983 have been reported from China (Mahnert & Li 2016; Li et al. 2017; Gao et al. 2018; Feng et al. 2019, 2020; Zhang et al. 2020).

The genus *Bisetocreagris* Ćurčić, 1983 was designated with *Microcreagris annamensis* Beier, 1951 (by original designation) (Ćurčić 1983) as the type species. So far, 12 cave-inhabiting species of this genus have been reported from China. During the identification of pseudoscorpion specimens collected from Yunnan–Guizhou Plateau in the years 2014–2020, we found twenty new cave-inhabiting species of *Bisetocreagris*, which we describe in this article.

### METHODS

The type specimens of the new species are deposited in the collections of the Museum of China West Normal University, Nanchong, Sichuan, China (MCWNU), and are preserved in 75% ethanol. They were cleared in lactic acid for 12 to 24 hours at room temperature and, after study, washed in distilled water and returned to alcohol. The specimens were examined with a Leica M205FA stereomicroscope and an Olympus CX31 compound microscope. Photographs were taken using a Canon 6D Mark II camera fitted with a Laowa 25mm f/2.8 2.5–5X and 100mm F2.8 2.0X Ultra Macro lens. The final high DoF (depth of field) images were stacked from 30–80 single photos using Helicon Focus 7.6.1.

Pseudoscorpion terminology and measurements mostly follow Chamberlin (1931) with some minor modifications to the terminology of the trichobothria (Harvey 1992) and chelicerae (Judson 2007). The following abbreviations apply to the trichobothria: *b* = basal; *sb* = sub-basal; *st* = sub-terminal; *t* = terminal; *ib* = interior basal; *isb* = interior sub-basal; *ist* = interior sub-terminal; *it* = interior terminal; *eb* = exterior basal; *esb* = exterior sub-basal; *est* = exterior sub-terminal; *et* = exterior terminal.

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## TAXONOMY

**Family Neobisiidae Chamberlin, 1930**  
**Subfamily Microcreagrinae Balzan, 1892**  
**Genus *Bisetocreagris* Ćurčić, 1983**

*Bisetocreagris* Ćurčić 1983: 25.

*Chinacreagris* Ćurčić 1983: 30 (synonymized by Harvey 1999: 94).

*Pedalocreagris* Ćurčić 1985: 349 (synonymized by Judson 1993: 1207).

**Type species.**—*Bisetocreagris*: *Microcreagris annamensis* Beier, 1951, by original designation.

*Chinacreagris*: *Microcreagris chinensis* Beier, 1943, by original designation.

*Pedalocreagris*: *Pedalocreagris tethys* Ćurčić, 1985, by original designation

**Remarks.**—The genus *Bisetocreagris* currently contains 40 valid species, all from Asia. Of these, 28 are known from China, and a total of 12 have been recorded from caves.

***Bisetocreagris baiyunensis* Li & Shi, sp. nov.**

<http://zoobank.org/NomenclaturalActs/95A26E28-F9F8-4D21-9936-E667D5AB4A58>  
 (Figs. 1, 22A)

**Type material.**—*Holotype female*. CHINA: Guizhou Province: Renhuai City, Houshan Town, Baiyun Village, Nameless Cave, 27.579722°N, 106.220088°E, 1179 m, 24 April 2019, Yun-Chun Li (MCWNU).

*Paratypes*. CHINA: Guizhou Province: 1 ♀, 1 tritonymph, same data as the holotype (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can easily be distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 2 (anterior) eyespots, and epistome small; pedipalps femur 5.50–5.53 × (length 1.95–1.99) and patella 3.88–3.91 × (length 1.73–1.82) longer than broad, pedicel about the same length as the widened part of patella (club), with a slightly rounded retrolateral margin. There is weak protrusion of the galea with the width approximately equal to the width of the fingertip, which can be easily distinguished from other species.

**Etymology.**—Latinized adjective, derived from the village of Baiyun, near the type locality.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen brown, legs yellowish.

*Carapace* (Fig. 1A): Smooth, 1.13–1.15 × longer than broad; epistome very small and weakly rounded. With 2 (anterior) eyespots on a raised surface, length 0.03mm, breadth 0.01mm. With a total of 25–30 setae, including 6 on the anterior margin and 7–8 on the posterior margin.

*Chelicera*: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta, fixed finger with 13–16 teeth, movable finger with 12–14 teeth (Fig. 1B). Weak protrusion of galea with the width approximately equal to the width of the fingertip (Fig. 1C). Serrula exterior with about 34–38 blades and serrula interior with 28–30. Rallum composed of 8 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 1D).

*Abdomen*: Tergal chaetotaxy (I–XI): 8: 10: 8: 8: 9: 8: 9: 9: 10: 10: 7 (2 tactile setae); sternal chaetotaxy (III–XI): 2x7+10: 2x6+8: 15: 14: 15: 14: 15: 12: 8 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 5–6 setae, coxa I 7, II 5, III 4, IV 9. Genital operculum of female (Fig. 1J) with 16 setae, 8 on each side.

*Pedipalps* (Figs. 1E–G): Lateral side of hand finely granulated at the base of the fixed finger, trochanter 2.49–2.52 × longer than broad, distal part of femur slightly enlarged, 5.50–5.53 × longer than broad, patella slender, 3.88–3.91 × longer than broad, with narrow pedicel, 5.17–5.22 × longer than broad, and very narrow club, 1.96–2.01 × longer than broad, with a slightly rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur 1.13–1.15 × longer than patella. Chela with pedicel 4.72–4.74 × longer than broad, hand with pedicel 2.39–2.41 × longer than broad; movable finger 1.13–1.15 × longer than hand (with pedicel) length. Fixed finger with 127–132 small cusped teeth, movable finger with 138–143 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria and movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* slightly distal of finger middle, *est* nearer to *et/it* than to *ist*; *it* distinctly closer to fingertip than to *et*; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *b* than to *st*.

*Legs* (Figs. 1H–I): Typical for Neobisiidae, elongate. Leg I: trochanter 1.51–1.54 × longer than deep, femur 5.12–5.15 × longer than deep and 1.52–1.55 × longer than patella, patella 3.73–3.76 × longer than deep, tibia 7.10–7.15 × longer, basitarsus 4.19–4.23 × longer, telotarsus 5.57–5.72 × longer than deep, telotarsus 1.39–1.46 × longer than basitarsus. Leg IV: trochanter 1.81–1.90 × longer than deep, femur+patella 5.20–5.26 × longer than deep, femur shorter than patella, tibia 9.27–10.06 × longer than deep, basitarsus 4.22–4.31 × longer, telotarsus 5.92–6.01 × longer than deep. Tibia with one tactile seta in the middle (TS = 0.34–0.35), basitarsus with two tactile setae (basally, TS = 0.38–0.39; distally, TS = 0.29–0.32), telotarsus with a tactile seta near the middle (TS = 0.40–0.41), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length 5.50–5.62; carapace 1.14–1.15/1.00–1.01. Pedipalps: trochanter 0.92–0.93/0.35–0.37, femur 1.95–1.99/0.35–0.37, patella 1.73–1.82/0.45–0.47, hand with pedicel 1.50–1.58/0.62–0.66, length of finger 1.62–1.78, length of chela 3.12–3.32/0.62–0.66. Leg I: trochanter 0.38–0.40/0.25–0.26, femur 1.05–1.07/0.20–0.21, patella 0.69–0.71/0.17–0.18, tibia 0.91–0.92/0.12–0.13, basitarsus 0.46–0.48/0.11–0.12, telotarsus 0.64–0.67/0.11–0.12. Leg IV: trochanter 0.54–0.57/0.30–0.32, femur+patella 1.61–1.65/0.31–0.33, tibia 1.62–1.67/0.17–0.18, basitarsus 0.57–0.58/0.13–0.14, telotarsus 0.81–0.83/0.13–0.14.

**Distribution.**—This species is only known from Nameless Cave, near Renhuai City in Guizhou Province, China.

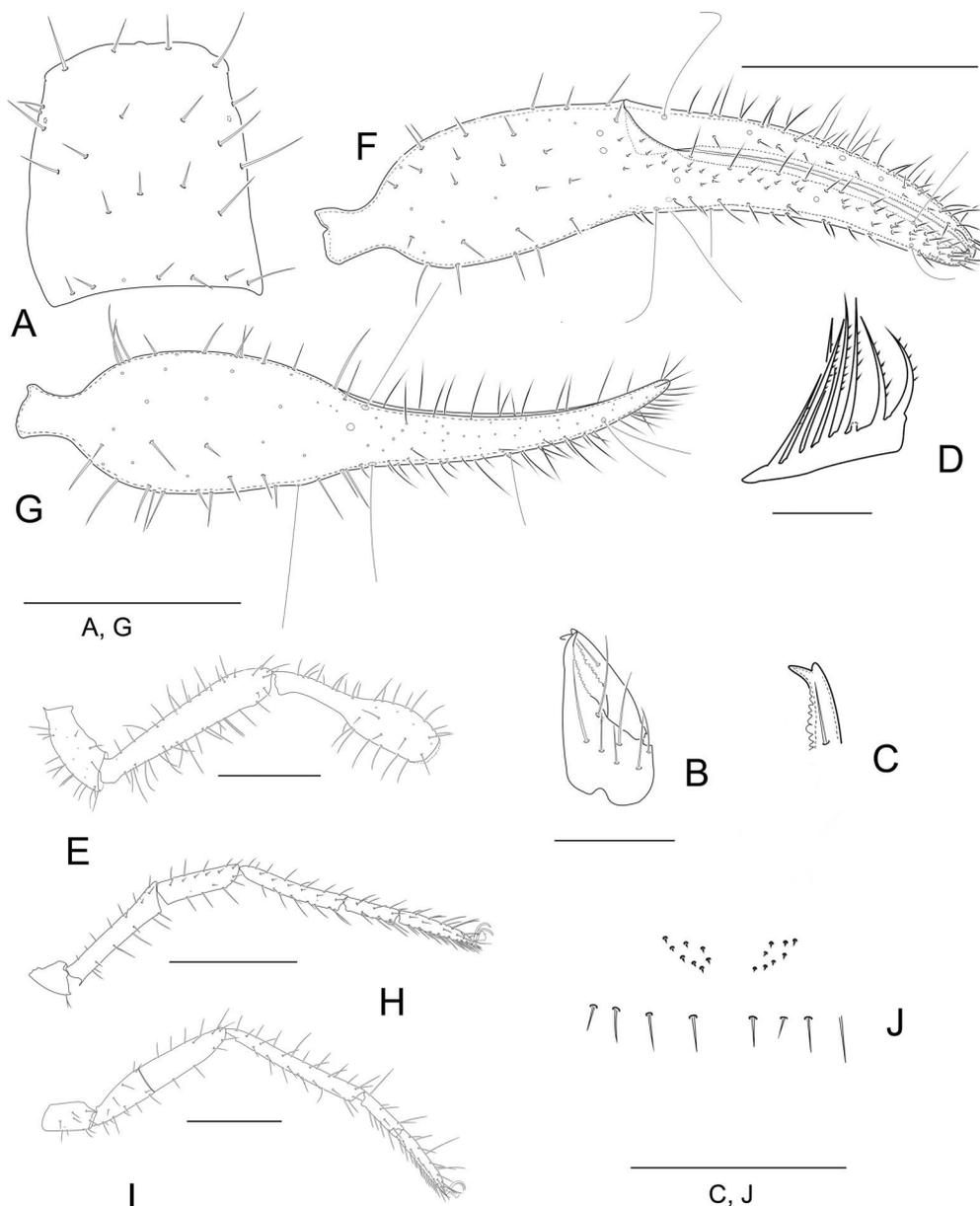


Figure 1.—*Bisetocreagris baiyunensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, right galea; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, right leg I, lateral view; I, right leg IV, lateral view; J, genital area. Scale bars: 0.10 mm (D); 0.50 mm (B–C, J); 1.00 mm (A, E–I).

*Bisetocreagris baimensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/A8336100-8E1C-40EC-8218-0AF8C6A6274B>  
(Figs. 2, 22B)

**Type material.**—*Holotype female*. CHINA: *Guizhou Province*: Pingtang County, Tangbian Town, Baima Cave, 25°40'6.13"N, 106°45'53.89"E, 870 m, 6 October 2019, Yun-Chun Li (MCWNU).

*Paratypes*. CHINA: *Guizhou Province*: 4 tritonymphs, same data as the holotype (MCWNU).

**Diagnosis.**—Troglolobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters:

carapace with 4 eyespots; epistome small; pedipalps femur  $4.61 \times$  (length 2.12) and patella  $2.77 \times$  (length 1.72) longer than broad, pedicel about the same length as the widened part of patella (club), with a rounded retrolateral margin. The new species resembles *B. shangshanensis* sp. nov. but can be distinguished by *sb* nearer to *b* than to *st* (*sb* slightly nearer to *st* than to *b* in *B. shangshanensis* sp. nov.), chela with pedicel  $3.53 \times$  longer than broad (3.53/1.00 mm), hand with pedicel  $1.86 \times$  longer than broad (1.86/1.00 mm) (chela with pedicel  $3.35\text{--}3.45 \times$  longer than broad [2.90–2.99/0.85–0.89 mm] and hand with pedicel  $1.83\text{--}1.90 \times$  longer than broad [1.58–1.64/0.85–0.89 mm] in *B. shangshanensis* sp. nov.).

**Etymology.**—Latinized adjective, derived from the type locality, namely Baima Cave.

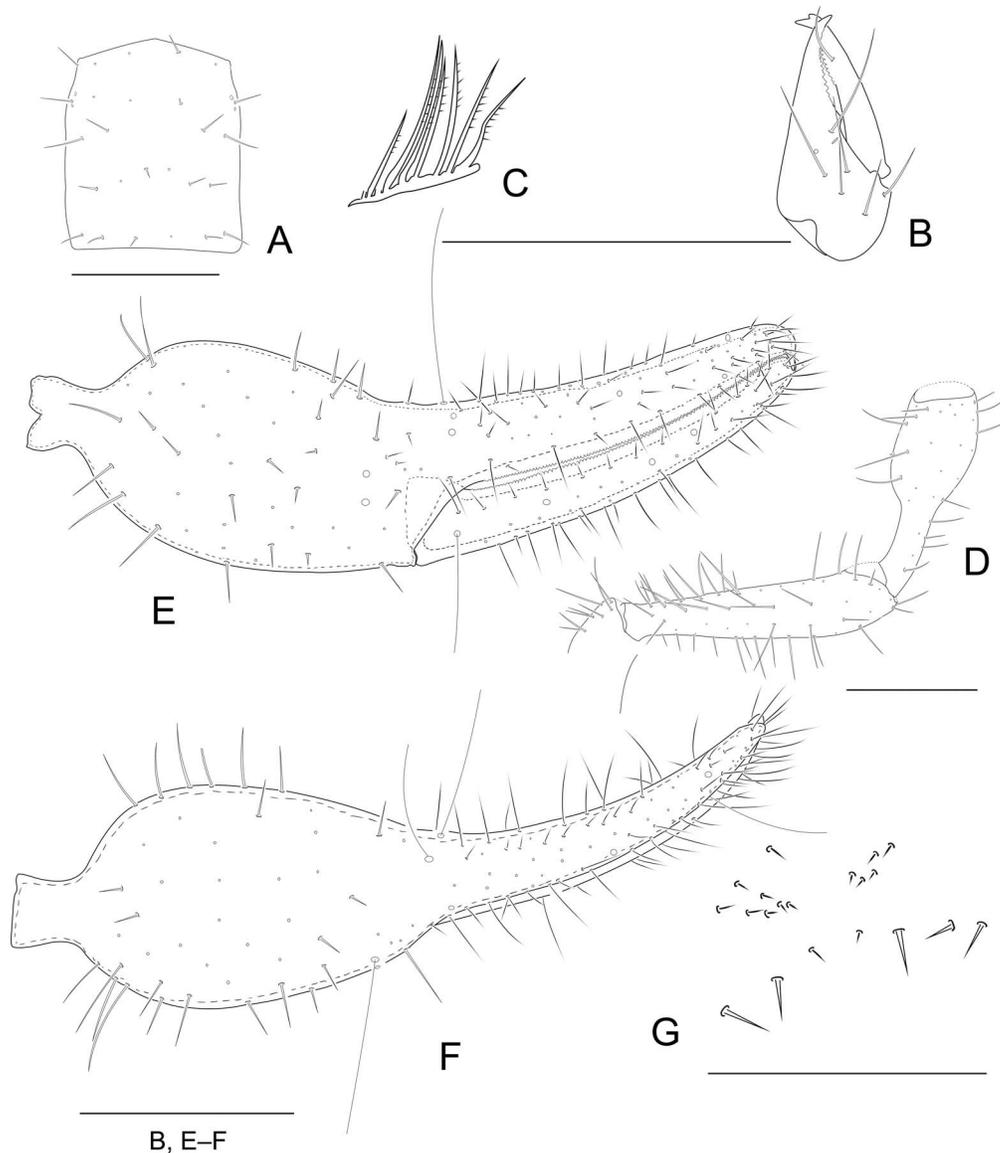


Figure 2.—*Bisetocreagris baimensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, rallum of right chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen weakly brown, legs yellowish.

**Carapace** (Fig. 2A): With 2 lyrifissures located dorsally, 1.19  $\times$  longer than broad; 4 eye-spots, length 0.03 mm, breadth 0.01 mm; anterior margin with a small rounded knob; with a total of 27 setae, including 6 on the anterior margin and 6 on the posterior margin.

**Chelicera:** Hand with 7 setae and one lyrifissure dorsally, movable finger with 1 submedial seta; fixed finger with 22 teeth, movable finger with 17 teeth. Weak protrusion of galea with the width approximately equal to the width of the fingertip (Fig. 2B). Serrula exterior with about 44 blades and serrula interior with 34. Rallum composed of 9 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 2C).

**Abdomen:** Tergal chaetotaxy (I–XI): 8: 8: 8: 8: 10: 12: 12: 11: 11: 7; sternal chaetotaxy (III–XI): 2x6+9: 2x6+9: 15: 15: 15: 14: 13: 12: 6; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 6 setae, coxa I 7, II 6, III 4, IV 10. Genital operculum of female with 15 setae (Fig. 2G).

**Pedipalps** (Figs. 2D–F): Smooth, trochanter 2.09  $\times$  longer than broad, distal part of femur slightly enlarged, 4.61  $\times$  longer than broad, patella slender, 2.77  $\times$  longer than broad, with narrow pedicel, 3.29  $\times$  longer than broad, and ovoid club, 1.57  $\times$  longer than broad, with rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur 1.23  $\times$  longer than patella. Chela with pedicel 3.53  $\times$  longer than broad, hand with pedicel 1.86  $\times$  longer than broad; movable finger 1.07  $\times$  longer than hand (with pedicel) length. Fixed finger with 112 small cusped teeth, movable finger with 130 teeth; venom duct in fixed finger, very short.

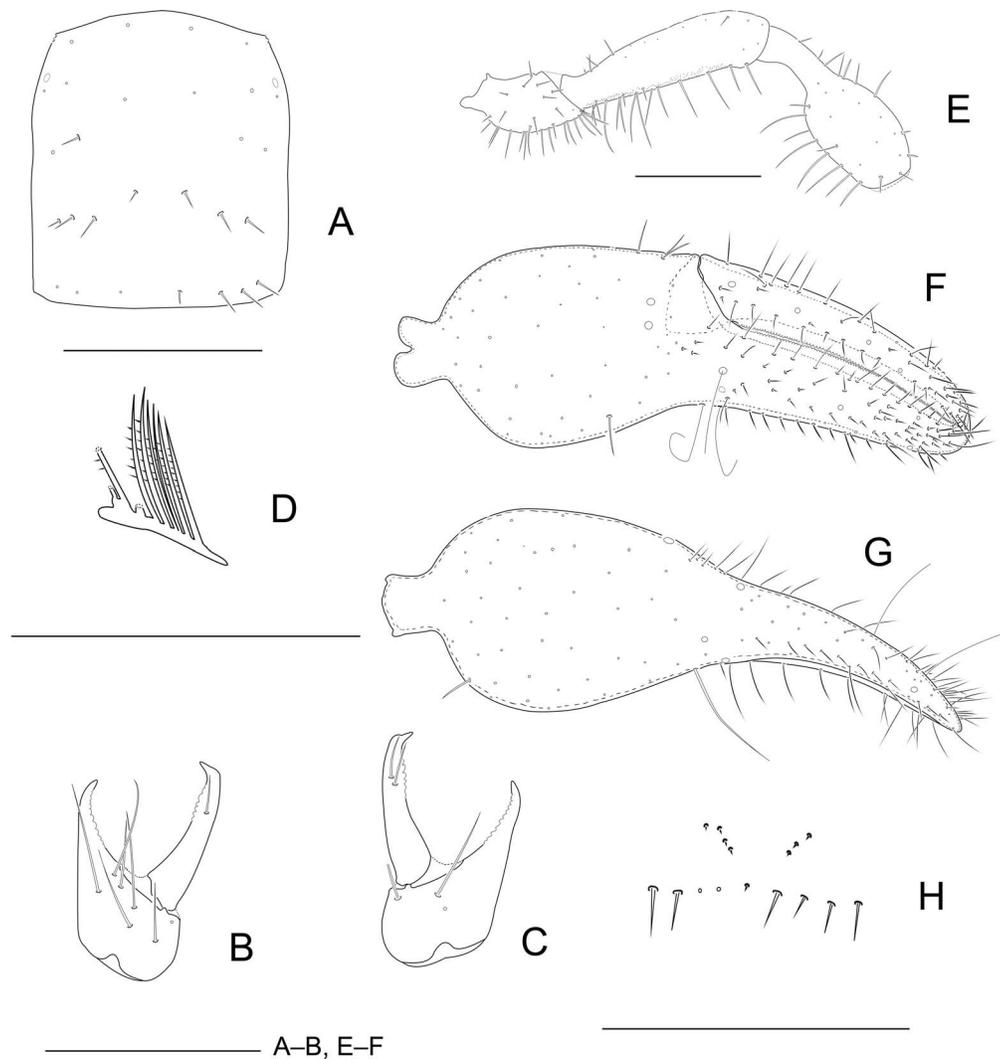


Figure 3.—*Bisetocreagris bangenensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, left chelicera; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.50 mm (D, H); 1.00 mm (A–C, E–G).

Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *et* than to *it*; on movable finger, *st* distinctly nearer to *t* than to *sb*, the latter nearer to *b* than to *st*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.44 \times$  longer than deep, femur  $4.48 \times$  longer than deep and  $1.48 \times$  longer than patella, patella  $3.38 \times$  longer than deep, tibia  $7.18 \times$  longer, basitarsus  $3.73 \times$  longer, telotarsus  $5.00 \times$  longer than deep, telotarsus  $1.34 \times$  longer than basitarsus. Leg IV: trochanter  $2.09 \times$  longer than deep, femur+patella  $4.47 \times$  longer than deep, femur shorter than patella, tibia  $9.00 \times$  longer than deep, basitarsus  $3.95 \times$  longer, telotarsus  $5.81 \times$  longer than deep. Basitarsus with two tactile setae (basally,  $TS = 0.48$ ; distally,  $TS = 0.39$ ), tactile setae probably present (most setae lacking) on telotarsus (near the middle of the segment), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 6.23; carapace

1.54/1.29. Pedipalps: trochanter 0.94/0.45, femur 2.12/0.46, patella 1.72/0.62, hand with pedicel 1.86/1.00, length of finger 1.99, length of chela 3.53/1.00. Leg I: trochanter 0.46/0.32, femur 1.30/0.29, patella 0.88/0.26, tibia 1.22/0.17, basitarsus 0.56/0.15, telotarsus 0.75/0.15. Leg IV: trochanter 0.69/0.33, femur+patella 2.01/0.45, tibia 2.25/0.25, basitarsus 0.75/0.19, telotarsus 0.93/0.16.

**Distribution.**—This species is only known from Baima Cave, near Pingtang County in Guizhou Province, China.

*Bisetocreagris bangenensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/0F98C0CF-EE88-4180-81F5-1CB2C2C782D6>  
(Figs. 3, 22C)

**Type material.**—*Holotype female.* CHINA: Guizhou Province: Luodian County, Bangeng Town, Bangen Village, Guanyin Cave, 519 m, 8 October 2019, Yun-Chun Li (MCWNU).

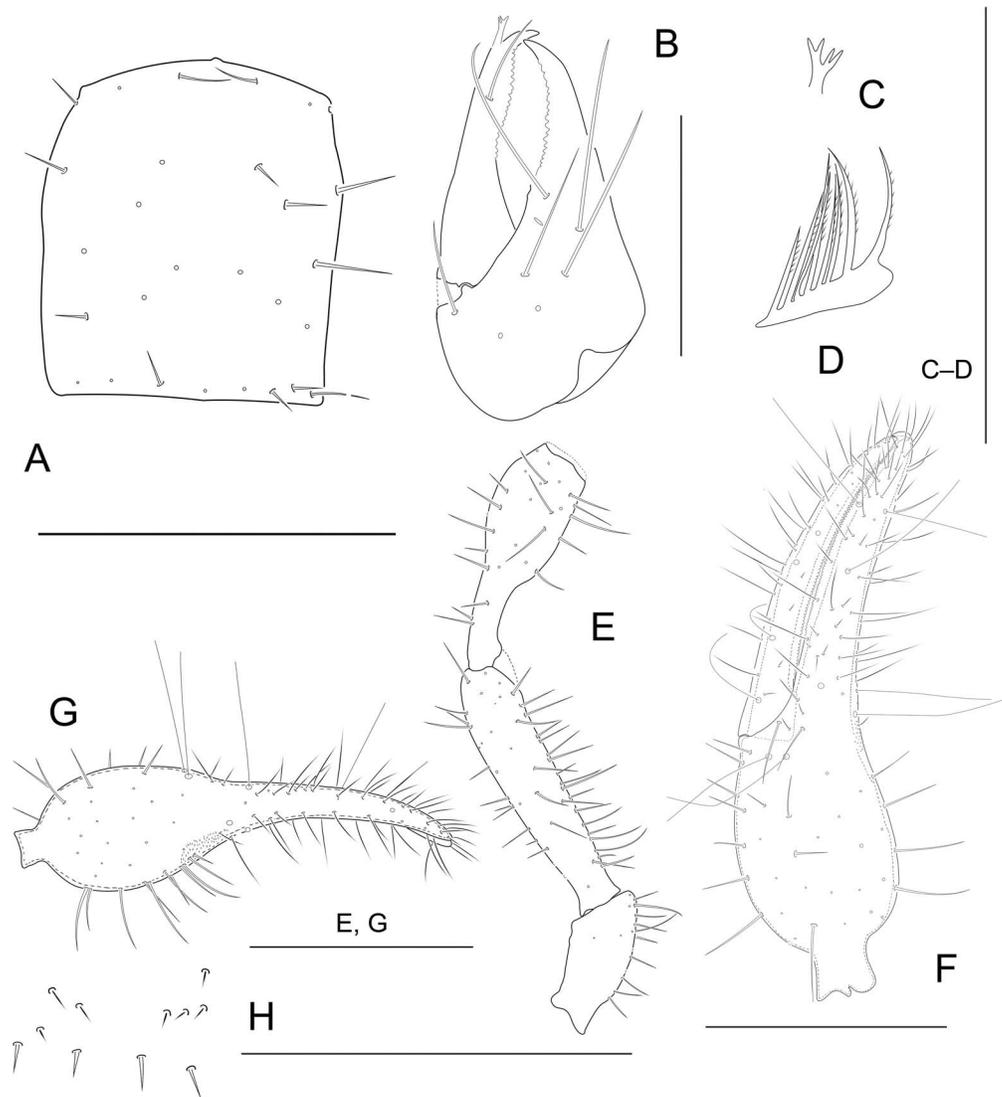


Figure 4.—*Bisetocreagris changchaoensis* Li & Shi, sp. nov., holotype female: A, carapace; B, left chelicera; C, left galea; D, rallum of left chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.10 mm (B–D, H); 0.50 mm (F); 1.00 mm (A, E, G).

*Paratype*. CHINA: *Guizhou Province*: 1 tritonymph, same data as the holotype (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 2 eyespots; epistome indistinct; pedipalps femur  $3.87 \times$  (length 1.67) and patella  $2.62 \times$  (length 1.52) longer than broad, with thick pedicel, distinctly shorter than widened part of patella (club), with very strongly rounded retrolateral margin, and manducatory process with 7 marginal setae.

**Etymology.**—Latinized adjective, derived from Bangen village, near to the type locality.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen brown, legs yellowish.

*Carapace* (Fig. 3A): Smooth,  $1.16 \times$  longer than broad; with 2 (anterior) indistinct eyespots, length 0.03 mm, breadth 0.03 mm; anterior margin without distinct epistome; with a total of

32 setae, including 8 on the anterior margin and 7 on the posterior margin.

*Chelicera*: Hand on the left with only 3 setae, movable finger with 2 submedial setae; hand on the right with 8 setae, movable finger with 1 submedial seta (Figs. 3B–C); hand without lyrifissures located dorsally; fixed finger with 11 teeth, movable finger with 7 teeth. Galea could not be investigated because it was probably broken. Serrula exterior with about 42 blades and serrula interior with 32 blades. Rallum composed of 9 pinnate blades (Fig. 3D).

*Abdomen*: Tergal chaetotaxy (I–XI): 11: 10: 11: 12: 11: 11: 11: 12: 13: 13: 7; sternal chaetotaxy (III–XI):  $2 \times 6 + 12$ :  $2 \times 5 + 11$ : 15: 16: 16: 17: 14: 12: 6; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 7 marginal setae. Pedipalpal coxa with 7 setae, coxa I 9, II 7, III 4, IV 10. Genital operculum of female with 8 setae (Fig. 3H).

*Pedipalps* (Figs. 3E–G): Lateral side of femur finely granulated, trochanter  $2.21 \times$  longer than broad, distal part

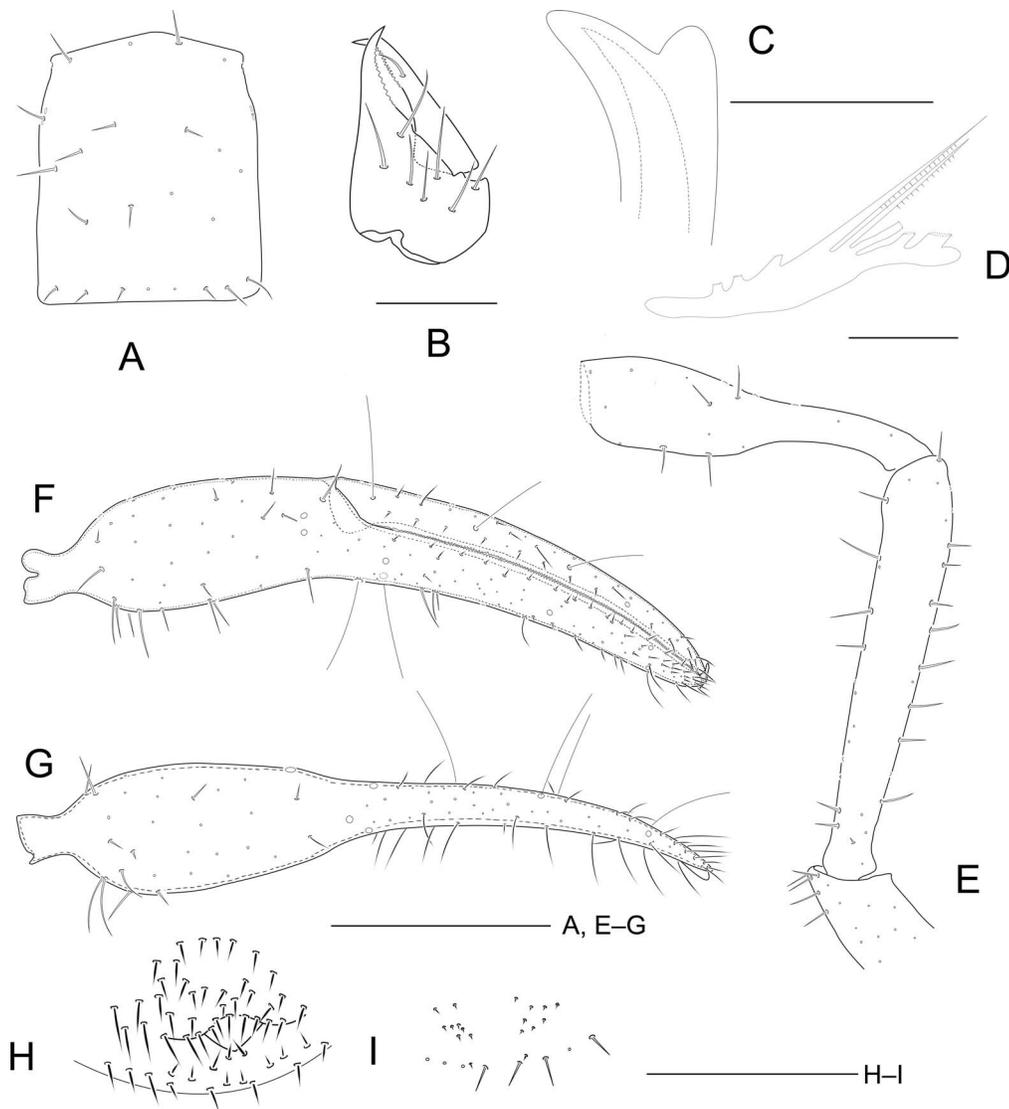


Figure 5.—*Bisetocreagris daxingensis* Li & Shi, sp. nov., holotype male and paratype female: A, carapace; B, right chelicera; C, right galea; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, male genital area; I, female genital area. Scale bars: 0.10 mm (C–D); 0.50 mm (B, H–I); 1.00 mm (A, E–G).

of femur slightly enlarged,  $3.87 \times$  longer than broad, patella slender,  $2.62 \times$  longer than broad, with thick pedicel,  $2.41 \times$  longer than broad, and ovoid club,  $1.35 \times$  longer than broad, with very strongly rounded retrolateral margin, pedicel distinctly shorter than widened part of patella (club), femur  $1.10 \times$  longer than patella. Chela with pedicel  $2.93 \times$  longer than broad, hand with pedicel  $1.52 \times$  longer than broad; movable finger  $1.08 \times$  longer than hand (with pedicel) length. Fixed finger with 87 small cusped teeth, movable finger with 93 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esh* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* distinctly nearer to *et/it* than to *ist*; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *b* than to *st*.

*Legs*: Typical for Neobisiidae, elongate. Leg I: trochanter  $1.31 \times$  longer than deep, femur  $3.58 \times$  longer than deep and

$1.56 \times$  longer than patella, patella  $2.60 \times$  longer than deep, tibia  $5.82 \times$  longer, basitarsus  $2.88 \times$  longer, telotarsus  $4.17 \times$  longer than deep, telotarsus  $1.45 \times$  longer than basitarsus. Leg IV: trochanter  $1.91 \times$  longer than deep, femur+patella  $3.33 \times$  longer than deep, femur shorter than patella, tibia  $6.61 \times$  longer than deep, basitarsus  $2.77 \times$  longer, telotarsus  $4.82 \times$  longer than deep. Tactile setae probably present (most setae lacking) on basitarsus (near basally of segment), telotarsus with a tactile seta near the middle (TS=0.47), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 4.65; carapace 1.36/1.16. Pedipalps: trochanter 0.95/0.43, femur 1.67/0.43, patella 1.52/0.58, hand with pedicel 1.37/0.90, length of finger 1.48, length of chela 2.64/0.90. Leg I: trochanter 0.29/0.22, femur 0.83/0.23, patella 0.54/0.21, tibia 0.84/0.14, basitarsus 0.35/0.12, telotarsus 0.51/0.12. Leg IV: trochanter 0.58/0.31,

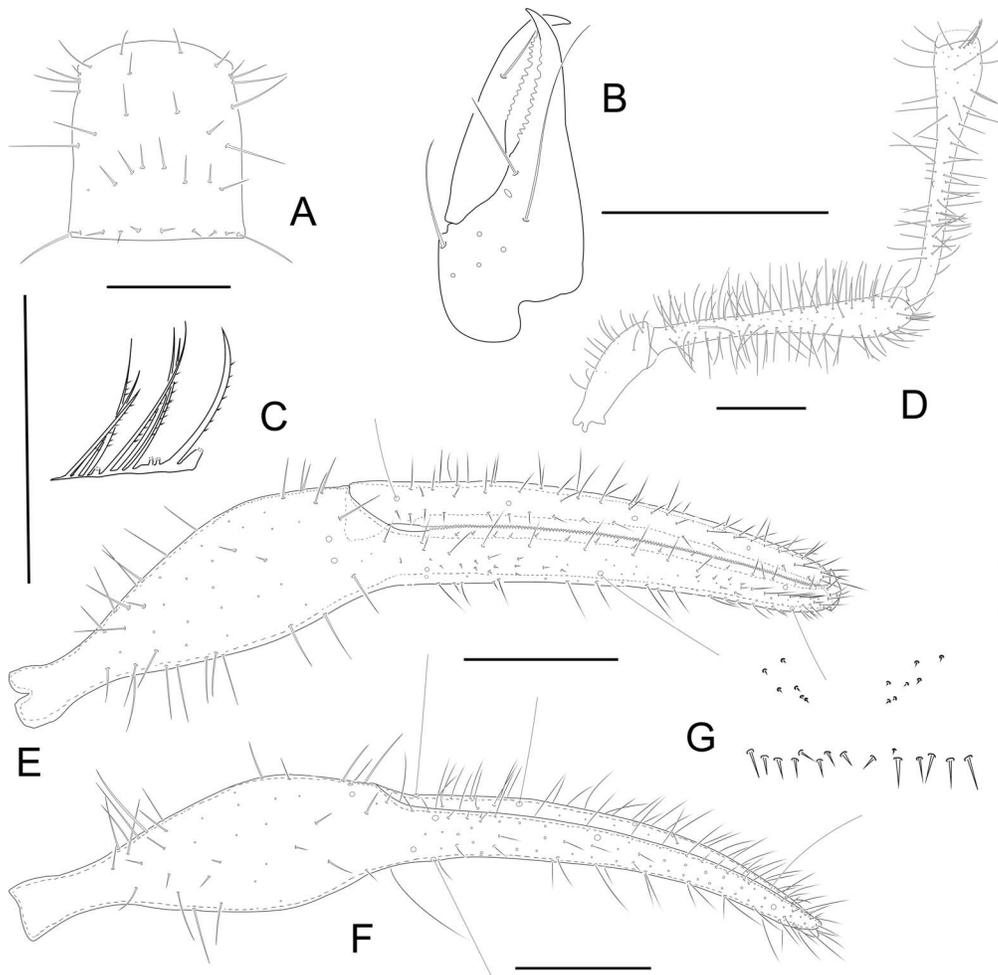


Figure 6.—*Bisetocreagris diaojiangensis* Li & Shi, sp. nov., holotype female: A, carapace; B, left chelicera; C, rallum of left chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

femur+patella 1.38/0.42, tibia 1.37/0.21, basitarsus 0.44/0.16, telotarsus 0.67/0.14.

**Distribution.**—This species is only known from Guanyin Cave, near Luodian County in Guizhou Province, China.

*Bisetocreagris baozinensis* Mahnert & Li, 2016

*Bisetocreagris baozinensis* Mahnert & Li 2016: 264, figs. 11–16.

**Material examined.**: CHINA: *Sichuan Province*: 5 ♂, 6 ♀, Gulin County, Yuhua Town, Baozi Cave, 28.01458°N 6.05209°E, 954 m, 22 April 2014, Yun-Chun Li & Yu-Cheng Lin (MCWNU).

**Distribution.**—This species is only known from Baozi Cave, near Gulin County in Sichuan Province, China.

*Bisetocreagris cavernarum* Mahnert & Li, 2016

*Bisetocreagris cavernarum* Mahnert & Li 2016: 261, figs. 6–10.

**Material examined.**: CHINA: *Chongqing Province*: 3 ♂, 5 ♀, Chongqing City, Beibei District, Jindaoxia Town, Er Long Cave, 30.05539°N, 106.62385°E, 776 m, 8 October 2015, Yun-Chun Li (MCWNU).

**Distribution.**—This species is only known from Er Long Cave, near Beibei District in Chongqing Province, China.

*Bisetocreagris changchaoensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/7A20B041-DE5E-4B22-AF2D-7C04C0D5A956>,  
(Figs. 4, 22D)

**Type material.**—*Holotype female*. CHINA: *Hubei Province*: Enshi City, Jianshi County, Banqiao Town, Changqiao Village, Changchao Cave, 30°33.497'N, 109°18.639'E, 1996 m, 23 March 2016, Yun-Chun Li (MCWNU).

*Paratypes*. CHINA: *Hubei Province*: 4 ♀, 2 tritonymph, same data as the holotype (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome triangular and small; pedipalps femur 4.70–4.85 × (length 1.20–1.28 mm), patella 3.05–3.16 × (length 1.04–1.12 mm) longer than broad, pedicel about the same length as the widened part of patella (club), with a slightly rounded retrolateral margin. The new species resembles *Bisetocreagris maomaotou* Gao, Wynne & Zhang, 2018 but can be distinguished by the cheliceral rallum with an

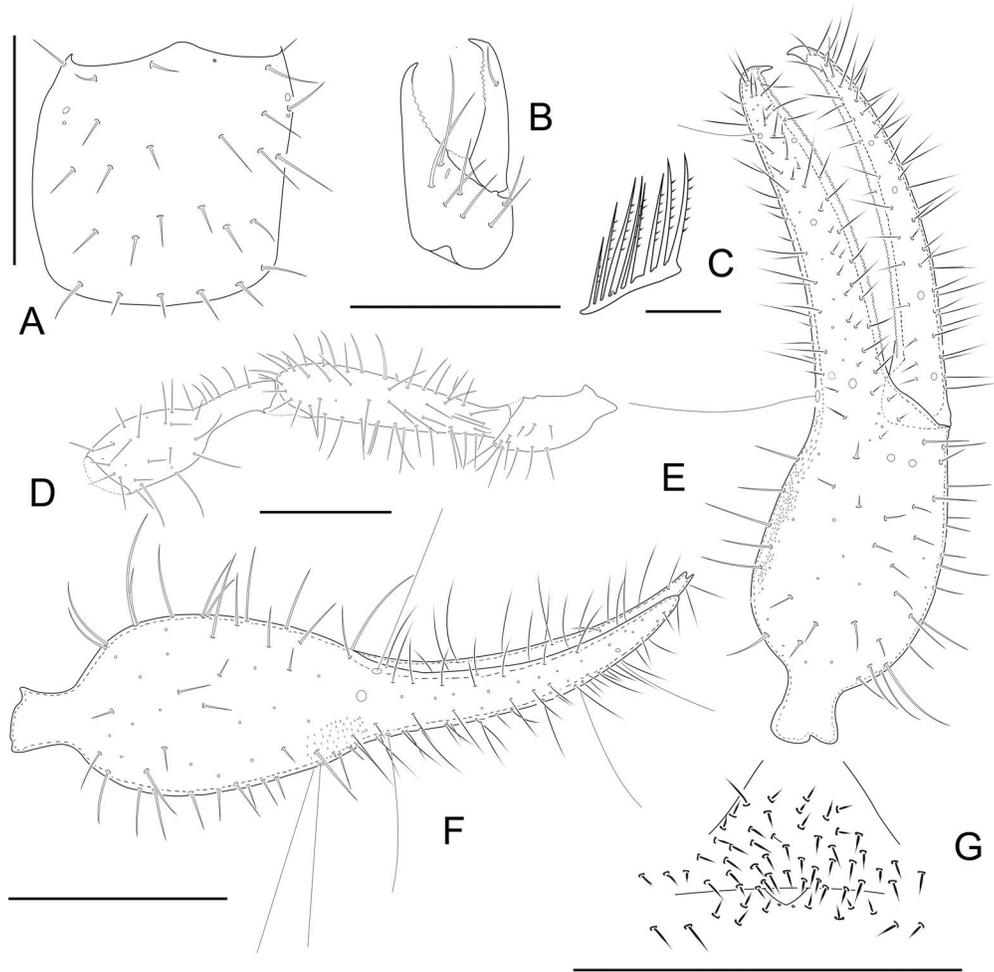


Figure 7.—*Bisetocreagris dongjiensis* Li & Shi, sp. nov., holotype male: A, carapace; B, right chelicera; C, rallum of right chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.10 mm (C); 0.50 mm (G); 1.00 mm (A–B, D–F).

expanded base (*B. maomaotou* without an expanded base), femur of pedipalp smooth (granulated basally in *B. maomaotou*) and femur 4.70–4.85 × longer than broad (5.20 × longer than broad in *B. maomaotou*), patella 3.05–3.16 × longer than broad (4.30 × longer than broad in *B. maomaotou*).

**Etymology.**—Latinized adjective, derived from the type locality, namely Changchao Cave.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen brown, legs yellowish.

**Carapace** (Fig. 4A): Smooth, 1.00–1.09 × longer than broad; eyes or eye-spots absent; anterior margin with a small, triangular epistome; with a total of 28–30 setae, including 6 on the anterior margin and 8–9 on the posterior margin.

**Chelicera:** Hand with 7–8 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 15–17 teeth, movable finger with 17–20 teeth (Fig. 4B). Galea divided into 2 main branches, each one forked apically (Fig. 4C). Serrula exterior with about 34–36 blades and serrula interior with 24–28. Rallum composed of 8 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 4D).

**Abdomen:** Tergal chaetotaxy (I–XI): 6: 10: 10: 11: 12: 12: 14: 15: 14: 13: 6 (2 tactile setae); sternal chaetotaxy (III–XI): 2x6+10–12: 2x5+6–8: 13: 16: 16: 18: 13: 13: 5 (2 tactile setae);

anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 4–5 marginal setae. Pedipalpal coxa with 5–6 setae, coxa I 4, II 8, III 4, IV 7. Genital operculum of female with 7 setae (Fig. 4H).

**Pedipalps** (Figs. 4E–G): Lateral sides of hand finely granulated at base of the fixed finger, trochanter 2.30–2.41 × longer than broad, distal part of femur slightly enlarged, 4.70–4.85 × longer than broad, patella slender, 3.05–3.16 × longer than broad, with narrow pedicel, 3.59–3.66 × longer than broad, and very narrow club, 1.70–1.75 × longer than broad, with slightly rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur 1.13–1.15 × longer than patella. Chela with pedicel 3.50–3.62 × longer than broad; hand with pedicel 1.75–1.84 × longer than broad; movable finger 1.22–1.28 × longer than hand (with pedicel) length. Fixed finger with 69–73 small cusped teeth, movable finger with 87–92 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* slightly distal of finger middle and nearer to *et/it* than to *ist*; *et-it* almost the same level near the fingertip; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *b* than to *st*.

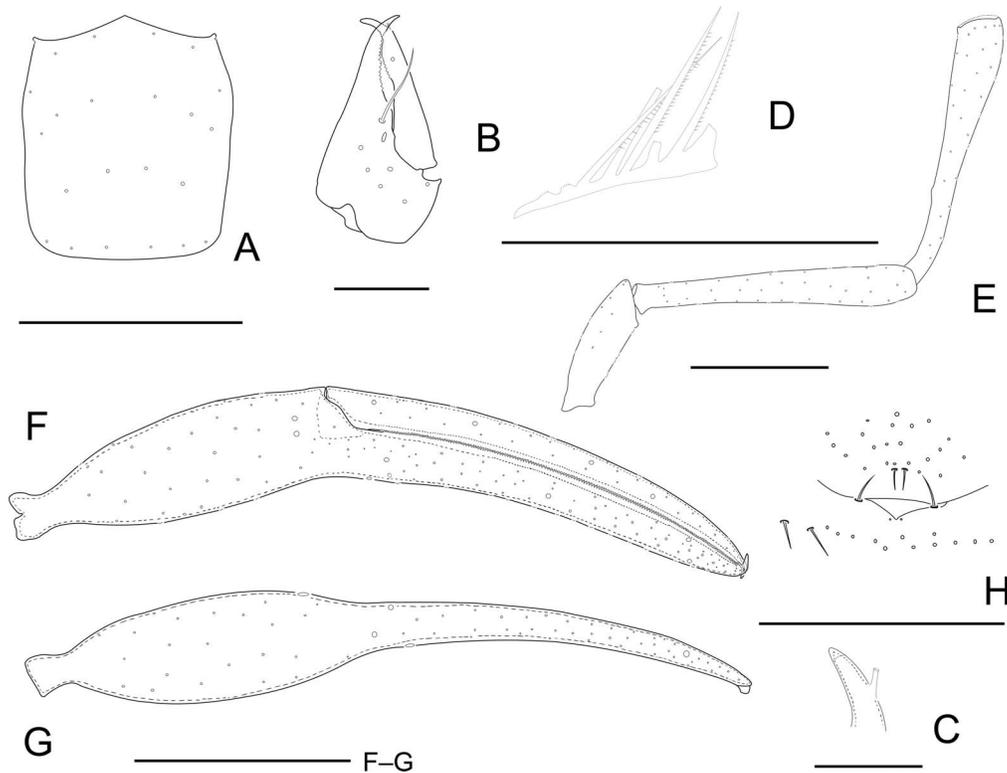


Figure 8.—*Bisetocreagris duolangpingensis* Li & Shi, sp. nov., holotype male: A, carapace; B, right chelicera; C, right galea; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.10 mm (C); 0.50 mm (B, D, H); 1.00 mm (A, E–G).

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter 1.30–1.36 × longer than deep, femur 3.32–3.43 × longer than deep and 1.52–1.56 × longer than patella, patella 2.42–2.48 × longer than deep, tibia 4.50–4.56 × longer, basitarsus 1.98–2.05 × longer, telotarsus 3.98–4.12 × longer than deep, telotarsus 1.98–2.05 longer than basitarsus. Leg IV: trochanter 1.42–1.50 × longer than deep, femur+patella 5.05–5.12 × longer than deep, femur shorter than patella, tibia 6.60–6.75 × longer than deep, basitarsus 2.62–2.71 × longer, telotarsus 4.62–4.68 × longer than deep. Tibia with one tactile seta in the middle (TS = 0.29–0.32), basitarsus probably with a tactile seta near base (most setae lacking), telotarsus with a tactile seta near the middle (TS = 0.29–0.33), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length 3.95–4.23; carapace 0.98–1.08/0.82–0.86. Pedipalps: trochanter 0.65–0.72/0.27–0.31, femur 1.20–1.28/0.24–0.27, patella 1.04–1.12/0.32–0.38, hand with pedicel 0.90–0.95/0.50–0.54, length of finger 1.14–1.19, length of chela 1.82–1.88/0.50–0.54. Leg I: trochanter 0.24–0.28/0.18–0.23, femur 0.56–0.64/0.17–0.20, patella 0.37–0.42/0.15–0.18, tibia 0.52–0.58/0.11–0.13, basitarsus 0.19–0.24/0.10–0.11, telotarsus 0.38–0.46/0.09–0.11. Leg IV: trochanter 0.30–0.36/0.20–0.24, femur+patella 1.04–1.12/0.19–0.24, tibia 0.90–0.96/0.13–0.15, basitarsus 0.30–0.36/0.11–0.12, telotarsus 0.48–0.54/0.10–0.11.

**Distribution.**—This species is only known from Changchao Cave, near Jianshi County in Hubei Province, China.

#### *Bisetocreagris chinacavernicola* (Schawaller, 1995)

*Stenohya chinacavernicola* Schawaller 1995: 1054, figs. 21–28.  
*Bisetocreagris chinacavernicola* (Schawaller, 1995): Mahnert & Li 2016: 260.

**Material examined.**—CHINA: *Sichuan Province*: 1 ♀, Huaying City, Tianchi Town, Daluowan Village, Bijia Cave, 30.42249°N, 106.89592°E, 877 m, 15 October 2010, Yu-Chen Lin (MCWNU).

**Distribution.**—This species is known from Bijia Cave and Xiannin Cave, near Huaying City in Sichuan Province, China.

#### *Bisetocreagris chuanensis* Mahnert & Li, 2016

*Bisetocreagris chuanensis* Mahnert & Li 2016: 260, figs. 1–5.

**Material examined.**—CHINA: *Guizhou Province*: 2 ♂, 1 ♀, Jinsha County, Xinhua Town, Chuan Cave, 27°23.797'N, 106°06.104'E, 1387 m, 5 October 2015, Yun-Chun Li (MCWNU).

**Distribution.**—This species is only known from Chuan Cave, near Jinsha County in Guizhou Province, China.

#### *Bisetocreagris daxingensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/D7F76FEA-5286-436C-B8D8-D810ECE09D0F>  
(Figs. 5, 23A–B)

**Type material.**—*Holotype male*. CHINA: *Guizhou Province*: Xiuwen County, Liutong Town, Daxing Village, Duobing

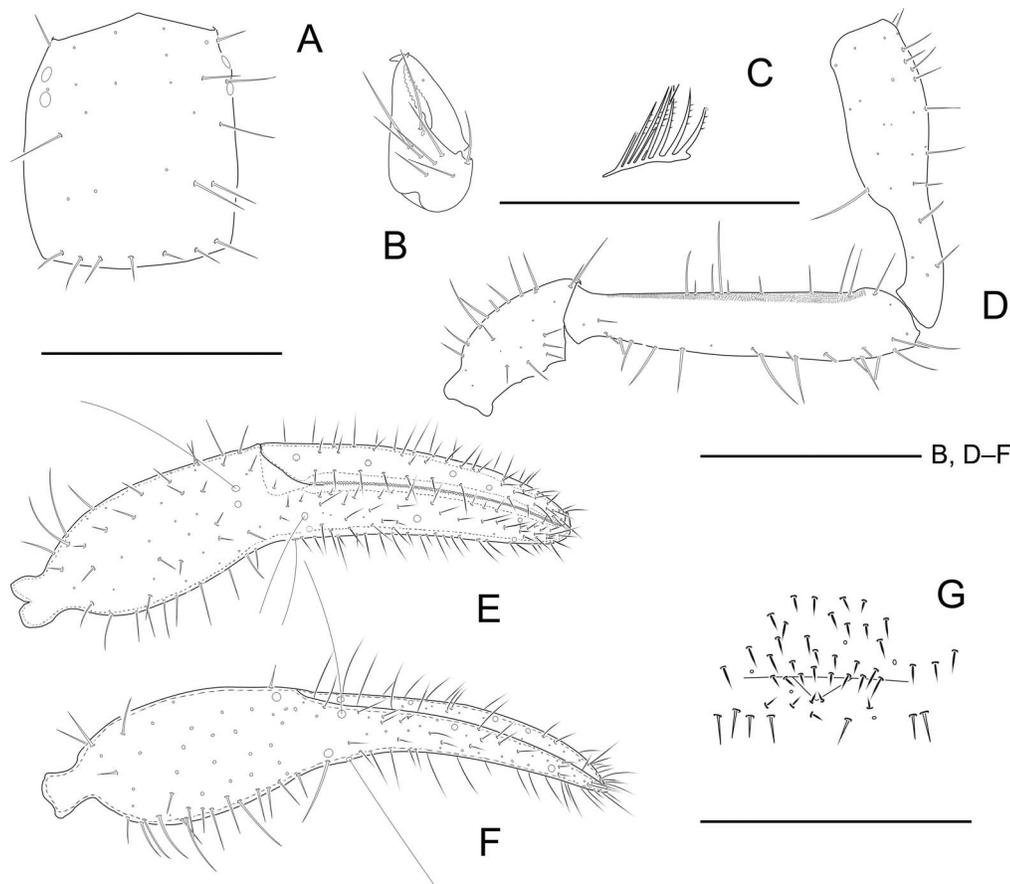


Figure 9.—*Bisetocreagris ganxiaoensis* Li & Shi, sp. nov., holotype male: A, carapace; B, right chelicera; C, rallum of right chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

Cave, 27°06.413'N, 106°29.561'E, 1050 m, 9 March 2017, Yun-Chun Li (MCWNU).

*Paratype*. CHINA: *Guizhou Province*: 1 ♀, same data as the holotype (MCWNU).

**Diagnosis.**—Troglolobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 4 eyespots; epistome indistinct; pedipalps femur  $6.07 \times$  (length 1.88), and patella  $4.00 \times$  (length 1.64) longer than broad, pedicel about the same length as the widened part of patella (club), with a slightly rounded retrolateral margin.

**Etymology.**—Latinized adjective, derived from the village of Daxing, near the type locality.

**Description (male holotype).**—Carapace, pedipalps and chelicerae yellowish brown, abdomen brown, legs yellowish.

*Carapace* (Fig. 5A): Smooth,  $1.22 \times$  longer than broad; with 4 small eye-spots, 2 anterior eye-spots length 0.05 mm, breadth 0.02 mm, 2 posterior eye-spots length 0.03 mm, breadth 0.01 mm; anterior margin without distinct epistome; with a total of 26 setae, including 6 on the anterior margin and 8 on the posterior margin.

*Chelicera*: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 15 teeth, movable finger with 14 teeth (Fig. 5B). The weak protrusion of galea with the width approximately equal to the width of the fingertip (Fig. 5C). Serrula exterior with about 36

blades and serrula interior with 28. Rallum composed of 8 pinnate blades (most broken), distal one separated and expanded at base (Fig. 5D).

*Abdomen*: Tergal chaetotaxy (I–XI): 10: 9: 9: 9: 9: 10: 11: 10: 10: 5; sternal chaetotaxy (III–XI):  $2 \times 9 + 11$ :  $2 \times 8 + 7$ : 15: 13: 13: 13: 12: 11: 6; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 7 setae, coxa I 8, II 6, III 5, IV 10. Genital operculum of male with 40 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 5H).

*Pedipalps* (Figs. 5E–G): Smooth, trochanter  $2.77 \times$  longer than broad, distal part of femur slightly enlarged,  $6.07 \times$  longer than broad, patella slender,  $4.00 \times$  longer than broad, with narrow pedicel,  $4.14 \times$  longer than broad, and very narrow club,  $2.00 \times$  longer than broad, with slightly rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur  $1.15 \times$  longer than patella. Chela with pedicel  $5.63 \times$  longer than broad, hand with pedicel  $2.59 \times$  longer than broad; movable finger  $1.32 \times$  longer than hand (with pedicel) length. Fixed finger with 109 small cusped teeth, movable finger with 117 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the

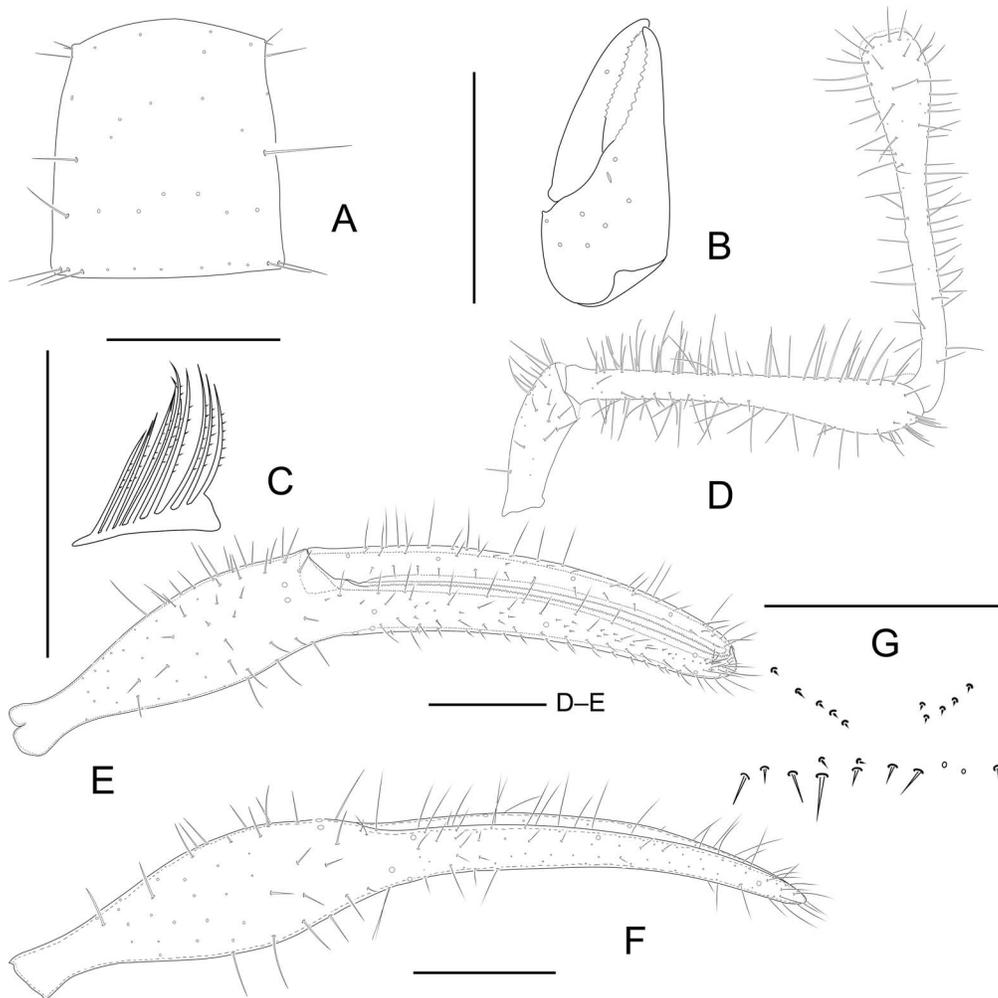


Figure 10.—*Bisetocreagris guanyinensis* Li & Shi, sp. nov., holotype female: A, carapace; B, left chelicera; C, rallum of left chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

fixed finger; *est* nearer to *et/it* than to *ist*; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *st* than to *b*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.33 \times$  longer than deep, femur  $4.86 \times$  longer than deep and  $1.60 \times$  longer than patella, patella  $3.35 \times$  longer than deep, tibia  $6.60 \times$  longer, basitarsus  $4.09 \times$  longer, telotarsus  $5.55 \times$  longer than deep, telotarsus  $1.36 \times$  longer than basitarsus. Leg IV: trochanter  $1.53 \times$  longer than deep, femur+patella  $4.76 \times$  longer than deep, femur shorter than patella, tibia  $9.21 \times$  longer than deep, basitarsus  $4.00 \times$  longer, telotarsus  $6.08 \times$  longer than deep. Tibia with one tactile seta in the middle (TS = 0.30), basitarsus with two tactile setae (basally, TS = 0.38; distally, TS = 0.31), telotarsus with a tactile seta near the middle (TS = 0.35), subterminal seta forked, arolia shorter than claws.

**Female (paratype).**—Mostly the same as the holotype (MCWNU).

**Chelicera:** Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 13 teeth, movable finger with 11 teeth.

**Abdomen:** Tergal chaetotaxy (I–XI): 9: 9: 10: 9: 9: 9: 10: 11: 10: 11: 6; sternal chaetotaxy (IV–XI): 2x6+12: 2x6+8: 13: 14:

14: 15: 13: 11: 6; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 5 setae, coxa I 6, II 5, III 4, IV 9. Genital operculum of female with 18 setae (Fig. 5I).

**Pedipalps:** Smooth, trochanter  $2.62 \times$  longer than broad, distal femur slightly enlarged,  $5.70 \times$  longer than broad, patella  $4.12 \times$  longer than broad, femur  $1.11 \times$  longer than patella. Chela with pedicel  $5.27 \times$  longer than broad, hand with pedicel  $3.07 \times$  longer than broad; movable finger  $1.24 \times$  longer than hand (with pedicel) length.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 3.72; carapace 1.21/0.99. Pedipalps: trochanter 0.86/0.31, femur 1.88/0.31, patella 1.64/0.41, hand with pedicel 1.45/0.56, length of finger 1.92, length of chela 3.15/0.56. Leg I: trochanter 0.36/0.27, femur 1.07/0.22, patella 0.67/0.20, tibia 0.99/0.15, basitarsus 0.45/0.11, telotarsus 0.61/0.11. Leg IV: trochanter 0.52/0.34, femur+patella 1.62/0.34, tibia 1.75/0.19, basitarsus 0.56/0.14, telotarsus 0.79/0.13.

**Female (paratype):** Body length 3.86; carapace 1.25/1.01. Pedipalps: trochanter 0.89/0.34, femur 1.88/0.33, patella 1.69/0.41, hand with pedicel 1.46/0.59, length of finger 1.81, length

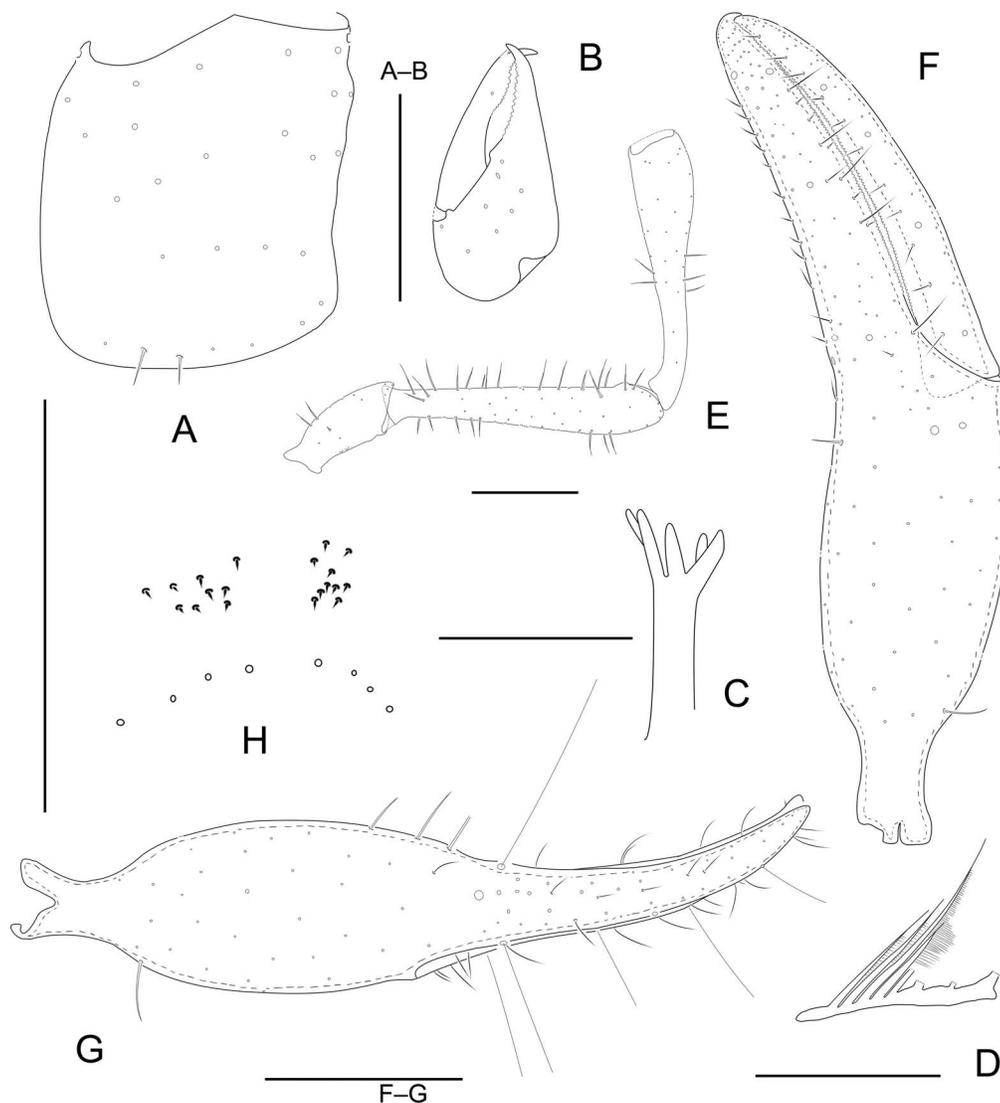


Figure 11.—*Bisetocreagris mahnerti* Li & Shi, sp. nov., holotype female: A, carapace; B, left chelicera; C, right galea; D, rallum of left chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.10 mm (C); 0.50 mm (D, H); 1.00 mm (A–B, E–G).

of chela 3.11/0.59. Leg I: trochanter 0.33/0.24, femur 1.03/0.20, patella 0.66/0.18, tibia 0.90/0.13, basitarsus 0.41/0.11, telotarsus 0.58/0.11. Leg IV: trochanter 0.51/0.28, femur+patella 1.59/0.32, tibia 1.65/0.19, basitarsus 0.53/0.14, telotarsus 0.76/0.12.

**Distribution.**—This species is only known from Duobing Cave, near Xiuwen County in Guizhou Province, China.

*Bisetocreagris diaojiangensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/54388BB2-D71A-426A-832F-BE0AD55145E2>  
(Figs. 6, 23C)

**Type material.**—*Holotype female*. CHINA: *Guizhou Province*: Luodian County, Moyang Town, Daxiaojing Village, Diaojiang Cave, 25°34'0.5"N, 106°51'29.32"E, 460 m, 8 October 2019, Yun-Chun Li (MCWNU).

*Paratype*. CHINA: *Guizhou Province*: 1 ♀, same data as the holotype (MCWNU).

**Diagnosis.**—Trogllobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome indistinct; pedipalps femur 6.57–6.60 × (length 3.00–3.10) and patella 5.96–5.99 × (length 3.26–3.30) longer than broad, patella very thin and long, pedicel distinctly longer than the widened part of patella (club), with a slightly rounded retrolateral margin and trichobothria *est* nearer to *ist* than to *et-it*.

**Etymology.**—Latinized adjective, derived from the type locality, namely Diaojiang Cave.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen weakly brown, legs yellowish.

*Carapace* (Fig. 6A): Smooth, 1.21–1.23 × longer than broad; eyes or eye-spots absent; anterior margin without distinct epistome; with a total of 37–38 setae, including 10 on the anterior margin and 10 on the posterior margin.

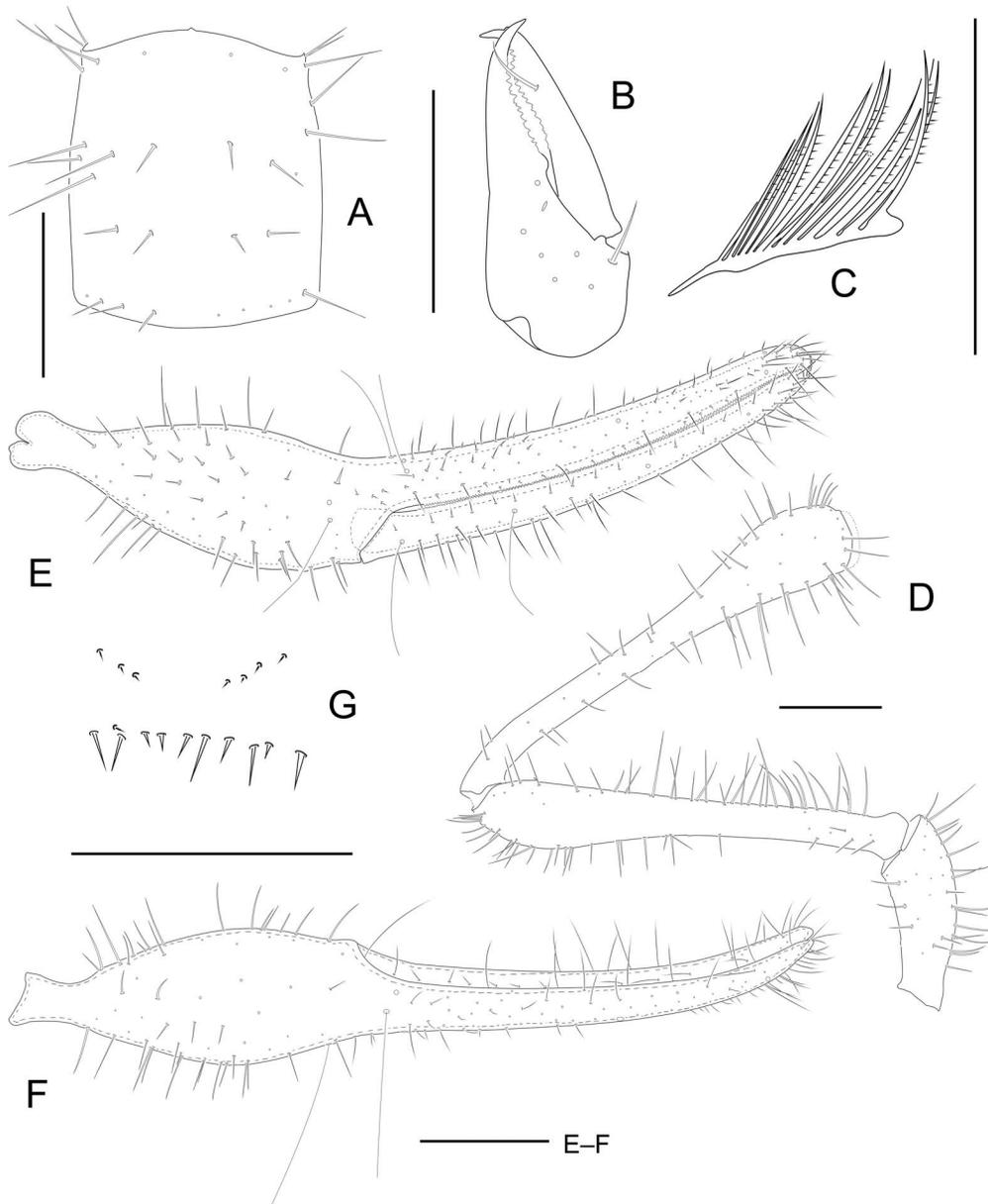


Figure 12.—*Bisetocreagris matuoensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, rallum of right chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

*Chelicera*: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 12–13 teeth, movable finger with 13–14 teeth (Fig. 6B). Galea could not be investigated because it was probably broken. Serrula exterior with about 42–44 blades and serrula interior with 34–36. Rallum composed of 11 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 6C).

*Abdomen*: Tergal chaetotaxy (I–XI): 12: 11: 12: 12: 11: 10: 10: 9: 11: 11: 9 (2 tactile setae); sternal chaetotaxy (III–XI): 2x9+27: 2x8+16: 20: 19: 19: 16: 16: 14: 7 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 6 marginal setae. Pedipalpal coxa with 11 setae, coxa I 11, II 11, III 4, IV 14. Genital operculum of female with 14 setae (Fig. 6G).

*Pedipalps* (Figs. 6D–F): Smooth, trochanter  $2.96\text{--}2.98 \times$  longer than broad, distal part of femur slightly enlarged,  $6.57\text{--}6.60 \times$  longer than broad, patella slender and longer,  $5.96\text{--}5.99 \times$  longer than broad, with very narrow pedicel,  $8.32\text{--}8.40 \times$  longer than broad, and narrow club,  $2.11\text{--}2.24 \times$  longer than broad, with a slightly rounded retrolateral margin, pedicel distinctly longer than the widened part of patella (club), femur  $0.92\text{--}0.93 \times$  longer than patella. Chela with pedicel  $6.17\text{--}6.20 \times$  longer than broad, hand with pedicel  $2.84\text{--}2.86 \times$  longer than broad; movable finger  $1.30\text{--}1.32 \times$  longer than hand (with pedicel) length. Fixed finger with 152–162 small cusped teeth, movable finger with 168–174 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *ist*

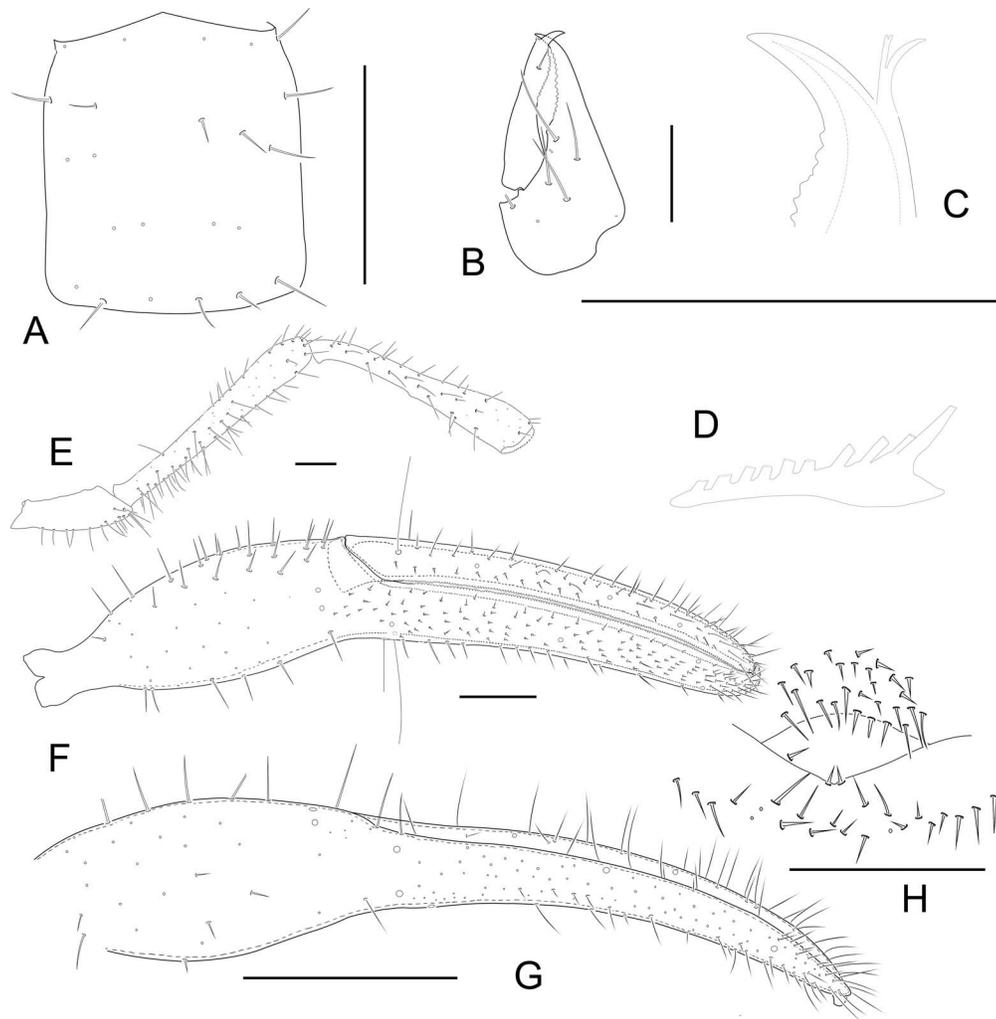


Figure 13.—*Bisetocreagris sanhensis* Li & Shi, sp. nov., holotype male: A, carapace; B, left chelicera; C, right galea; D, rallum of left chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.50 mm (B–F, H); 1.00 mm (A, G).

than to *et/it*; on movable finger, *st* nearer to *t* than to *sb*, the latter indistinct nearer to *b* than to *st*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter 1.65–1.68 × longer than deep, femur 6.60–6.66 × longer than deep and 1.50–1.54 × longer than patella, patella 4.86–4.90 × longer than deep, tibia 11.00–11.16 × longer, basitarsus 5.30–5.34 × longer, telotarsus 6.59–6.64 × longer than deep, telotarsus 1.30–1.36 longer than basitarsus. Leg IV: trochanter 2.18–2.22 × longer than deep, femur+patella 8.12–8.16 × longer than deep, femur shorter than patella, tibia 14.58–14.72 × longer than deep, basitarsus 4.80–4.84 × longer, telotarsus 7.30–7.36 × longer than deep. Basitarsus with two tactile setae (basally, TS = 0.51–0.53; distally, TS = 0.37–0.40), telotarsus with a tactile seta near the middle (TS = 0.43–0.45), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratype): Body length 5.92–6.64; carapace 1.79–1.81/1.46–1.50. Pedipalps: trochanter 1.43–1.46/0.48–0.52, femur 3.00–3.10/0.44–0.48, patella 3.26–3.30/0.54–0.58, hand with pedicel 2.66–2.72/0.92–0.95, length of finger 3.49–3.51, length of chela 5.79–5.82/0.92–0.95.

Leg I: trochanter 0.64–0.68/0.38–0.42, femur 2.04–2.08/0.30–0.32, patella 1.34–1.38/0.26–0.29, tibia 2.24–2.28/0.19–0.22, basitarsus 0.83–0.87/0.16–0.17, telotarsus 1.10–1.14/0.16–0.17. Leg IV: trochanter 0.90–0.93/0.40–0.44, femur+patella 3.23–3.28/0.38–0.42, tibia 3.63–3.68/0.24–0.26, basitarsus 1.00–1.06/0.20–0.21, telotarsus 1.31–1.35/0.19–0.20.

**Distribution.**—This species is only known from Diaojiang Cave, near Luodian County in Guizhou Province, China.

***Bisetocreagris dongjiensis* Li & Shi, sp. nov.**

<http://zoobank.org/NomenclaturalActs/81778779-ED3F-4368-AEF3-94DF6EC97A59>  
(Figs. 7, 23 D)

**Type material.**—*Holotype male*. CHINA: Guizhou Province: Pingtang County, Dongjia Town, Dongjia Village, Nameless Cave, 25°38′32″N, 106°54′40.19″E, 869 m, 7 October 2019, Yun-Chun Li (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 4 eyespots; epistome indistinct; pedipalps femur

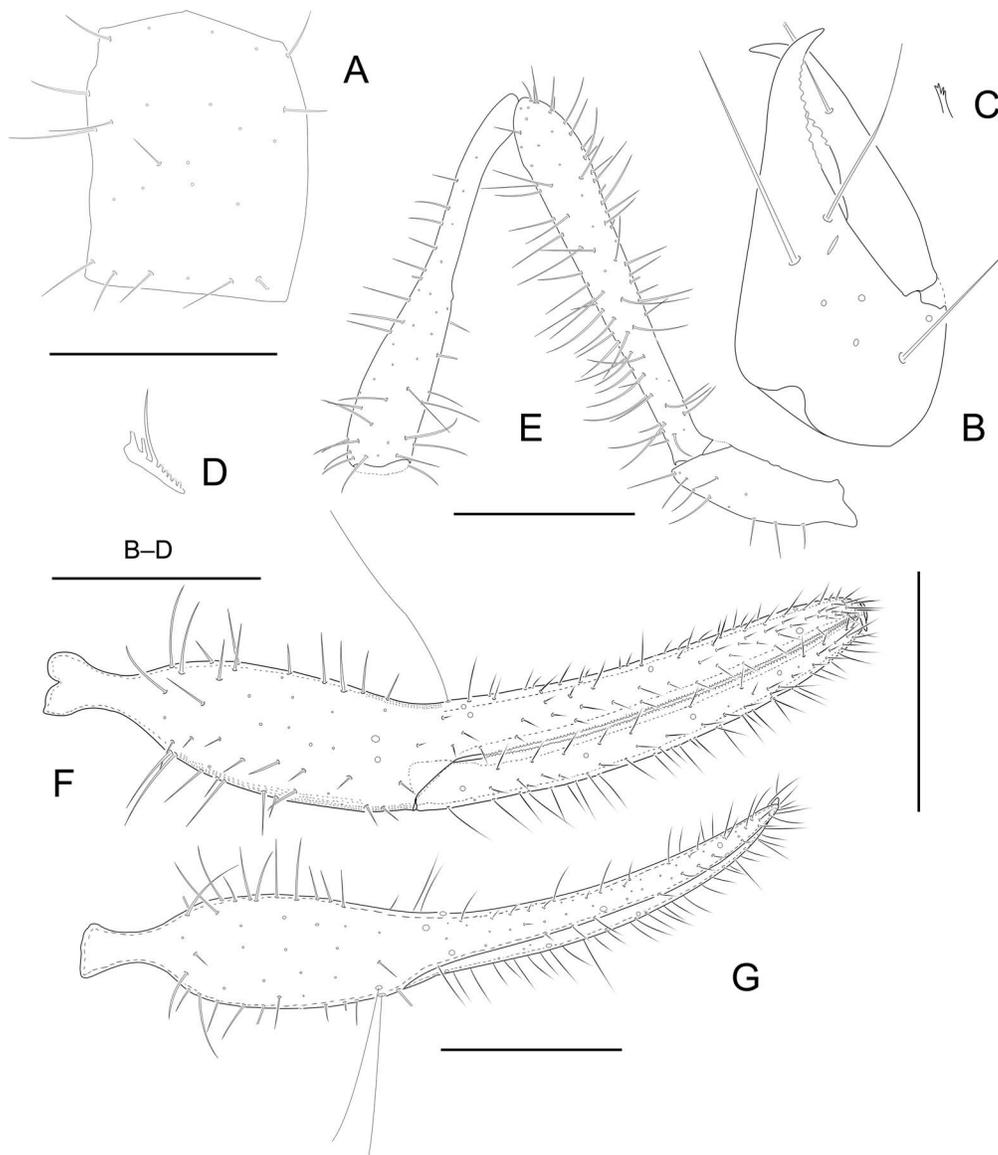


Figure 14.—*Bisetocreagris shahensis* Li & Shi, sp. nov., holotype male: A, carapace; B, right chelicera; C, left galea; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view. Scale bars: 0.10 mm (A–C); 1.00 mm (D–F).

4.36 × (length 1.92), patella 2.96 × (length 1.66) longer than broad, pedicel about the same length as the widened part of patella (club), with a rounded retrolateral margin. The new species resembles *B. chuanensis* but can be distinguished by the carapace with 4 small eye-spots (2 small eye-spots in *B. chuanensis*) and *sb* distinctly nearer to *b* than to *st* (*sb* on movable finger halfway between *b* and *st* in *B. chuanensis*).

**Etymology.**—Latinized adjective, derived from the village of Dongjia, near the type locality.

**Description (male holotype).**—Pedipalps reddish brown, carapace and chelicerae brown, abdomen weakly brown, legs yellowish.

**Carapace** (Fig. 7A): Smooth, 1.05 × longer than broad; with 4 small eye-spots, 2 anterior eye-spots length 0.04 mm, breadth 0.03 mm, 2 posterior eye-spots length 0.01 mm, breadth 0.01 mm; anterior margin without distinct epistome; with a total of

27 setae, including 6 on the anterior margin and 6 on the posterior margin.

**Chelicera:** Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 9 teeth, movable finger with 11 teeth (Fig. 7B). Galea could not be investigated because it was probably broken. Serrula exterior with about 40 blades and serrula interior with 32 blades. Rallum composed of 9 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 7C).

**Abdomen:** Tergal chaetotaxy (I–XI): 6: 8: 8: 7: 8: 10: 10: 10: 11: 12: 7 (2 tactile setae); sternal chaetotaxy (III–XI): 2x8+6: 2x5+7: 15: 14: 13: 14: 14: 13: 4; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 7 setae, coxa I 9, II 5, III 4, IV 8. Genital operculum of male with 55 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 7G).

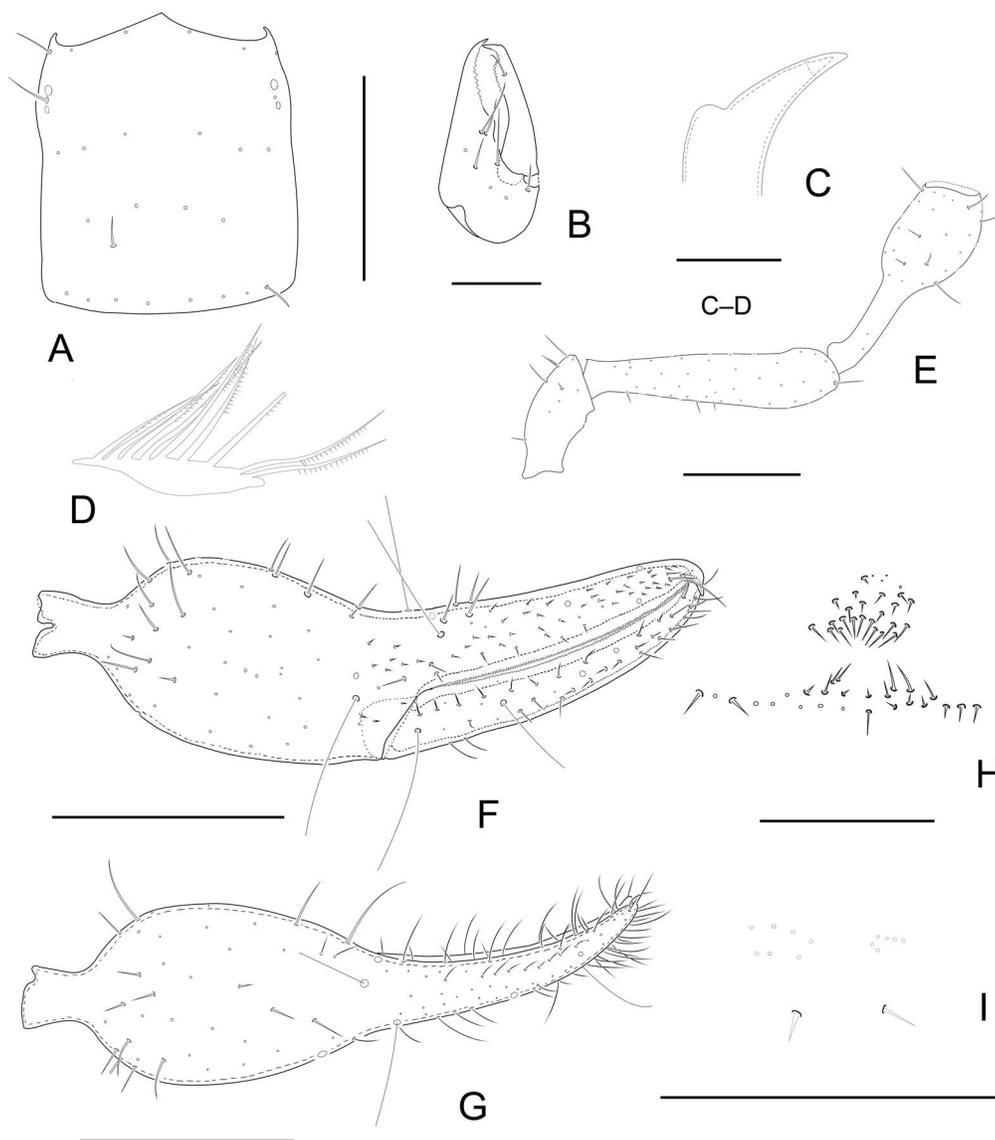


Figure 15.—*Bisetocreagris shangshanensis* Li & Shi, sp. nov., holotype male and paratype female: A, carapace; B, right chelicera; C, movable fingertip; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, male genital area; I, female genital area. Scale bars: 0.10 mm (C–D); 0.50 mm (B, H–I); 1.00 mm (A, E–G).

*Pedipalps* (Figs. 7D–F): Lateral side of hand finely granulated, trochanter  $2.36 \times$  longer than broad, distal part of femur slightly enlarged,  $4.36 \times$  longer than broad, patella slender,  $2.96 \times$  longer than broad, with narrow pedicel,  $3.57 \times$  longer than broad, and ovoid club,  $1.74 \times$  longer than broad, with rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur  $1.16 \times$  longer than patella. Chela with pedicel  $3.89 \times$  longer than broad, hand with pedicel  $1.95 \times$  longer than broad; movable finger  $1.21 \times$  longer than hand (with pedicel) length. Fixed finger with 90 small cusped teeth, movable finger with 97 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *it* distinctly closer to fingertip than to *et*; on movable finger, *st* nearer to *t* than to *sb*, the latter distinctly nearer to *b* than to *st*.

*Legs*: Typical for Neobisiidae, elongate. Leg I: trochanter  $1.46 \times$  longer than deep, femur  $3.89 \times$  longer than deep and  $1.49 \times$  longer than patella, patella  $3.32 \times$  longer than deep, tibia  $6.50 \times$  longer, basitarsus  $3.46 \times$  longer, telotarsus  $5.92 \times$  longer than deep, telotarsus  $1.58 \times$  longer than basitarsus. Leg IV: trochanter  $1.41 \times$  longer than deep, femur+patella  $4.83 \times$  longer than deep, femur shorter than patella, tibia  $7.87 \times$  longer than deep, basitarsus  $3.53 \times$  longer, telotarsus  $5.87 \times$  longer than deep. Basitarsus with two tactile setae (basally,  $TS = 0.49$ ; distally,  $TS = 0.40$ ), telotarsus with a tactile seta near the middle ( $TS = 0.49$ ), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 5.69; carapace 1.23/1.17. Pedipalps: trochanter 1.04/0.44, femur 1.92/0.44, patella 1.66/0.56, hand with pedicel 1.56/0.80, length of finger 1.88, length of chela 3.11/0.80. Leg I: trochanter 0.38/0.26,

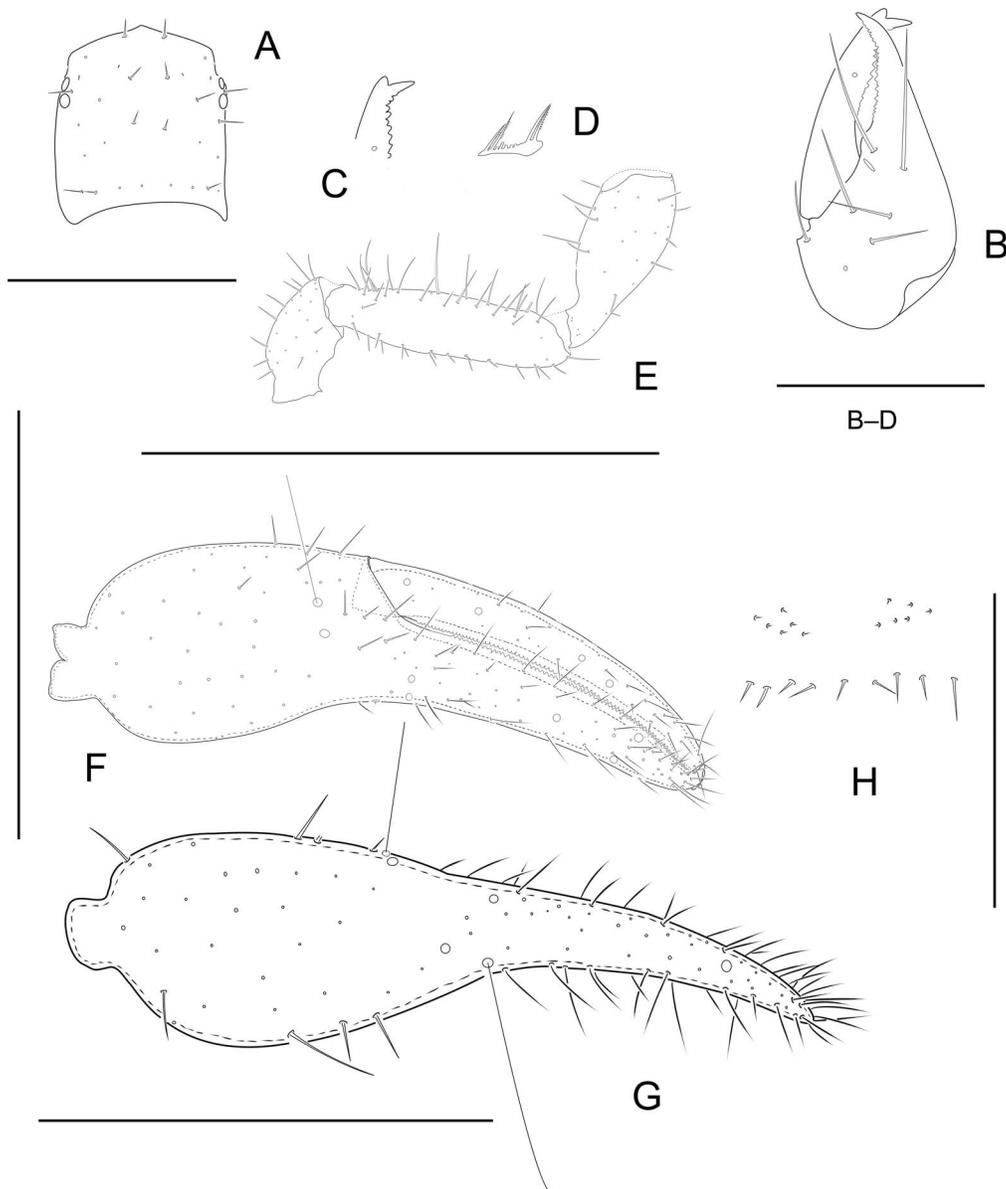


Figure 16.—*Bisetocreagris tianyangensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, right galea; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.10 mm (B–D, H); 0.50 mm (E); 1.00 mm (A, F–G).

femur 1.09/0.28, patella 0.73/0.22, tibia 1.04/0.16, basitarsus 0.45/0.13, telotarsus 0.71/0.12. Leg IV: trochanter 0.45/0.32, femur+patella 1.74/0.36, tibia 1.81/0.23, basitarsus 0.60/0.17, telotarsus 0.88/0.15.

**Distribution.**—This species is only known from Nameless Cave, near Pingtang County in Guizhou Province, China.

*Bisetocreagris duolangpingensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/625AC87C-9B37-420D-89C7-D9C426C60FD2>  
(Figs. 8, 24A)

**Type material.**—*Holotype male*. CHINA: Guizhou Province: Fuquan City, Niuchang Town, Duolangping Village, Shen-

xian Cave, 26°55.010'N, 107°26.128'E, 1179 m, 5 March 2017, Yun-Chun Li (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome triangular; pedipalps femur  $7.11 \times$  (length 1.99) and patella  $6.41 \times$  (length 2.05) longer than broad, pedicel about the same length as the widened part of patella (club), with slightly rounded retrolateral margin and almost straight prolateral margin. The new species resembles *B. sanhensis* sp. nov. but can be distinguished by the rallum with 8 pinnate blades (10 pinnate blades in *B. sanhensis* sp. nov.), femur of pedipalps  $7.11 \times$  longer than broad (1.99/0.28 mm), patella  $6.41 \times$  longer than broad (2.05/0.32 mm) (femur  $6.00 \times$  longer than broad [2.58/

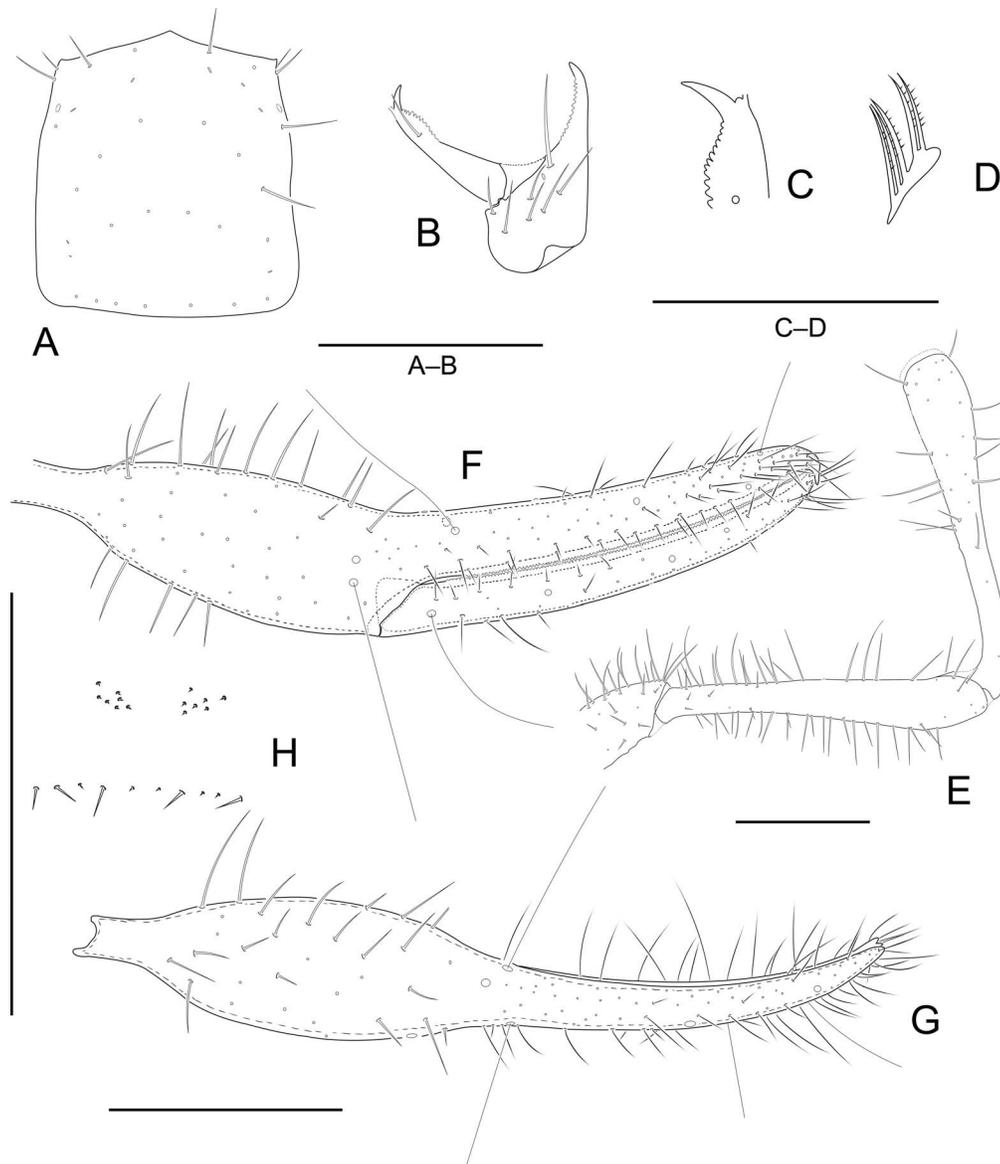


Figure 17.—*Bisetocreagris tuanjiensis* Li & Shi, sp. nov., holotype female: A, carapace; B, left chelicera; C, right galea; D, rallum of left chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, genital area. Scale bars: 0.50 mm (C–D, H); 1.00 mm (A–B, E–G).

0.43 mm] and patella  $5.45 \times$  longer than broad [2.57/0.47 mm] in *B. sanhensis* sp. nov.).

**Etymology.**—Latinized adjective, derived from the village of Duolangping, near the type locality.

**Description (male holotype).**—Carapace, pedipalps and chelicerae yellowish brown, abdomen weakly brown, legs yellowish.

**Carapace** (Fig. 8A): Smooth,  $1.16 \times$  longer than broad; eyes or eye-spots absent; anterior margin with distinct epistome, triangular; with a total of 24 setae, including 6 on the anterior margin and 6 on the posterior margin.

**Chelicera:** Hand with 7 setae and one lyrifissure dorsally, movable finger with 1 submedial seta; fixed finger with 14 teeth, movable finger with 15 teeth (Fig. 8B). Galea with a short broad stump on right chelicera (clearly broken) (Fig. 8C). Serrula exterior with about 28 blades and serrula interior

with 20 blades. Rallum composed of 8 pinnate blades, distal one separated and expanded at base (Fig. 8D).

**Abdomen:** Tergal chaetotaxy (I–XI): 6: 6: 6: 6: 6: 7: 7: 8: 9: 10:5; sternal chaetotaxy (III–XI): 2x7+9: 2x6+7: 13: 13: 13: 12: 10: 8; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 5 setae, coxa I 7, II 8, III 5, IV 7. Genital operculum of male with 26 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 8H).

**Pedipalps** (Fig. 8E–G): Smooth, trochanter  $3.50 \times$  longer than broad, distal part of femur slightly enlarged,  $7.11 \times$  longer than broad, patella slender,  $6.41 \times$  longer than broad, with narrow pedicel,  $5.68 \times$  longer than broad, and narrow club,  $3.48 \times$  longer than broad, with slightly rounded retrolateral margin and almost straight prolateral margin,

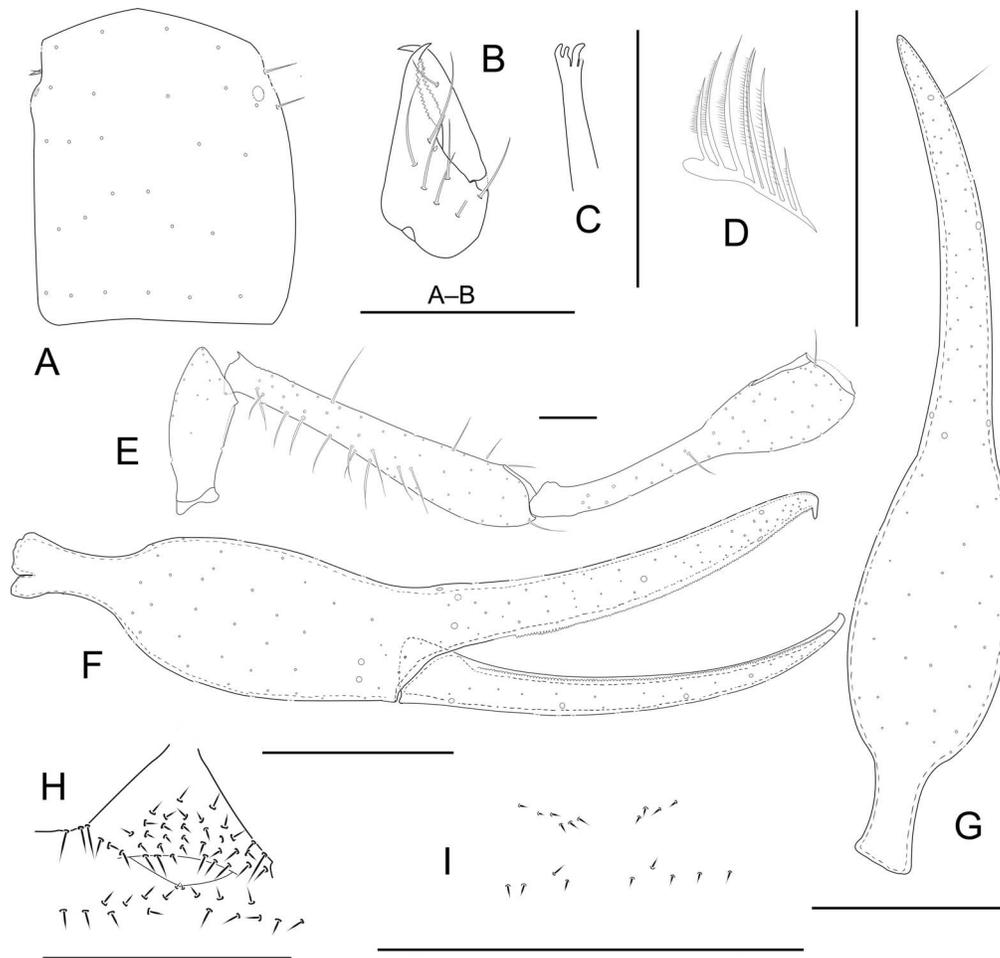


Figure 18.—*Bisetocreagris xianduhensis* Li & Shi, sp. nov., holotype male and paratype female: A, carapace; B, right chelicera; C, left galea; D, rallum of right chelicera; E, palp (minus chela); F, chela, retrolateral view; G, chela, dorsal view; H, male genital area; I, female genital area. Scale bars: 0.20 mm (C); 0.50 mm (D–E, H–I); 1.00 mm (A–B, F–G).

pedicel about the same length as the widened part of patella (club), femur  $0.97 \times$  longer than patella. Chela with pedicel  $6.92 \times$  longer than broad, hand with pedicel  $3.15 \times$  longer than broad; movable finger  $1.37 \times$  longer than hand (with pedicel) length. Fixed finger with 158 small cusped teeth, movable finger with 169 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *et/it* than to *ist*; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *b* than to *st*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.41 \times$  longer than deep, femur  $6.00 \times$  longer than deep and  $1.52 \times$  longer than patella, patella  $3.95 \times$  longer than deep, tibia  $7.85 \times$  longer, basitarsus  $4.91 \times$  longer, telotarsus  $6.91 \times$  longer than deep, telotarsus  $1.41 \times$  longer than basitarsus. Leg IV: trochanter  $2.54 \times$  longer than deep, femur+patella  $5.88 \times$  longer than deep, femur shorter than patella, tibia  $9.68 \times$  longer than deep, basitarsus  $5.61 \times$  longer, telotarsus  $8.42 \times$  longer than deep. Tactile setae probably present (most setae lacking) on basitarsus and telotarsus, subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 3.77; carapace 1.09/0.94. Pedipalps: trochanter 1.05/0.30, femur 1.99/0.28, patella 2.05/0.32, hand with pedicel 1.51/0.48, length of finger 2.07, length of chela 3.32/0.48. Leg I: trochanter 0.38/0.27, femur 1.20/0.20, patella 0.79/0.20, tibia 1.02/0.13, basitarsus 0.54/0.11, telotarsus 0.76/0.11. Leg IV: trochanter 0.61/0.24, femur+patella 1.88/0.32, tibia 1.84/0.19, basitarsus 0.73/0.13, telotarsus 1.01/0.12.

**Distribution.**—This species is only known from Shenxian Cave, near Fuquan City in Guizhou Province, China.

*Bisetocreagris ganxiaoensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/576D5A68-E892-406F-8432-208ABAEF8DB0>

(Figs. 9, 24B)

**Type material.**—*Holotype male*. CHINA: Guizhou Province: Pingtang County, Tangbian Town, Bamaochong Village, Ganxiao Cave,  $27^{\circ}46'17.18''\text{N}$ ,  $107^{\circ}17'39.26''\text{E}$ , 716 m, 6 October 2019, Yun-Chun Li (MCWNU).

**Diagnosis.**—Troglophilous habitus. This new species can be easily distinguished from other members of the genus

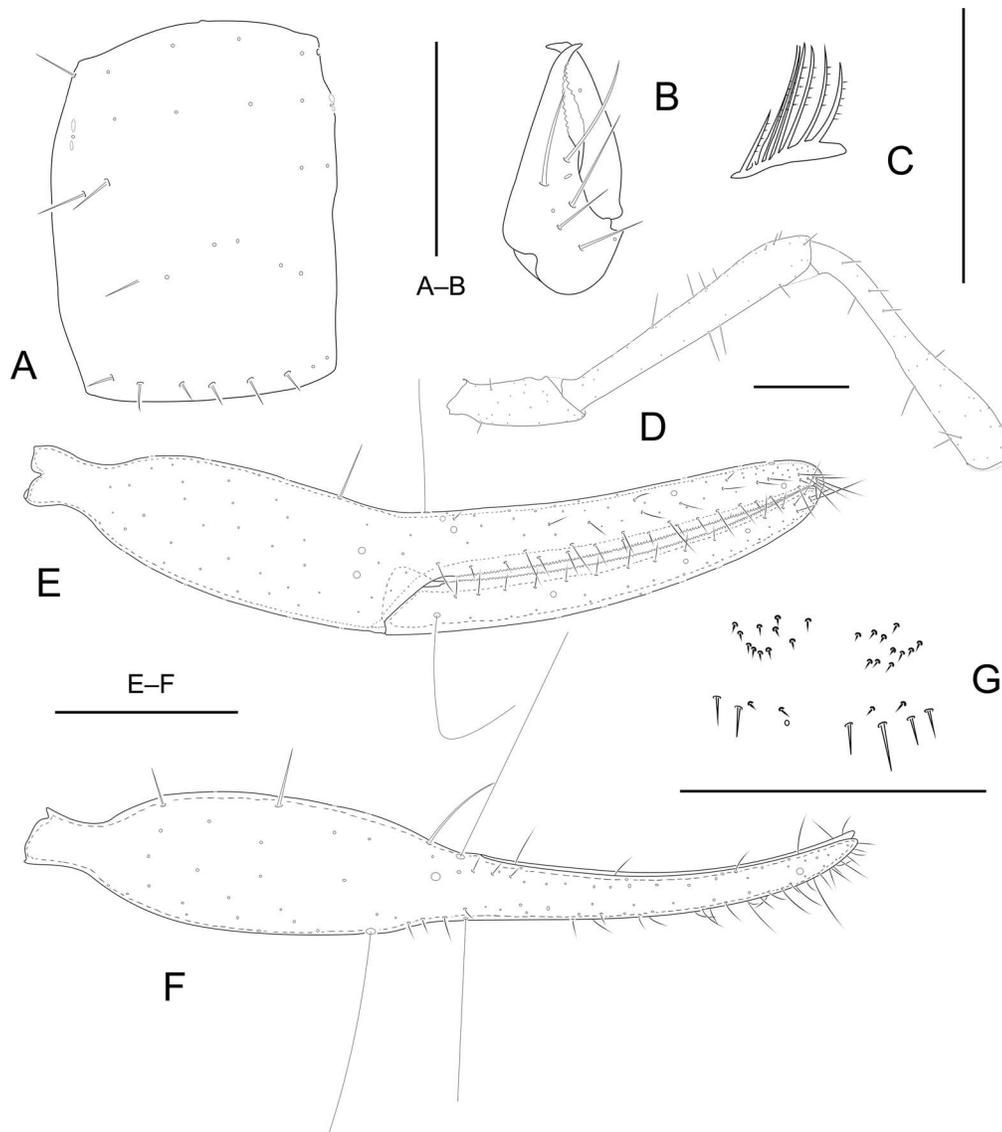


Figure 19.—*Bisetocreagris xiniuyanensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, rallum of right chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

*Bisetocreagris* by the following combination of characters: carapace with 4 eyes; pedipalps femur  $4.99 \times$  (length 1.59) and patella  $3.92 \times$  (length 1.45) longer than broad, with narrow pedicel, distinctly shorter than widened part of patella (club), with slightly rounded retrolateral margin and cheliceral rallum with 8 pinnate blades.

**Etymology.**—Latinized adjective, derived from the type locality, namely Ganxiao Cave.

**Description (male holotype).**—Pedipalps reddish brown, chelicerae, carapace and abdomen brown, legs yellowish.

**Carapace** (Fig. 9A): With 2 lyrifissures located dorsally,  $1.21 \times$  longer than broad; 4 small distinct eyes, length 0.07 mm, breadth 0.05 mm; anterior margin with a small, rounded and knob-like epistome. With a total of 30 setae, including 8 on the anterior margin and 7 on the posterior margin.

**Chelicera:** Hand with 7 (on left)–8 (on right) setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 10 teeth, movable finger with

13 teeth (Fig. 9B). Galea could not be investigated because it was probably broken. Serrula exterior with about 42 blades and serrula interior with 30. Rallum composed of 8 blades, distal one separated and expanded at base (Fig. 9C).

**Abdomen:** Tergal chaetotaxy (I–XI): 10: 11: 11: 10: 9: 10: 11: 11: 11: 6; sternal chaetotaxy (III–XI):  $2 \times 6 + 9$ :  $2 \times 5 + 6$ : 10: 10: 11: 11: 10: 12: 4; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 4 (on right)–5 (on left) marginal setae. Pedipalpal coxa with 8 setae, coxa I 7, II 6, III 4, IV 7. Genital operculum of male with 43 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 9G).

**Pedipalps** (Figs. 9D–F): Lateral side of femur finely granulated, trochanter  $2.29 \times$  longer than broad, distal part of femur slightly enlarged, patella slender,  $4.99 \times$  longer than broad, with narrow pedicel,  $3.61 \times$  longer than broad, and narrow club,  $2.54 \times$  longer than broad, with slightly rounded retrolateral margin, pedicel distinctly shorter than the widened

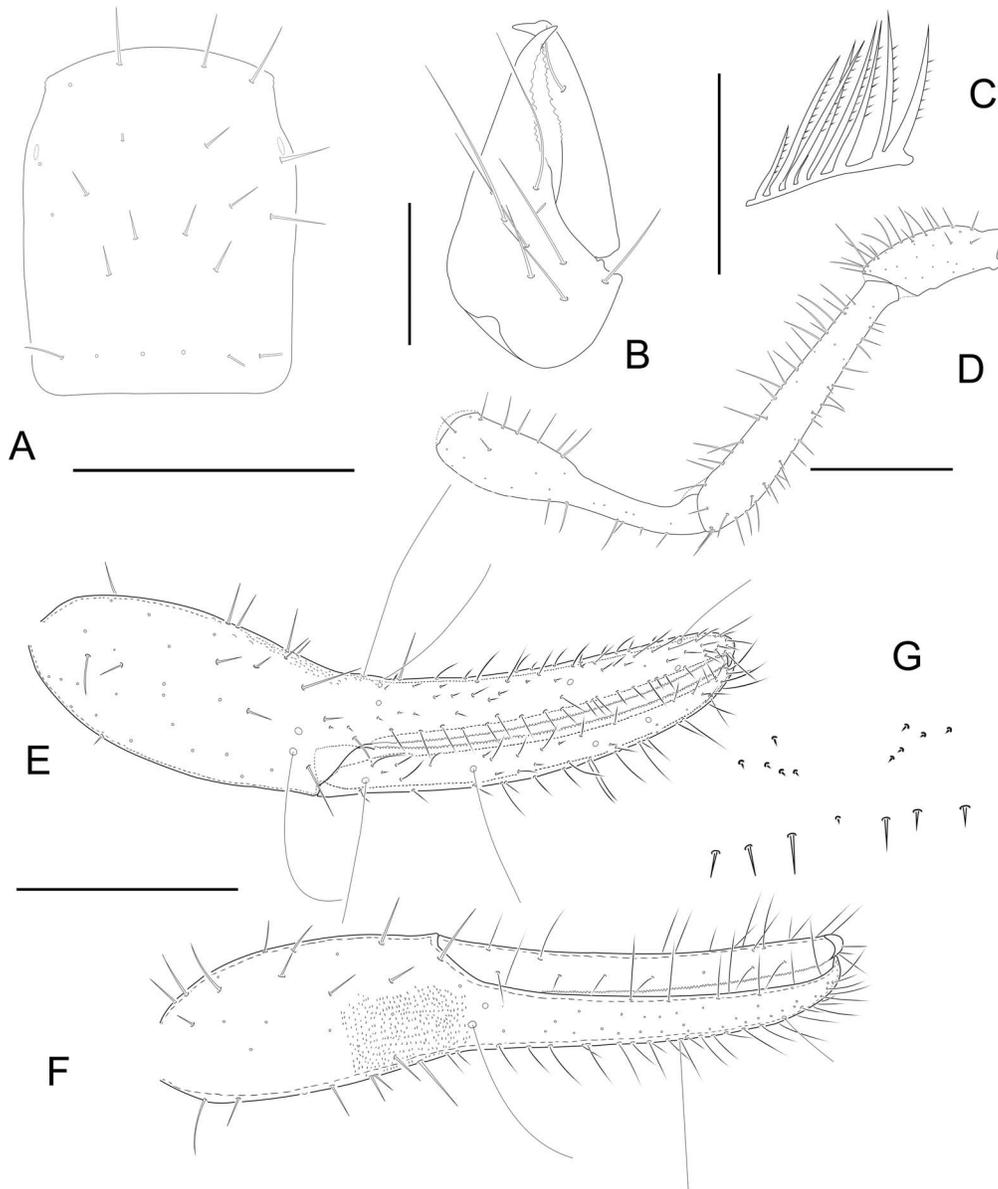


Figure 20.—*Bisetocreagris yaolinensis* Li & Shi, sp. nov., holotype female: A, carapace; B, right chelicera; C, rallum of right chelicera; D, palp (minus chela); E, chela, retrolateral view; F, chela, dorsal view; G, genital area. Scale bars: 0.50 mm (C, G); 1.00 mm (A–B, D–F).

part of patella (club), femur  $1.10 \times$  longer than patella. Chela with pedicel  $4.60 \times$  longer than broad, hand with pedicel  $2.35 \times$  longer than broad; movable finger  $1.12 \times$  longer than hand (with pedicel) length. Fixed finger with 106 small cusped teeth, movable finger with 118 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *et-it* than to *ist*; *et-it* at same level near fingertip; on movable finger, *st* distinctly nearer to *t* than to *sb*, the latter distinctly nearer to *b* than to *st*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.17 \times$  longer than deep, femur  $4.35 \times$  longer than deep and  $1.50 \times$  longer than patella, patella  $3.22 \times$  longer than deep, tibia  $6.46 \times$  longer, basitarsus  $4.09 \times$  longer, telotarsus  $6.11 \times$  longer than deep, telotarsus 1.22 longer than basitarsus. Leg

IV: trochanter  $1.60 \times$  longer than deep, femur+patella  $3.37 \times$  longer than deep, femur shorter than patella, tibia  $7.28 \times$  longer than deep, basitarsus  $3.86 \times$  longer, telotarsus  $6.82 \times$  longer than deep. Tactile setae probably present (most setae lacking) on basitarsus (near basally of segment), telotarsus with a tactile seta near middle (TS = 0.51), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 4.01; carapace 1.15/0.95. Pedipalps: trochanter 0.80/0.35, femur 1.59/0.32, patella 1.45/0.37, hand with pedicel 1.29/0.55, length of finger 1.45, length of chela 2.53/0.55. Leg I: trochanter 0.27/0.23, femur 0.87/0.20, patella 0.58/0.18, tibia 0.84/0.13, basitarsus 0.45/0.11, telotarsus 0.55/0.09. Leg IV: trochanter 0.48/0.30, femur+patella 1.28/0.38, tibia 1.31/0.18, basitarsus 0.54/0.14, telotarsus 0.75/0.11.

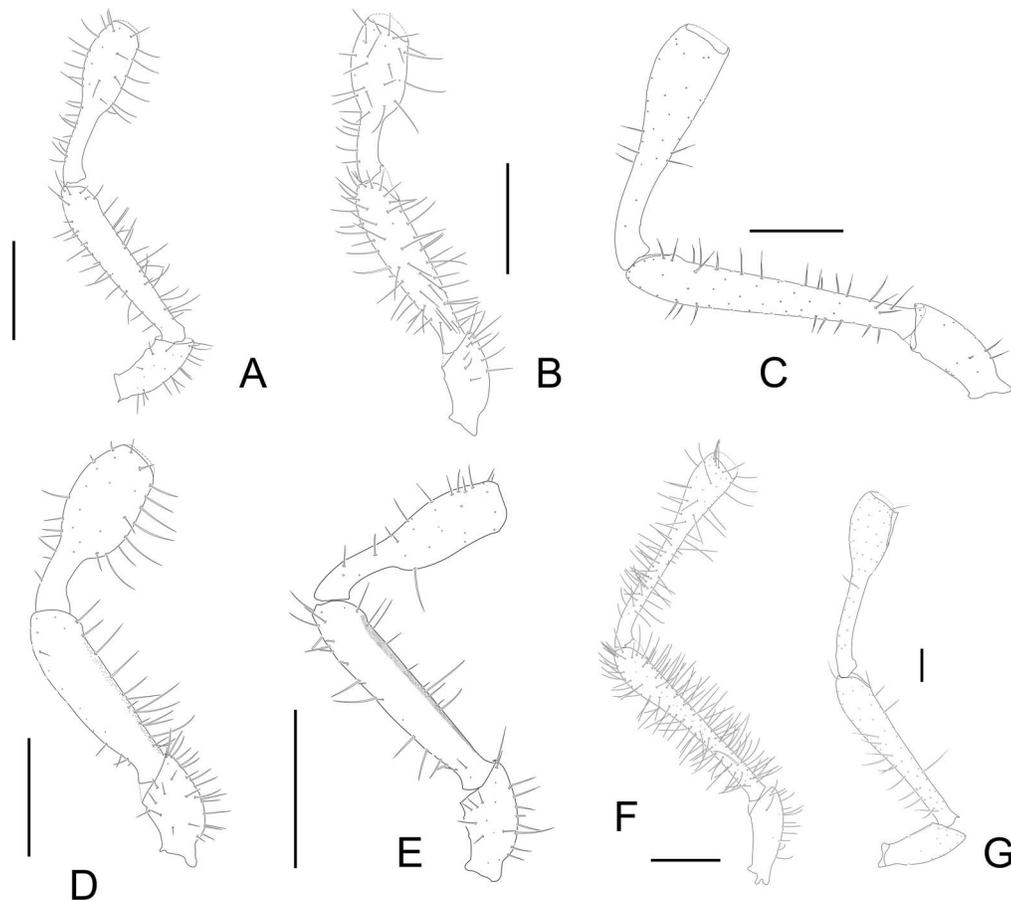


Figure 21.—Pedicel of pedipalpal patella: A, *B. baiyunensis* Li & Shi, sp. nov.; B, *B. dongjiensis* Li & Shi, sp. nov.; C, *B. mahnerti* Li & Shi, sp. nov.; D, *B. banganensis* Li & Shi, sp. nov.; E, *B. ganxiaoensis* Li & Shi, sp. nov.; F, *B. diaojiangensis* Li & Shi, sp. nov.; G, *B. xianduhensis* Li & Shi, sp. nov. Scale bars: 0.50 mm (G); 1.00 mm (A–F).

**Distribution.**—This species is only known from Ganxiao Cave, near Pingtang County in Guizhou Province, China.

*Bisetocreagris guanyinensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/A14DFDB0-C3AE-495A-A6BC-AA770F2EEF4C>  
(Figs. 10, 24C)

**Type material.**—*Holotype female*. CHINA: *Guizhou Province*: Luodian County, Bangeng Town, Bangen Village, Guanyin Cave, 25°31'6.84"N, 106°38'54.68"E, 519 m, 8 October 2019, Yun-Chun Li (MCWNU).

*Paratypes*. CHINA: *Guizhou Province*: 3 ♀, same data as the holotype (MCWNU).

**Diagnosis.**—Troglolobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome indistinct; pedipalps femur 6.60–6.70 × (length 3.50–3.55), patella 6.37–6.40 × (length 3.74–3.83) longer than broad, patella very thin and long, pedicel distinctly longer than the widened part of patella (club), with a slightly rounded retrolateral margin. The new species resembles *Bisetocreagris gracilenta* Gao & Zhang, 2017 but can be distinguished by *est* nearer to *et/it* than to *ist*,

*sb* nearer to *b* than to *st* (*est* halfway between *ist* and *et/it*, *sb* halfway between *b* and *st* in *B. gracilenta*).

**Etymology.**—Latinized adjective, derived from the type locality, namely Guanyin Cave.

**Description (female holotype).**—Carapace, pedipalps and chelicerae brown, abdomen weakly brown, legs yellowish.

*Carapace* (Fig. 10A): Smooth, 1.19–1.23 × longer than broad; eyes or eye-spots absent; anterior margin without distinct epistome; with a total of 38–39 setae, including 10 on the anterior margin and 11–12 on the posterior margin.

*Chelicera*: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 13 teeth, movable finger with 16 teeth (Fig. 10B). Galea could not be investigated because was probably broken. Serrula exterior with about 44–45 blades and serrula interior with 35–37. Rallum composed of 11 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 10C).

*Abdomen*: Tergal chaetotaxy (I–XI): 12: 11: 13: 13: 11: 12: 10: 11: 12: 11: 7 (2 tactile setae); sternal chaetotaxy (III–XI): 2x9+17: 2x9+14: 20: 20: 17: 18: 18: 16: 7 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 6 marginal setae. Pedipalpal coxa with 7 setae, coxa I 9–11, II 8, III 5, IV 11. Genital operculum of female with 12 setae (Fig. 10G).

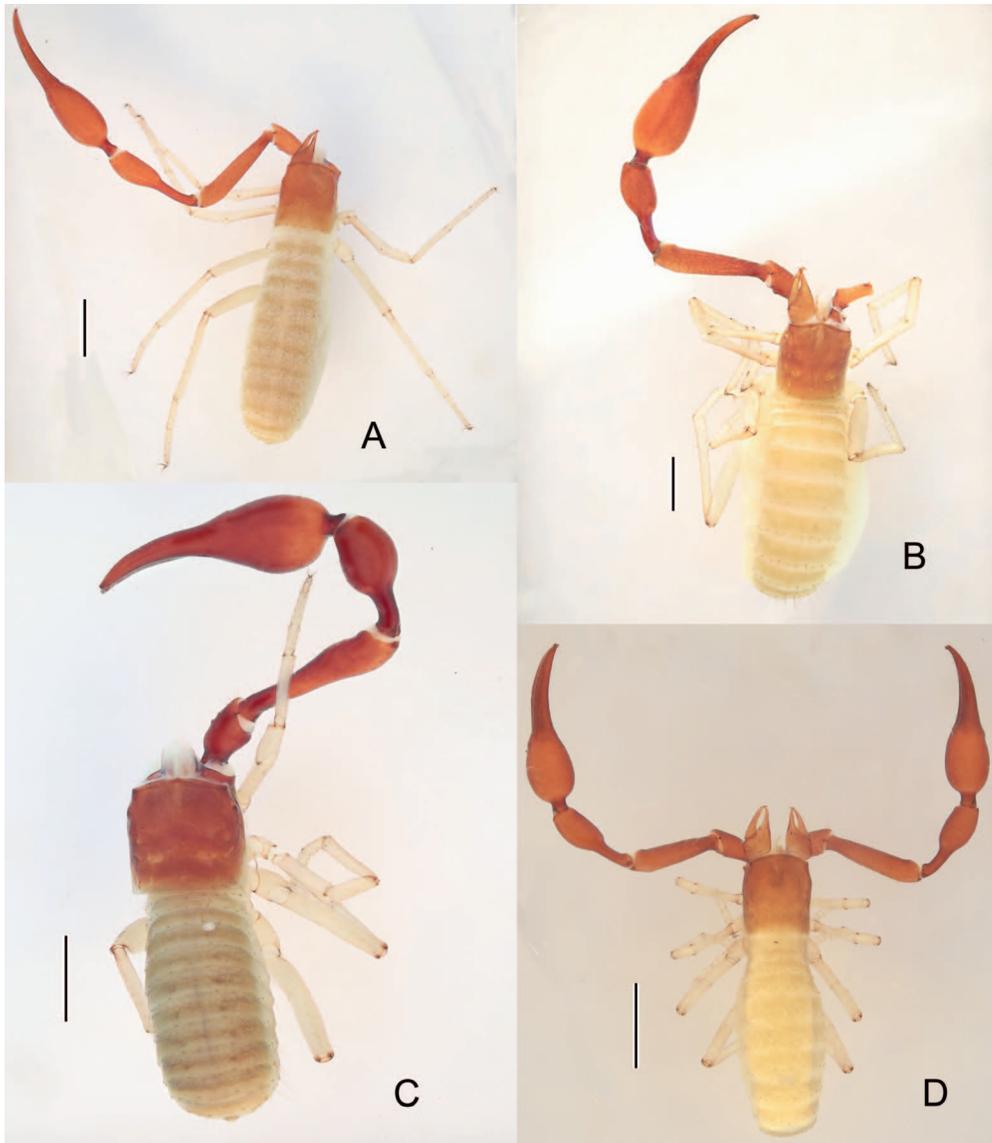


Figure 22.—*Bisetocreagris* species, dorsal views: A, *B. baiyunensis* Li & Shi, sp. nov., holotype female; B, *B. baimensis* Li & Shi, sp. nov., holotype female; C, *B. banganensis* Li & Shi, sp. nov., holotype female; D, *B. changchaensis* Li & Shi, sp. nov., holotype female. Scale bars: 1.00 mm (A–D).

*Pedipalps* (Figs. 10D–F): Smooth, trochanter  $2.86\text{--}2.93 \times$  longer than broad, distal part of femur slightly enlarged,  $6.60\text{--}6.70 \times$  longer than broad, patella slender and longer,  $6.37\text{--}6.40 \times$  longer than broad, with very narrow pedicel,  $9.79\text{--}9.86 \times$  longer than broad, and narrow club,  $2.11\text{--}2.19 \times$  longer than broad, with slightly rounded retrolateral margin, pedicel distinctly longer than the widened part of patella (club), femur  $0.92\text{--}0.93 \times$  longer than patella. Chela with pedicel  $6.79\text{--}6.81 \times$  longer than broad, hand with pedicel  $3.18\text{--}3.20 \times$  longer than broad; movable finger  $1.32\text{--}1.35 \times$  longer than hand (with pedicel) length. Fixed finger with 128–135 small cusped teeth, movable finger with 152–159 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *et/it* than to *ist*; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *b* than to *st*.

*Legs*: Typical for Neobisiidae, elongate. Leg I: trochanter  $1.44\text{--}1.49 \times$  longer than deep, femur  $5.73\text{--}5.76 \times$  longer than deep and  $1.56\text{--}1.57 \times$  longer than patella, patella  $4.65\text{--}4.70 \times$  longer than deep, tibia  $9.14\text{--}9.20 \times$  longer, basitarsus  $4.93\text{--}4.97 \times$  longer, telotarsus  $6.93\text{--}6.95 \times$  longer than deep, telotarsus  $1.41\text{--}1.45$  longer than basitarsus; leg IV: trochanter  $2.38\text{--}2.40 \times$  longer than deep, femur+patella  $8.64\text{--}8.67 \times$  longer than deep, femur shorter than patella, tibia  $13.21\text{--}13.30 \times$  longer than deep, basitarsus  $4.68\text{--}4.71 \times$  longer, telotarsus  $6.78\text{--}6.81 \times$  longer than deep. Basitarsus with one tactile seta (basally,  $TS = 0.50\text{--}0.52$ ), tactile setae probably present (most setae lacking) on telotarsus (near middle of segment), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/ breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length  $6.75\text{--}6.90$ ; carapace  $1.66\text{--}1.68/1.40\text{--}1.45$ . Pedipalps: trochanter  $1.55\text{--}1.59/0.53\text{--}0.56$ , femur  $3.50\text{--}3.55/0.54\text{--}0.57$ , patella

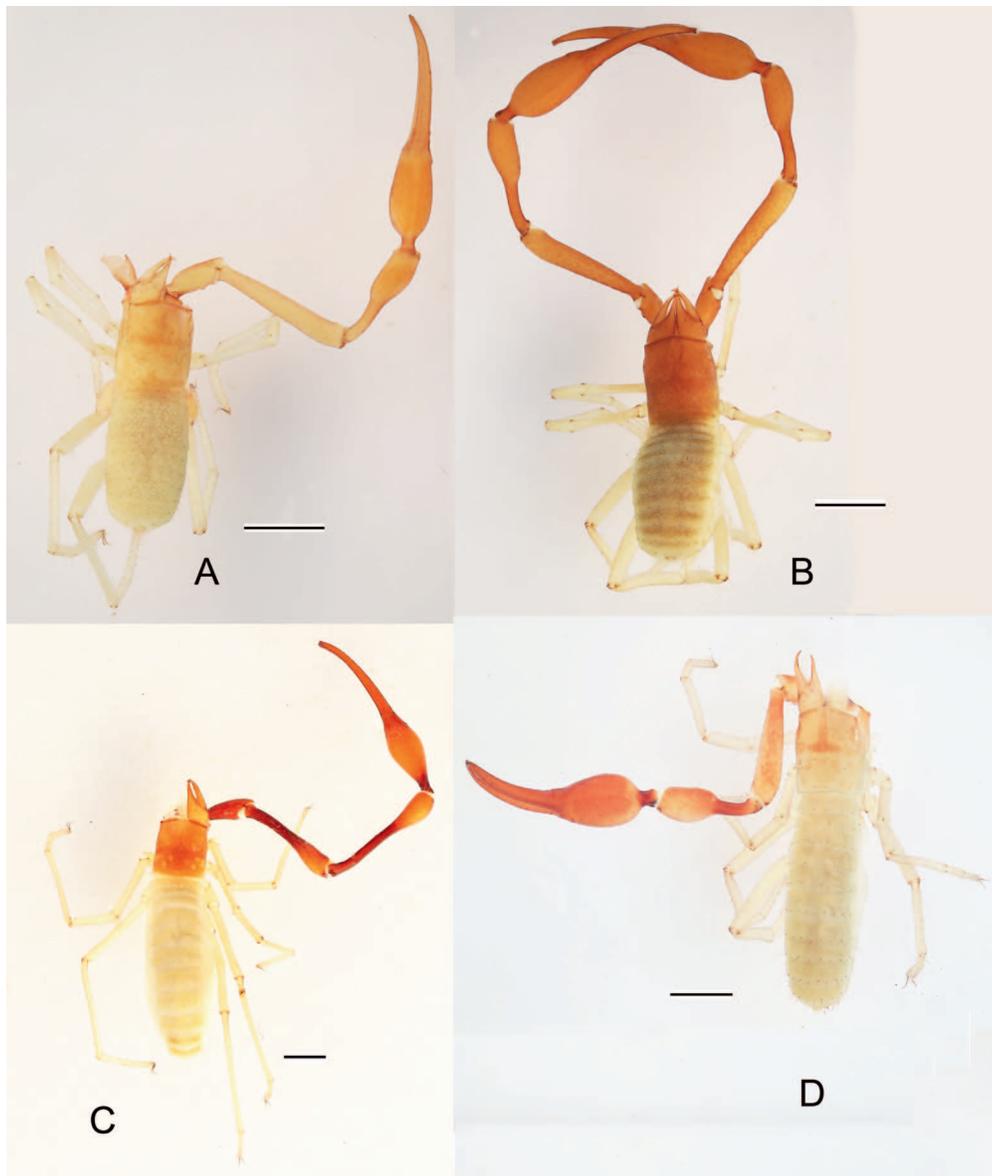


Figure 23.—*Bisetocreagris* species, dorsal views: A–B, *B. daxingensis* Li & Shi, sp. nov., holotype male (A) and paratype female (B); C, *B. diaojiangensis* Li & Shi, sp. nov., holotype female; D, *B. dongjiensis* Li & Shi, sp. nov., holotype male. Scale bars: 1.00 mm (A–D).

3.79–3.83/0.58–0.61, hand with pedicel 2.50–2.58/0.78–0.82, length of finger 3.29–3.40, length of chela 5.38–5.46/0.78–0.82. Leg I: trochanter 0.55–0.63/0.39–0.44, femur 1.85–1.92/0.30–0.35, patella 1.17–1.24/0.24–0.27, tibia 1.87–1.94/0.20–0.22, basitarsus 0.71–0.75/0.14–0.15, telotarsus 1.01–1.09/0.14–0.15. Leg IV: trochanter 0.90–0.94/0.36–0.41, femur+patella 3.09–3.18/0.32–0.37, tibia 3.14–3.21/0.22–0.25, basitarsus 0.85–0.92/0.18–0.19, telotarsus 1.19–1.25/0.18–0.19.

**Distribution.**—This species is only known from Guanyin Cave, near Luodian County in Guizhou Province, China.

*Bisetocreagris juanxuae* Mahnert & Li, 2016

*Bisetocreagris juanxuae* Mahnert & Li 2016: 265, figs. 17–23.

**Material examined.**—CHINA: Sichuan Province: 7 ♂, 13 ♀, Xingwen County, Shihai Town, Dao Cave, 28.18900°N,

105.12118°E, 840 m, 17 October 2015, Yun-Chun Li (MCWNU).

**Distribution.**—This species is only known from Dao Cave, near Xingwen County in Sichuan Province, China.

*Bisetocreagris mahnerti* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/1fd9eed-b134-4f0a-85a8-81d00fc3eb2a>  
(Figs. 11, 24D)

**Type material.**—*Holotype female.* CHINA: Yunnan Province: Kunming City, Panlong District, Aziying Town, Huanglong Cave, 25°25.522'N, 102°55.552'E, 2371 m, 19 April 2019, Yun-Chun Li (MCWNU).

*Paratypes.* CHINA: Yunnan Province: 1 ♀, same data as the holotype (MCWNU); 1 ♀, 4 December 2014, Yun-Chun Li leg; 1 ♀, 27 August 2020, Yun-Chun Li (MCWNU).

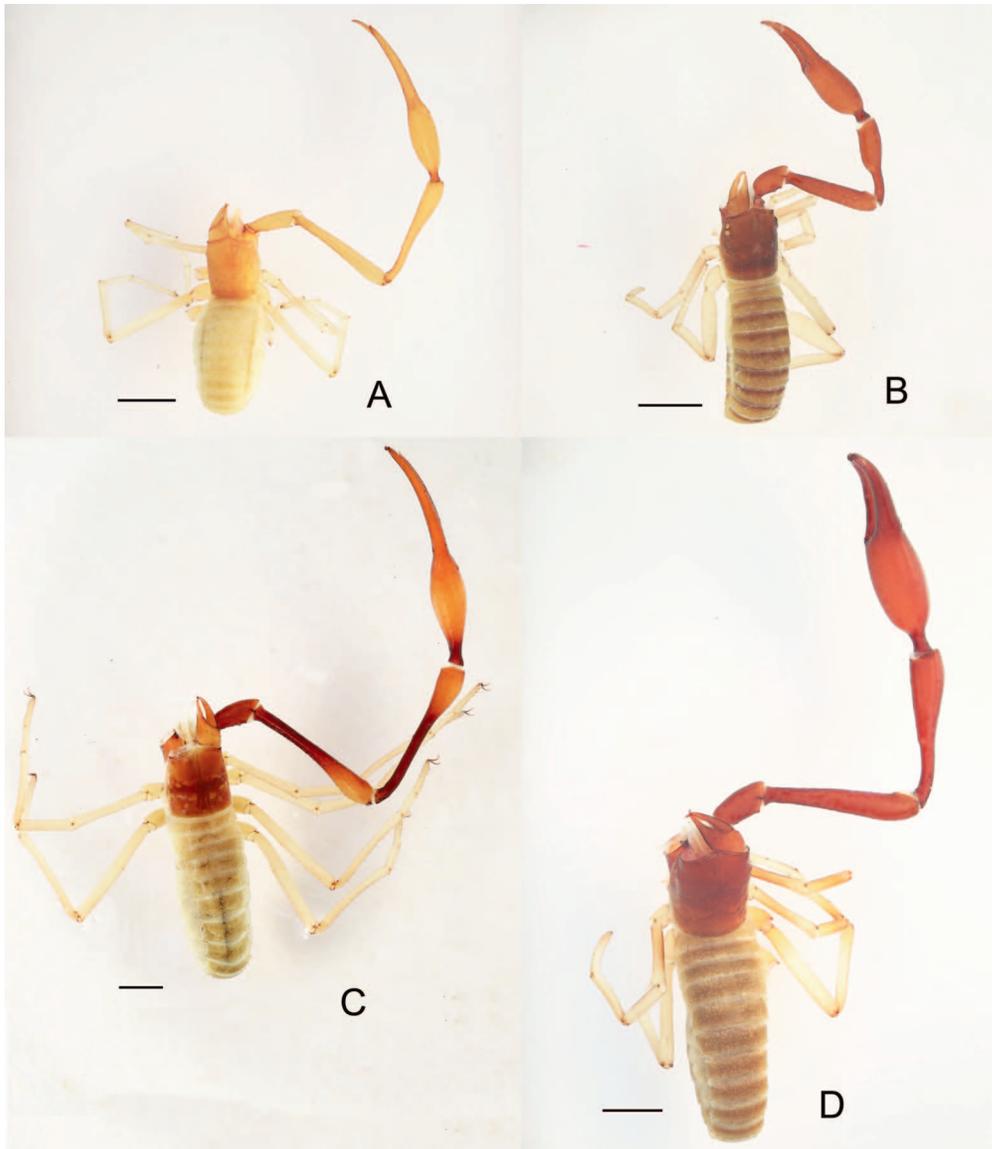


Figure 24.—*Bisetocreagris* species, dorsal views: A, *B. duolangpingensis* Li & Shi, sp. nov., holotype male; B, *B. ganxiaoensis* Li & Shi, sp. nov., holotype male; C, *B. guanyinensis* Li & Shi, sp. nov., holotype female; D, *B. mahnerti* Li & Shi, sp. nov., holotype female. Scale bars: 1.00 mm (A–D).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome triangular and very small; pedipalps femur  $5.26\text{--}5.41 \times$  (length  $2.11\text{--}2.79$ ) and patella  $4.70\text{--}5.26 \times$  (length  $2.21\text{--}3.03$ ) longer than broad, pedicel about the same length as the widened part of patella (club), with slightly rounded retrolateral margin and almost straight prolateral margin, trichobothria *it* distinctly closer to fingertip than to *et*, *sb* indistinctly nearer to *st* than to *b*, chelal finger shorter than hand with pedicel.

**Etymology.**—The new species is named in honour of the late Volker Mahnert (Muséum d'histoire naturelle, Genève, Switzerland).

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen brown, legs yellowish.

**Carapace** (Fig. 11A): Smooth,  $1.18\text{--}1.20 \times$  longer than broad; without eyes or eyespots; epistome very small, triangular. With a total of 28–30 setae, including 6 on the anterior margin and 7–8 on the posterior margin.

**Chelicera:** Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 12–13 teeth, movable finger with 13–14 teeth (Fig. 11B). Galea divided into 3 main branches, in which two forked apically (Fig. 11C). Serrula exterior with about 46–48 blades and serrula interior with 32–36. Rallum composed of 7–8 blades, distal one separated and expanded at base (Fig. 11D).

**Abdomen:** Tergal chaetotaxy (I–XI): 8: 8: 9: 10: 10: 11: 9: 11: 10: 11: 5 (2 tactile setae); sternal chaetotaxy (III–XI):  $2 \times 6 + 11$ : 12: 15: 14: 14: 12: 12: 9 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 4–6 marginal setae. Pedipalpal coxa with 8–9 setae, coxa I

8, II 7, III 5–7, IV 9–10. Genital operculum of female with 19 setae (Fig. 11H).

**Pedipalps** (Figs. 11E–G): Smooth, trochanter 2.08–2.30 × longer than broad, distal part of femur slightly enlarged, 5.26–5.41 × longer than broad, patella slender, 4.70–5.26 × longer than broad, with narrow pedicel, 5.89–5.92 × longer than broad, and narrow club, 2.36–2.43 × longer than broad, with a slightly rounded retrolateral margin and almost straight prolateral margin, pedicel about the same length as the widened part of patella (club), femur 0.92–0.95 × longer than patella. Chela with pedicel 3.16–4.18 × longer than broad, hand with pedicel 2.41–2.49 × longer than broad; movable finger 0.88–0.96 × longer than hand (with pedicel) length. Fixed finger with 103–112 small cusped teeth, movable finger with 119–131 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist*, and *isb* closely grouped at the base of the fixed finger; *it* distinctly closer to finger than to *et*; on movable finger, *st* nearer to *t* than to *sb*, the latter indistinctly nearer to *st* than to *b*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter 1.75–1.90 × longer than deep, femur 5.12–5.16 × longer than deep and 1.36–1.53 × longer than patella, patella 3.79–4.08 × longer than deep, tibia 7.44–7.67 × longer, basitarsus 4.21–4.62 × longer, telotarsus 5.93–6.54 × longer than deep, telotarsus 1.41–1.42 longer than basitarsus. Leg IV: trochanter 1.90–1.96 × longer than deep, femur+patella 4.74–4.93 × longer than deep, femur shorter than patella, tibia 8.65–9.00 × longer than deep, basitarsus 3.73–3.89 × longer, telotarsus 5.30–6.19 × longer than deep. Basitarsus (near base) and telotarsus (near middle) probably with a tactile seta (most setae lacking), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/ breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length 5.72–5.90; carapace 1.32–1.49/1.10–1.26. Pedipalps: trochanter 0.81–1.29/0.39–0.56, femur 2.11–2.79/0.39–0.53, patella 2.21–3.03/0.47–0.66, hand with pedicel 1.79–2.34/0.72–0.97, length of finger 1.74–2.09, length of chela 3.01–3.94/0.72–0.97. Leg I: trochanter 0.55–0.60/0.28–0.34, femur 1.39–1.44/0.26–0.28, patella 0.91–1.04/0.24–0.26, tibia 1.34–1.38/0.17–0.18, basitarsus 0.59–0.60/0.13–0.14, telotarsus 0.83–0.85/0.13–0.14. Leg IV: trochanter 10.68–0.75/0.35–0.40, femur+patella 2.12–2.37/0.43–0.50, tibia 2.25–2.43/0.26–0.27, basitarsus 0.74–0.82/0.19–0.22, telotarsus 0.99–1.06/0.16–0.20.

**Distribution.**—This species is only known from Huanglong Cave, near Kunming City in Yunnan Province, China.

#### *Bisetocreagris martii* (Mahnert, 2003)

*Parobisium martii* Mahnert 2003: 740, figs. 1–4.

*Bisetocreagris martii* (Mahnert, 2003): Mahnert & Li 2016: 260.

**Material examined.**—CHINA: Yunnan Province: 1 ♂, 2 ♀, Zhenxiong County, Wude Town, Xiaoguoquan Cave, 25.586027°N, 104.762101°E, 1220 m, 9 April 2017, Yun-Chun Li (MCWNU); 3 ♂, 9 ♀, 30 August 2020, Yun-Chun Li (MCWNU).

**Distribution.**—This species is only known from Xiaoguoquan Cave, near Zhenxiong County in Yunnan Province, China.

#### *Bisetocreagris matuoensis* Li & Shi, sp. nov.

http://zoobank.org/NomenclaturalActs/D9E03158-325F-4052-AE70-4DDCCEA6FE32  
(Figs. 12, 25A)

**Type material.**—*Holotype female.* CHINA: Guizhou Province: Pingtang County, Tangbian Town, Matuo Village, Nameless Cave, 25°39′33.98″N, 106°45′44.12″E, 1019 m, 7 October 2019, Yun-Chun Li (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome triangular and small; pedipalps femur 6.50 × (length 4.03) and patella 5.97 × (length 4.48) longer than broad, patella very thin and long, pedicel distinctly longer than the widened part of patella (club), with slightly rounded retrolateral margin. The new species resembles *Bisetocreagris titanium* (Mahnert, 2003) but can be distinguished by *est* nearer to *et/it* than to *ist*, *st* nearer to *t* than to *sb* (*est* halfway between *ist* and *et/it*, *st* halfway between *sb* and *t* in *B. titanium*).

**Etymology.**—Latinized adjective, derived from the village of Matuo, near the type locality.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen weakly brown, legs yellowish.

**Carapace** (Fig. 12A): Smooth, 1.20 × longer than broad; eyes or eye-spots absent; anterior margin with a small and triangular epistome; with a total of 33 setae, including 10 on the anterior margin and 9 on the posterior margin.

**Chelicera:** Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 15 teeth, movable finger with 19 teeth (Fig. 12B). Galea could not be investigated because it was probably broken. Serrula exterior with about 46 blades and serrula interior with 36. Rallum composed of 13 pinnate blades, distal one separated and with an expanded base, proximal one short (Fig. 12C).

**Abdomen:** Tergal chaetotaxy (I–XI): 13: 10: 13: 13: 12: 13: 13: 14: 13: 11; sternal chaetotaxy (III–XI): 2x10+20: 2x8+14: 22: 21: 20: 19: 19: 18: 10; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 6 marginal setae. Pedipalpal coxa with 8 setae, coxa I 10, II 10, III 6, IV 17. Genital operculum of female with 8 setae (Fig. 12G).

**Pedipalps** (Figs. 12D–F): Smooth, trochanter 2.92 × longer than broad, distal part of femur slightly enlarged, 6.50 × longer than broad, patella slender and longer, 5.97 × longer than broad, with very narrow pedicel, 10.59 × longer than broad, and narrow club, 2.09 × longer than broad, with slightly rounded retrolateral margin, pedicel distinctly longer than the widened part of patella (club), femur 0.90 × longer than patella. Chela with pedicel 6.00 × longer than broad, hand with pedicel 2.71 × longer than broad; movable finger 1.35 × longer than hand (with pedicel) length. Fixed finger with 129 small cusped teeth, movable finger with 145 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *et-it* than to *ist*; *it* distinctly closer to fingertip than to *et*; on movable finger, *st* nearer to *t* than to *sb*, the latter nearer to *b* than to *st*.

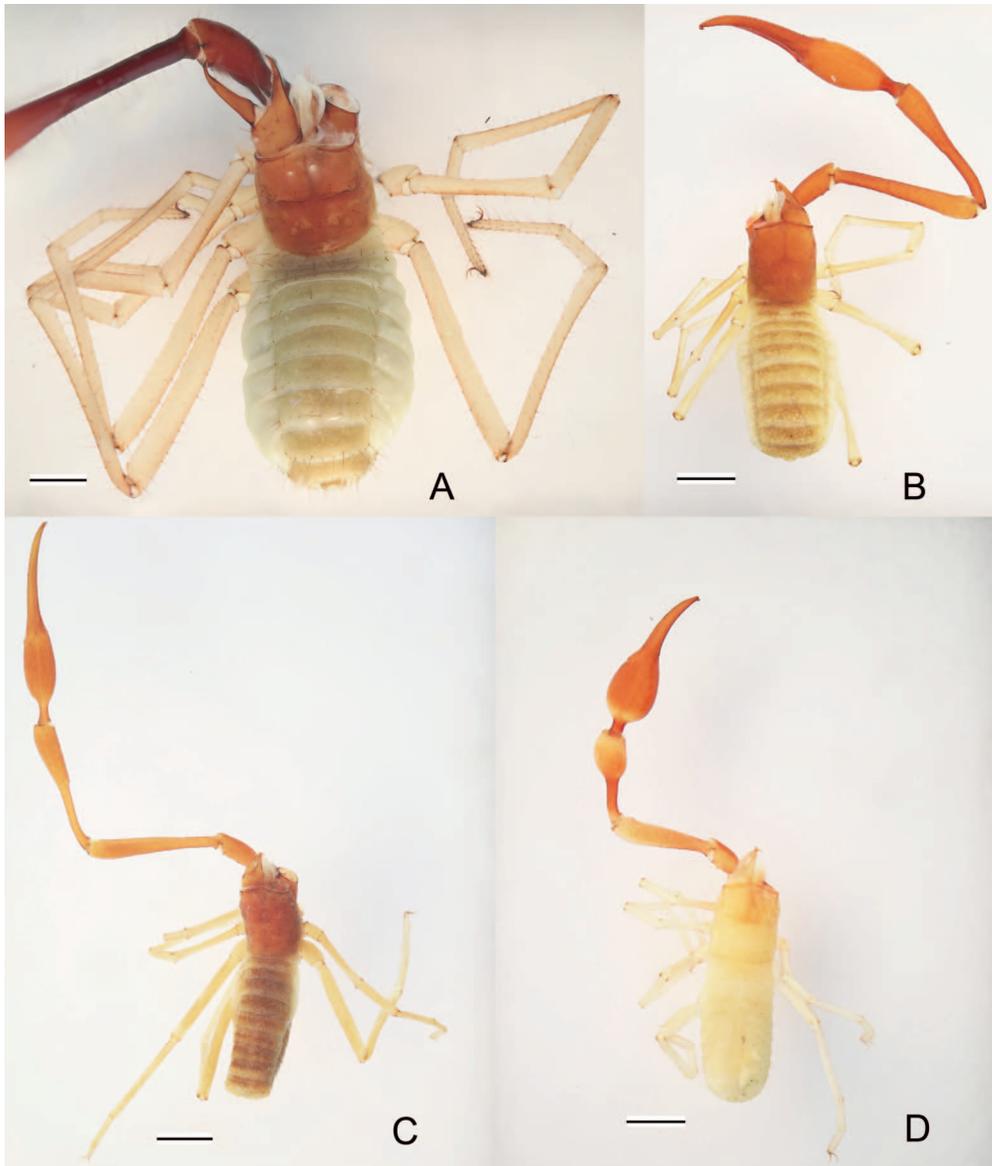


Figure 25.—*Bisetocreagris* species, dorsal views: A, *B. matuoensis* Li & Shi, sp. nov., holotype female; B, *B. sanhensis* Li & Shi, sp. nov., holotype male; C, *B. shahensis* Li & Shi, sp. nov., holotype male; D, *B. shangshanensis* Li & Shi, sp. nov., holotype male. Scale bars: 1.00 mm (A–D).

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.46 \times$  longer than deep, femur  $6.67 \times$  longer than deep and  $1.44 \times$  longer than patella, patella  $4.94 \times$  longer than deep, tibia  $10.95 \times$  longer, basitarsus  $4.84 \times$  longer, telotarsus  $6.42 \times$  longer than deep, telotarsus  $1.33 \times$  longer than basitarsus. Leg IV: trochanter  $2.65 \times$  longer than deep, femur+patella  $9.51 \times$  longer than deep, femur shorter than patella, tibia  $14.03 \times$  longer than deep, basitarsus  $4.91 \times$  longer, telotarsus  $6.00 \times$  longer than deep. Basitarsus with one tactile seta (basally, TS = 0.52), telotarsus with a tactile seta near the middle (TS = 0.47), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 7.74; carapace 1.91/1.59. Pedipalps: trochanter 1.87/0.64, femur 4.03/0.62, patella 4.48/0.75, hand with pedicel 2.82/1.04, length of finger

3.81, length of chela 6.24/1.04. Leg I: trochanter 0.67/0.46, femur 2.20/0.33, patella 1.53/0.31, tibia 2.41/0.22, basitarsus 0.92/0.19, telotarsus 1.22/0.19. Leg IV: trochanter 1.14/0.43, femur+patella 3.71/0.39, tibia 4.07/0.29, basitarsus 1.13/0.23, telotarsus 1.38/0.23.

**Distribution.**—This species is only known from Nameless Cave, near Pingtang County in Guizhou Province, China.

*Bisetocreagris sanhensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/33E9A1EE-CFF0-475B-92D3-1C397A797442>

(Figs. 13, 25B)

**Type material.**—*Holotype male*. CHINA: Guizhou Province: Dafang County, Wenge Town, Sanhe Village, Yelaoda Cave,

27°10.900'N, 105°28.278'E, 1438 m, 4 October 2015, Yun-Chun Li (MCWNU).

**Diagnosis.**—Trogllobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without eyes or eyespots; epistome triangular and small; pedicel of pedipalpal patella about the same length as the widened part of patella (club), with a slightly rounded retrolateral margin and an almost straight prolateral margin. The new species resembles *B. baozinensis* but can be distinguished by the carapace with small epistome (no epistome in *B. baozinensis*) and genital operculum of male with 37 setae (46–48 in *B. baozinensis*). The new species also resembles *B. duolangpingensis* sp. nov. but can be distinguished by the rallum with 10 pinnate blades (8 pinnate blades in *B. duolangpingensis* sp. nov.), femur of pedipalps  $6.00 \times$  longer than broad (2.58/0.43 mm) and patella  $5.45 \times$  longer than broad (2.57/0.47 mm) (femur  $7.11 \times$  longer than broad [1.99/0.28 mm] and patella  $6.41 \times$  longer than broad [2.05/0.32 mm] in *B. duolangpingensis* sp. nov.).

**Etymology.**—Latinized adjective, derived from the village of Sanhe, near the type locality.

**Description (male holotype).**—Carapace, pedipalps and chelicerae yellowish brown, abdomen weakly brown, legs yellowish.

**Carapace** (Fig. 13A): Smooth,  $1.18 \times$  longer than broad; eyes or eye-spots absent; anterior margin with a small and triangular epistome; with a total of 24 setae, including 6 on the anterior margin and 6 on the posterior margin.

**Chelicera:** Hand with 6 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 14 teeth, movable finger with 16 teeth (Fig. 13B). Galea divided into 2 main branches, one apically forked on right chelicera, another with a short broad stump on left chelicera (clearly broken) (Fig. 13C). Serrula exterior with about 36 blades and serrula interior with 24. Rallum composed of 10 pinnate blades, all broken, distal one with an expanded base (Fig. 13D).

**Abdomen:** Tergal chaetotaxy (I–XI): 7: 8: 8: 8: 9: 9: 10: 12: 12: 9; sternal chaetotaxy (III–XI):  $2 \times 8 + 14$ :  $2 \times 6 + 14$ : 17: 17: 17: 17: 12: 5; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 6 setae, coxa I 12, II 9, III 5, IV 10. Genital operculum of male with 37 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 13H).

**Pedipalps** (Figs. 13E–G): Smooth, trochanter  $3.07 \times$  longer than broad, distal part of femur slightly enlarged,  $6.00 \times$  longer than broad, patella slender,  $5.45 \times$  longer than broad, with narrow pedicel,  $6.35 \times$  longer than broad, and narrow club,  $2.83 \times$  longer than broad, with slightly rounded retrolateral margin and almost straight prolateral margin, pedicel about the same length as the widened part of patella (club), femur  $1.00 \times$  longer than patella. Chela with pedicel  $5.89 \times$  longer than broad, hand with pedicel  $2.73 \times$  longer than broad; movable finger  $1.27 \times$  longer than hand (with pedicel) length. Fixed finger with 131 small cusped teeth, movable finger with 151 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped

at the base of the fixed finger; *est* nearer to *et/it* than to *ist*; on movable finger, *st* nearer to *t* than to *sb*, the latter distinct nearer to *b* than to *st*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.61 \times$  longer than deep, femur  $5.59 \times$  longer than deep and  $1.72 \times$  longer than patella, patella  $3.38 \times$  longer than deep, tibia  $8.12 \times$  longer, basitarsus  $4.25 \times$  longer, telotarsus  $5.25 \times$  longer than deep, telotarsus  $1.24 \times$  longer than basitarsus. Leg IV: trochanter  $1.73 \times$  longer than deep, femur+patella  $6.51 \times$  longer than deep, femur shorter than patella, tibia  $10.91 \times$  longer than deep, basitarsus  $5.06 \times$  longer, telotarsus  $5.88 \times$  longer than deep. Basitarsus with one tactile seta (distally, TS = 0.33), telotarsus with a tactile seta near the middle (TS = 0.36), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 4.92; carapace 1.39/1.18. Pedipalps: trochanter 1.32/0.43, femur 2.58/0.43, patella 2.57/0.47, hand with pedicel 1.94/0.71, length of finger 2.47, length of chela 4.18/0.71. Leg I: trochanter 0.50/0.31, femur 1.51/0.27, patella 0.88/0.26, tibia 1.38/0.17, basitarsus 0.68/0.16, telotarsus 0.84/0.16. Leg IV: trochanter 0.57/0.33, femur+patella 2.28/0.35, tibia 2.40/0.22, basitarsus 0.86/0.17, telotarsus 1.00/0.17.

**Distribution.**—This species is only known from Yelaoda Cave, near Dafang County in Guizhou Province, China.

*Bisetocreagris shahensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/56CC006A-DFDC-4995-92C3-DFA4B5DF90A9>

(Figs. 14, 25C)

**Type material.**—*Holotype male*. CHINA: Guizhou Province: Liupanshui City, Liuzhi District, Suogua Town, Shahe Village, Fenghuang Cave, 26°24'5.35"N, 105°24'29.37"E, 1253 m, 7 August 2018, Ming-Yi Tian (MCWNU).

**Diagnosis.**—Trogllobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 2 eyespots; epistome triangular and very small; pedipalps femur  $6.63 \times$  (length 2.32) and patella  $5.98 \times$  (length 2.39) longer than broad, pedicel about the same length as the widened part of patella (club), with slightly rounded retrolateral margin and almost straight prolateral margin. The new species resembles *Bisetocreagris tuanjiensis* Li & Shi sp. nov. but can be distinguished by the carapace anterior margin with 6 setae (8 setae in *B. tuanjiensis* sp. nov.) and rallum with 8 pinnate blades (5 pinnate blades in *B. tuanjiensis* sp. nov.).

**Etymology.**—Latinized adjective, derived from the village of Shahe, near the type locality.

**Description (male holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen brown, legs yellowish.

**Carapace** (Fig. 14A): Smooth,  $1.31 \times$  longer than broad; with 2 (anterior) eye spots, length 0.04mm, breadth 0.02mm; anterior margin with a small triangular epistome. With a total of 26 setae, including 6 on the anterior margin and 6 on the posterior margin.

**Chelicera:** Hand with 6–7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed chelical finger with 13 teeth, movable finger with 15 teeth (Fig. 14B). Galea divided into 3 main branches, one of them forked apically (Fig. 14C). Serrula exterior with about 42 blades and

serrula interior with 30. Rallum composed of 8 blades, distal one separated and with an expanded base (Fig. 14D).

**Abdomen:** Tergal chaetotaxy (I–XI): 6: 6: 6: 7: 7: 8: 9: 9: 9: 10: 5 (2 tactile setae); sternal chaetotaxy (III–XI): 2x5+8: 13: 12: 11: 10: 9: 12: 7 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 6 setae, coxa I 8, II 6, III 4, IV 6. Genital operculum of male glued to the white jelly, and the number of setae cannot be seen clearly.

**Pedipalps** (Figs. 14E–G): Lateral side of femur finely granulated, trochanter  $3.29 \times$  longer than broad, distal part of femur slightly enlarged, patella slender,  $6.63 \times$  longer than broad, with narrow pedicel,  $7.79 \times$  longer than broad, and narrow club,  $2.98 \times$  longer than broad, with slightly rounded retrolateral margin and almost straight prolateral margin, pedicel about the same length as the widened part of patella (club), femur  $0.97 \times$  longer than patella. Chela with pedicel  $6.64 \times$  longer than broad, hand with pedicel  $3.02 \times$  longer than broad; movable finger  $1.26 \times$  longer than hand (with pedicel) length. Fixed finger with 132 small cusped teeth, movable finger with 142 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *et-it* at the same level near fingertip; on movable finger, *st* nearer to *t* than to *sb*, the latter nearer to *st* than to *b*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.41 \times$  longer than deep, femur  $5.70 \times$  longer than deep and  $1.51 \times$  longer than patella, patella  $4.35 \times$  longer than deep, tibia  $8.50 \times$  longer, basitarsus  $5.27 \times$  longer, telotarsus  $7.09 \times$  longer than deep, telotarsus  $1.34 \times$  longer than basitarsus. Leg IV: trochanter  $2.00 \times$  longer than deep, femur+patella  $3.81 \times$  longer than deep, femur shorter than patella, tibia  $10.00 \times$  longer than deep, basitarsus  $4.56 \times$  longer, telotarsus  $7.64 \times$  longer than deep. Tactile setae probably present (most setae lacking) on basitarsus (near basally of segment), telotarsus with a tactile seta near the middle (TS = 0.47), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/ breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 4.33; carapace 1.23/0.94. Pedipalps: trochanter 1.12/0.34, femur 2.32/0.35, patella 2.39/0.40, hand with pedicel 1.64/0.53, length of finger 2.07, length of chela 3.52/0.53. Leg I: trochanter 0.38/0.27, femur 1.31/0.23, patella 0.87/0.20, tibia 1.19/0.14, basitarsus 0.58/0.11, telotarsus 0.78/0.11. Leg IV: trochanter 0.62/0.31, femur+patella 2.09/0.36, tibia 2.10/0.21, basitarsus 0.73/0.16, telotarsus 1.07/0.14.

**Distribution.**—This species is only known from Fenghuang Cave, near Liupanshui City in Guizhou Province, China.

***Bisetocreagris shangshanensis* Li & Shi, sp. nov.**

<http://zoobank.org/NomenclaturalActs/8BC73688-C004-4B4C-A0EB-662AE591BDF4>  
(Figs. 15, 25D, 26A)

**Type material.**—*Holotype male.* CHINA: Guizhou Province: Renhuai City, Houshan Town, Shangshan Village, Niupi Cave,  $27^{\circ}35.281'N$ ,  $106^{\circ}15.648'E$ , 1248 m, 25 April 2019, Yun-Chun Li (MCWNU).

**Paratypes.** CHINA: Guizhou Province: 1 ♂, 2 ♀, 6 tritonymphs, same data as the holotype (MCWNU); 1 ♀, 12

March 2017, same data as the holotype (MCWNU); 2 ♀, Jinsha County, Yankong Town, Yunyan Village, 5 March 2017, Gao Cave,  $27^{\circ}35.042'N$ ,  $106^{\circ}14.1190'E$ , 1123 m, Yun-Chun Li (MCWNU).

**Diagnosis.**—Troglolobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 4 eyespots; epistome rounded knob and small; pedipalps femur  $4.25\text{--}4.34 \times$  (length  $1.80\text{--}1.88$ ) and patella  $2.88\text{--}2.96 \times$  (length  $1.65\text{--}1.72$ ) longer than broad, pedicel about the same length as the widened part of patella (club), with a rounded retrolateral margin. The new species resembles *B. baimensis* sp. nov. but can be distinguished by *sb* slightly nearer to *st* than to *b* (*sb* nearer to *b* than to *st* in *B. baimensis* sp. nov.).

**Etymology.**—Latinized adjective, derived from the village of Shangshan, near the type locality.

**Description (male holotype).**—Pedipalps reddish brown, carapace and chelicerae weak brown, abdomen and legs yellowish.

**Carapace** (Fig. 15A): Smooth,  $1.18\text{--}1.22 \times$  longer than broad; with 4 small eye-spots, 2 anterior eye-spots length 0.05 mm, breadth 0.02 mm, 2 posterior eye-spots length 0.04 mm, breadth 0.02 mm; anterior margin with a small, rounded and knob-like epistome. With a total of 27–28 setae, including 6 on the anterior margin and 8 on the posterior margin.

**Chelicera:** Hand with 7–8 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 13–14 teeth, movable finger with 14–15 teeth (Fig. 15B). Weak protrusion of galea with the width approximately equal to the width of a fingertip or weak protrusion broken (Fig. 15C). Serrula exterior with about 40–44 blades and serrula interior with 28–34. Rallum composed of 9 blades, proximal one short (Fig. 15D).

**Abdomen:** Tergal chaetotaxy (I–XI): 11: 11: 10: 8: 9: 10: 22: 12: 12: 12: 6 (2 tactile setae); sternal chaetotaxy (III–XI): 2x7+15: 2x6+9: 17: 17: 16: 15: 15: 14: 9 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 6 setae, coxa I 9, II 7, III 6, IV 13. Genital operculum of male with 40–46 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 15H).

**Pedipalps** (Figs. 15E–G): Smooth, trochanter  $2.35\text{--}2.39 \times$  longer than broad, distal part of femur slightly enlarged,  $4.25\text{--}4.34 \times$  longer than broad, patella slender,  $2.88\text{--}2.96 \times$  longer than broad, with narrow pedicel,  $4.19\text{--}4.31 \times$  longer than broad, and ovoid club,  $1.62\text{--}1.65 \times$  longer than broad, with rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur  $1.06\text{--}1.12 \times$  longer than patella. Chela with pedicel  $3.55\text{--}3.64 \times$  longer than broad, hand with pedicel  $1.95\text{--}1.98 \times$  longer than broad; movable finger  $1.00\text{--}1.06 \times$  longer than hand (with pedicel) length; fixed finger with 102–118 small cusped teeth, movable finger with 112–132 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* distinctly nearer to *et* than to *ist*; on movable finger, *st* distinctly nearer to *t* than to *sb*, the latter slightly nearer to *st* than to *b*.

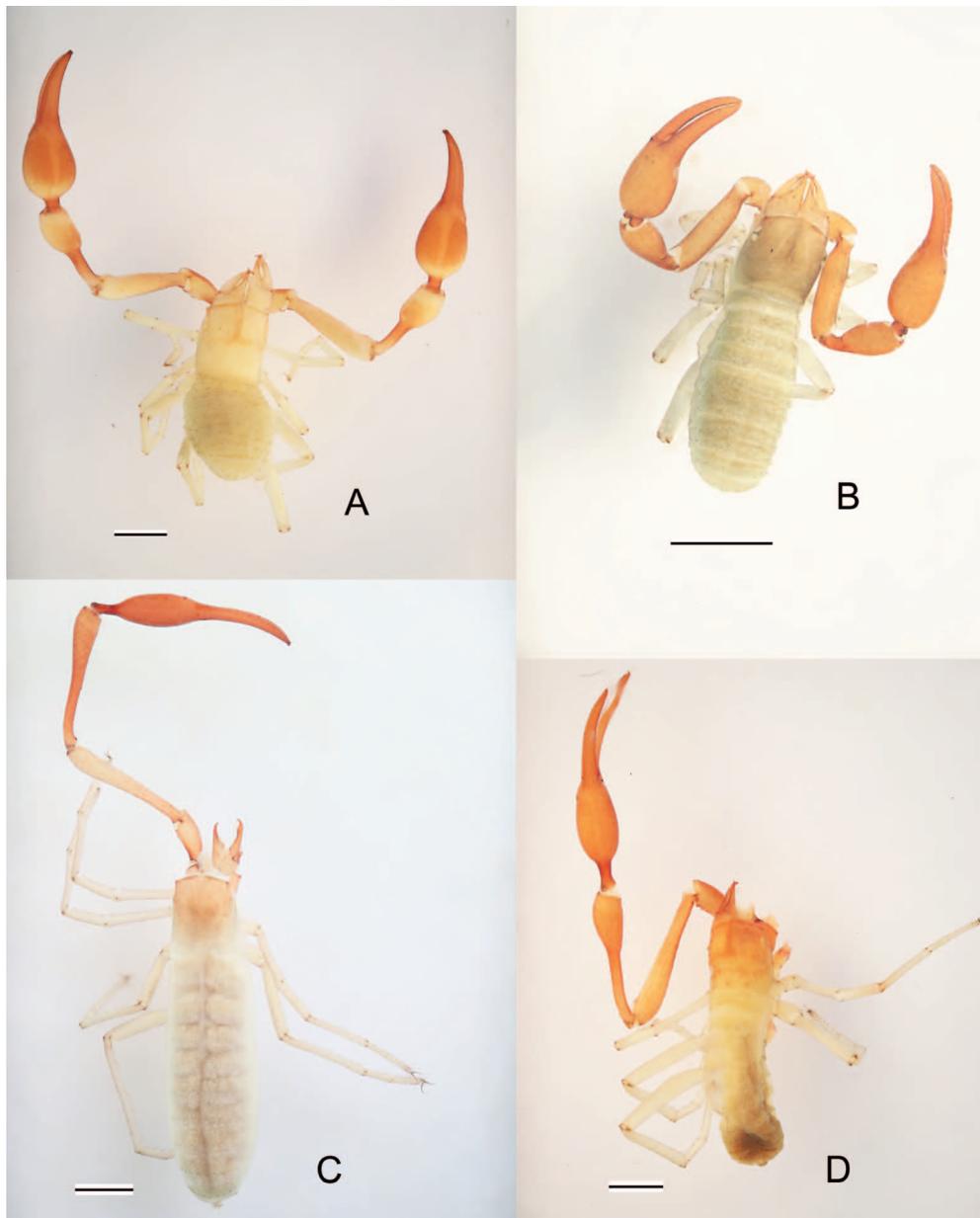


Figure 26.—*Bisetocreagris* species, dorsal views: A, *B. shangshanensis* Li & Shi, sp. nov., paratype female; B, *B. tianyangensis* Li & Shi, sp. nov., holotype female; C, *B. tuanjiensis* Li & Shi, sp. nov., holotype female; D, *B. xianduhensis* Li & Shi, sp. nov., holotype male. Scale bars: 1.00 mm (A–D).

*Legs:* Typical for Neobisiidae, elongate. Leg I: trochanter 1.45–1.50 × longer than deep, femur 4.90–4.98 × longer than deep and 1.46–1.50 × longer than patella, patella 3.45–3.50 × longer than deep, tibia 6.70–6.82 × longer, basitarsus 3.32–3.42 × longer and telotarsus 5.15–5.26 × longer than deep, telotarsus 1.30–1.42 longer than basitarsus. Leg IV: trochanter 1.80–1.86 × longer than deep, femur+patella 5.35–5.44 × longer than deep, femur shorter than patella, tibia 8.45–8.56 × longer than deep, basitarsus 3.75–3.82 × longer, telotarsus 5.55–5.65 × longer than deep. Tactile setae probably present (most setae lacking) on basitarsus (near base of segment), telotarsus with a tactile seta near the middle (TS = 0.32), subterminal seta forked, arolia shorter than claws.

**Description (Female Paratype).**—Mostly the same as the holotype (MCWNU).

*Chelicera:* Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 12–14 teeth, movable finger with 13–14 teeth.

*Abdomen:* Tergal chaetotaxy (I–XI): 10: 10: 10: 11: 11: 10: 11: 10: 12: 9: 6 (2 tactile setae); sternal chaetotaxy (III–XI): 2x8+14: 2x7+8: 16: 16: 16: 15: 16: 13: 7; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 7 setae, coxa I 12, II 6, III 6, IV 11. Genital operculum of female with 13 setae (Fig. 15I).

Pedipalps: Smooth, trochanter  $2.02\text{--}2.08 \times$  longer than broad, distal part of femur slightly enlarged,  $4.55\text{--}4.62 \times$  longer than broad, patella  $2.95\text{--}3.12 \times$  longer than broad, femur  $1.04\text{--}1.10 \times$  longer than patella. Chela with pedicel  $3.35\text{--}3.45 \times$  longer than broad, hand with pedicel  $1.83\text{--}1.90 \times$  longer than broad; movable finger  $1.05\text{--}1.12 \times$  longer than hand (with pedicel) length.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length  $4.52\text{--}4.76$ ; carapace  $1.38\text{--}1.46/1.15\text{--}1.20$ . Pedipalps: trochanter  $0.95\text{--}1.01/0.39\text{--}0.45$ , femur  $1.80\text{--}1.88/0.41\text{--}0.47$ , patella  $1.65\text{--}1.72/0.55\text{--}0.60$ , hand with pedicel  $1.55\text{--}1.58/0.78\text{--}0.82$ , length of finger  $1.56\text{--}1.59$ , length of chela  $2.84\text{--}2.88/0.78\text{--}0.82$ . Leg I: trochanter  $0.36\text{--}0.42/0.24\text{--}0.28$ , femur  $1.07\text{--}1.15/0.20\text{--}0.24$ , patella  $0.70\text{--}0.76/0.19\text{--}0.23$ , tibia  $1.00\text{--}1.08/0.14\text{--}0.16$ , basitarsus  $0.45\text{--}0.49/0.13\text{--}0.14$ , telotarsus  $0.60\text{--}0.66/0.12\text{--}0.13$ . Leg IV: trochanter  $0.52\text{--}0.58/0.28\text{--}0.33$ , femur+patella  $1.75\text{--}1.82/0.31\text{--}0.36$ , tibia  $1.75\text{--}1.82/0.20\text{--}0.23$ , basitarsus  $0.58\text{--}0.64/0.15\text{--}0.17$ , telotarsus  $0.76\text{--}0.81/0.14\text{--}0.15$ .

Female (paratypes): Body length  $4.22\text{--}4.89$ ; carapace  $1.38\text{--}1.46/1.17\text{--}1.22$ . Pedipalps: trochanter  $0.90\text{--}0.97/0.43\text{--}0.47$ , femur  $1.84\text{--}1.92/0.40\text{--}0.46$ , patella  $1.75\text{--}1.84/0.55\text{--}0.60$ , hand with pedicel  $1.58\text{--}1.64/0.85\text{--}0.89$ , length of finger  $1.69\text{--}1.73$ , length of chela  $2.90\text{--}2.99/0.85\text{--}0.89$ . Leg I: trochanter  $0.36\text{--}0.42/0.27\text{--}0.31$ , femur  $1.07\text{--}1.15/0.22\text{--}0.26$ , patella  $0.78\text{--}0.83/0.19\text{--}0.23$ , tibia  $1.00\text{--}1.08/0.14\text{--}0.15$ , basitarsus  $0.44\text{--}0.47/0.13\text{--}0.14$ , telotarsus  $0.60\text{--}0.66/0.12\text{--}0.13$ . Leg IV: trochanter  $0.52\text{--}0.58/0.30\text{--}0.36$ , femur+patella  $1.75\text{--}1.82/0.31\text{--}0.36$ , tibia  $1.88\text{--}1.99/0.18\text{--}0.22$ , basitarsus  $0.56\text{--}0.62/0.14\text{--}0.15$ , telotarsus  $0.73\text{--}0.81/0.14\text{--}0.15$ .

**Distribution.**—This species is known from Niupi Cave and Gao Cave, near Renhuai City in Guizhou Province, China.

*Bisetocreagris tianyangensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/0D0BA5BD-B55B-4003-B4CB-723C66B6E461>

(Figs. 16, 26B)

**Type material.**—*Holotype female*. CHINA: Sichuan Province: Yibin City, Xingwen County, Shihai Town, Pingzhai Village, Tianyang Cave,  $28.19094^{\circ}\text{N}$ ,  $105.13734^{\circ}\text{E}$ , 835 m, 7 January 2020, Yun-Chun Li (MCWNU).

*Paratypes*. CHINA: Sichuan Province: 2 ♀, same data as the holotype (MCWNU).

**Diagnosis.**—Troglophilous habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 4 eyes; pedipalps femur  $4.06\text{--}4.16 \times$  (length  $0.92\text{--}0.96$ ), patella  $2.45\text{--}2.52 \times$  (length  $0.77\text{--}0.81$ ) longer than broad, with thick pedicel, distinctly shorter than widened part of patella (club), with a rounded retrolateral margin and chelicera rallum with 10 pinnate blades.

**Etymology.**—Latinized adjective, derived from the type locality, namely Tianyang Cave.

**Description (female holotype).**—Pedipalps and chelicerae reddish brown, carapace, abdomen and legs brown.

*Carapace* (Fig. 16A): With 4 lyrifissures located dorsally,  $1.18\text{--}1.22 \times$  longer than broad; 4 small distinct eyes, length  $0.06$  mm, breadth  $0.05$  mm; anterior margin with a small, rounded and knob-like epistome; with a total of 27–28 setae,

including 6 on the anterior margin and 8 on the posterior margin.

*Chelicera*: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 20–23 teeth, movable finger with 17–19 teeth (Fig. 16B). Weak protrusion of galea with tip wider than that of a fingertip (Fig. 16C). Serrula exterior with about 36–38 blades and serrula interior with 26–28. Rallum composed of 10 pinnate blades (Fig. 16D).

*Abdomen*: Tergal chaetotaxy (I–XI): 11: 11: 11: 12: 12: 12: 12: 13: 15: 12: 6 (2 tactile setae); sternal chaetotaxy (III–XI):  $2 \times 8 + 14$ :  $2 \times 6 + 12$ : 19: 19: 17: 17: 18: 16: 7 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 3–5 marginal setae. Pedipalpal coxa with 7 setae, coxa I 10, II 6, III 5, IV 11. Genital operculum of female with 12 setae, 6 setae each side (Fig. 16H).

*Pedipalps* (Figs. 16E–G): Smooth, trochanter  $1.98\text{--}2.05 \times$  longer than broad, distal part of femur slightly enlarged,  $4.06\text{--}4.16 \times$  longer than broad, patella slender,  $2.45\text{--}2.52 \times$  longer than broad, with thick pedicel,  $2.09\text{--}2.14 \times$  longer than broad, and ovoid club,  $1.82\text{--}1.83 \times$  longer than broad, with rounded retrolateral margin, pedicel distinctly shorter than the widened part of patella (club), femur  $1.18\text{--}1.22 \times$  longer than patella. Chela with pedicel  $2.75\text{--}2.82 \times$  longer than broad, hand with pedicel  $1.65\text{--}1.72 \times$  longer than broad; movable finger  $1.23\text{--}1.27 \times$  longer than hand (with pedicel) length. Fixed finger with 74–80 small cusped teeth, movable finger with 82–90 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* distinctly nearer to *et-it* than to *ist*; on movable finger, *st* distinctly nearer to *t* than to *sb*, the latter distinctly nearer to *b* than to *st*.

*Legs*: Typical for Neobisiidae, elongate. Leg I: trochanter  $1.36\text{--}1.40 \times$  longer than deep, femur  $2.92\text{--}3.04 \times$  longer than deep and  $1.40\text{--}1.46 \times$  longer than patella, patella  $2.73\text{--}2.81 \times$  longer than deep, tibia  $4.62\text{--}4.78 \times$  longer, basitarsus  $2.60\text{--}2.68 \times$  longer, telotarsus  $4.40\text{--}4.52 \times$  longer than deep, telotarsus  $1.45\text{--}1.51 \times$  longer than basitarsus. Leg IV: trochanter  $1.53\text{--}1.62 \times$  longer than deep, femur+patella  $3.18\text{--}3.26 \times$  longer than deep, femur shorter than patella, tibia  $5.70\text{--}5.81 \times$  longer than deep, basitarsus  $2.96\text{--}3.06 \times$  longer, telotarsus  $4.65\text{--}4.73 \times$  longer than deep. Tactile setae probably present (most setae lacking) on basitarsus (near basally of segment), telotarsus with a tactile seta near distal (TS = 0.18), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length  $3.20\text{--}3.43$ ; carapace  $0.78\text{--}0.82/0.74\text{--}0.78$ . Pedipalps: trochanter  $0.50\text{--}0.54/0.24\text{--}0.26$ , femur  $0.92\text{--}0.96/0.21\text{--}0.25$ , patella  $0.77\text{--}0.81/0.30\text{--}0.34$ , hand with pedicel  $0.75\text{--}0.79/0.44\text{--}0.48$ , length of finger  $0.94\text{--}0.98$ , length of chela  $1.55\text{--}1.59/0.44\text{--}0.48$ . Leg I: trochanter  $0.20\text{--}0.24/0.15\text{--}0.17$ , femur  $0.45\text{--}0.49/0.15\text{--}0.17$ , patella  $0.31\text{--}0.35/0.12\text{--}0.13$ , tibia  $0.45\text{--}0.49/0.09\text{--}0.11$ , basitarsus  $0.19\text{--}0.23/0.08\text{--}0.09$ , telotarsus  $0.29\text{--}0.33/0.07\text{--}0.08$ . Leg IV: trochanter  $0.26\text{--}0.30/0.16\text{--}0.20$ , femur+patella  $0.78\text{--}0.82/0.23\text{--}0.27$ , tibia  $0.78\text{--}0.82/0.13\text{--}0.15$ , basitarsus  $0.28\text{--}0.32/0.09\text{--}0.11$ , telotarsus  $0.40\text{--}0.44/0.08\text{--}0.09$ .

**Distribution.**—This species is only known from Tianyang Cave, near Xingwen County in Sichuan Province, China.

***Bisetocreagris titanium* (Mahnert, 2003)***Parobisium titanium* Mahnert 2003: 741, figs. 5–9.*Bisetocreagris titanium* (Mahnert, 2003): Mahnert & Li 2016, 260.

**Material examined.**—CHINA: *Yunnan Province*: 2 ♀, Zhenxiong County, Wude Town, Xiaoguoquan Cave, 27°29.712'N, 104°44.678'E, 1301 m, 9 April 2017, Yun-Chun Li leg; 3 ♀, 30 August 2020, Yun-Chun Li (MCWNU).

**Distribution.**—This species is only known from Xiaoguoquan Cave, near Zhenxiong County in Yunnan Province, China.

***Bisetocreagris tuanjiensis* Li & Shi, sp. nov.**

<http://zoobank.org/NomenclaturalActs/17DC6F82-229A-404D-9469-865BA99206FF>  
(Figs. 17, 26C)

**Type material.**—*Holotype female*. CHINA: *Yunnan Province*: Kunming City, Panlong District, Dianyuan Town, Tuanjie Village, Dashi Cave, 25.193406°N, 102.805446°E, 2092 m, 27 August 2020, Yun-Chun Li (MCWNU).

**Diagnosis.**—Trogllobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace without 2 eyespots; epistome triangular and very small; pedipalps femur  $5.90 \times$  (length 2.30) and patella  $5.84 \times$  (length 2.57) longer than broad, pedicel about the same length as the widened part of patella (club), with a slightly rounded retrolateral margin and an almost straight prolateral margin. The new species resembles *B. shahensis* sp. nov. but can be distinguished by the carapace anterior margin with 8 setae (6 setae in *B. shahensis* sp. nov.) and rallum with 5 pinnate blades (8 pinnate blades in *B. shahensis* sp. nov.).

**Etymology.**—Latinized adjective, derived from the village of Tuanjie, near the type locality.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen and legs brown.

**Carapace** (Fig. 17A): With 9 lyrifissures located dorsally,  $1.13 \times$  longer than broad; with 2 (anterior) eye spots, length 0.03mm, breadth 0.02mm; epistome small, triangular; with a total of 27 setae, including 8 on the anterior margin and 7 on the posterior margin.

**Chelicera:** Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 13 teeth, movable finger with 12 teeth (Fig. 17B). Galea a short broad stump on left chelicera (clearly broken) (Fig. 17C). Serrula exterior with about 42 blades and serrula interior with 32. Rallum composed of 5 blades (Fig. 17D).

**Abdomen:** Tergal chaetotaxy (I–XI): 7: 8: 9: 8: 10: 9: 10: 11: 10: 10: 5; sternal chaetotaxy (III–XI): 2x8+13: 2x5+7: 14: 15: 14: 14: 13: 13: 6; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 3 marginal setae. Pedipalpal coxa with 7 setae, coxa I 7, II 6, III 5, IV 8. Genital operculum of female with 19 setae (Fig. 17H).

**Pedipalps** (Figs. 17E–G): Smooth, trochanter  $2.62 \times$  longer than broad, distal part of femur slightly enlarged,  $5.90 \times$  longer than broad, patella slender,  $5.84 \times$  longer than broad, with narrow pedicel,  $7.04 \times$  longer than broad, and narrow club,  $3.05 \times$  longer than broad, with a slightly rounded retrolateral margin and an almost straight prolateral margin,

pedicel about the same length as the widened part of patella (club), femur  $0.89 \times$  longer than patella. Chela with pedicel  $5.93 \times$  longer than broad, hand with pedicel  $2.98 \times$  longer than broad; movable finger  $1.10 \times$  longer than hand (with pedicel) length. Fixed finger with 125 small cusped teeth, movable finger with 134 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib, ist* and *ish* closely grouped at the base of the fixed finger; *it* distinctly closer to fingertip than to *et*; on movable finger, *st* nearer to *t* than to *sb*, the latter indistinctly nearer to *b* than to *st*.

**Legs:** Typical for Neobisiidae, elongate. Leg I: trochanter  $1.58 \times$  longer than deep, femur  $5.35 \times$  longer than deep and  $1.43 \times$  longer than patella, patella  $4.30 \times$  longer than deep, tibia  $8.36 \times$  longer, basitarsus  $4.50 \times$  longer, telotarsus  $6.17 \times$  longer than deep, telotarsus  $1.37 \times$  longer than basitarsus. Leg IV: trochanter  $1.81 \times$  longer than deep, femur+patella  $6.06 \times$  longer than deep, femur shorter than patella, tibia  $11.58 \times$  longer than deep, basitarsus  $4.44 \times$  longer, telotarsus  $6.71 \times$  longer than deep. Basitarsus (near base) and telotarsus (near middle) probably with a tactile seta (most setae lacking), subterminal seta forked, arolia shorter than claws.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype): Body length 6.73; carapace 1.28/1.13. Pedipalps: trochanter 0.97/0.37, femur 2.30/0.39, patella 2.57/0.44, hand with pedicel 1.82/0.61, length of finger 2.01, length of chela 3.62/0.61. Leg I: trochanter 0.41/0.26, femur 1.23/0.23, patella 0.86/0.20, tibia 1.17/0.14, basitarsus 0.54/0.12, telotarsus 0.74/0.12. Leg IV: trochanter 0.56/0.31, femur+patella 2.00/0.33, tibia 2.20/0.19, basitarsus 0.71/0.16, telotarsus 0.94/0.14.

**Distribution.**—This species is only known from Dashi Cave, near Kunming City in Yunnan Province, China.

***Bisetocreagris xiaoensis* Li & Liu, 2017***Bisetocreagris xiaoensis* Li & Liu 2017: 214, figs. 1–3.

**Material examined.**—CHINA: *Yunnan Province*: 8 ♂, 10 ♀, Yanjin County, Doushaguan Town, Xiao Cave, 28°02.405'N, 104°06.845'E, 708 m, 11 April 2017, Yun-Chun Li (MCWNU).

**Distribution.**—This species is only known from Xiao Cave, near Yanjin County in Yunnan Province, China.

***Bisetocreagris xianduhensis* Li & Shi, sp. nov.**

<http://zoobank.org/NomenclaturalActs/C5ED87C8-7ECD-49C1-B6F7-9EC419C2EF90>  
(Figs. 18, 26D, 27A)

**Type material.**—*Holotype male*. CHINA: *Chongqing Province*: Chongqing City, Qijiang District, Shihao Town, Xianduhe Cave, 28.51717°N, 106.69029°E, 1179 m, 26 April 2019, Yun-Chun Li (MCWNU).

**Paratypes.** CHINA: *Chongqing Province*: 2 ♂, 2 ♀, 14 tritonymphs, same data as the holotype (MCWNU); 1 ♀, 29 April 2014, Yun-Chun Li (MCWNU).

**Diagnosis.**—Trogllobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 2 eyespots; epistome triangular and small; pedipalps femur  $5.60$ – $5.68 \times$  (length 2.79–2.85) and patella

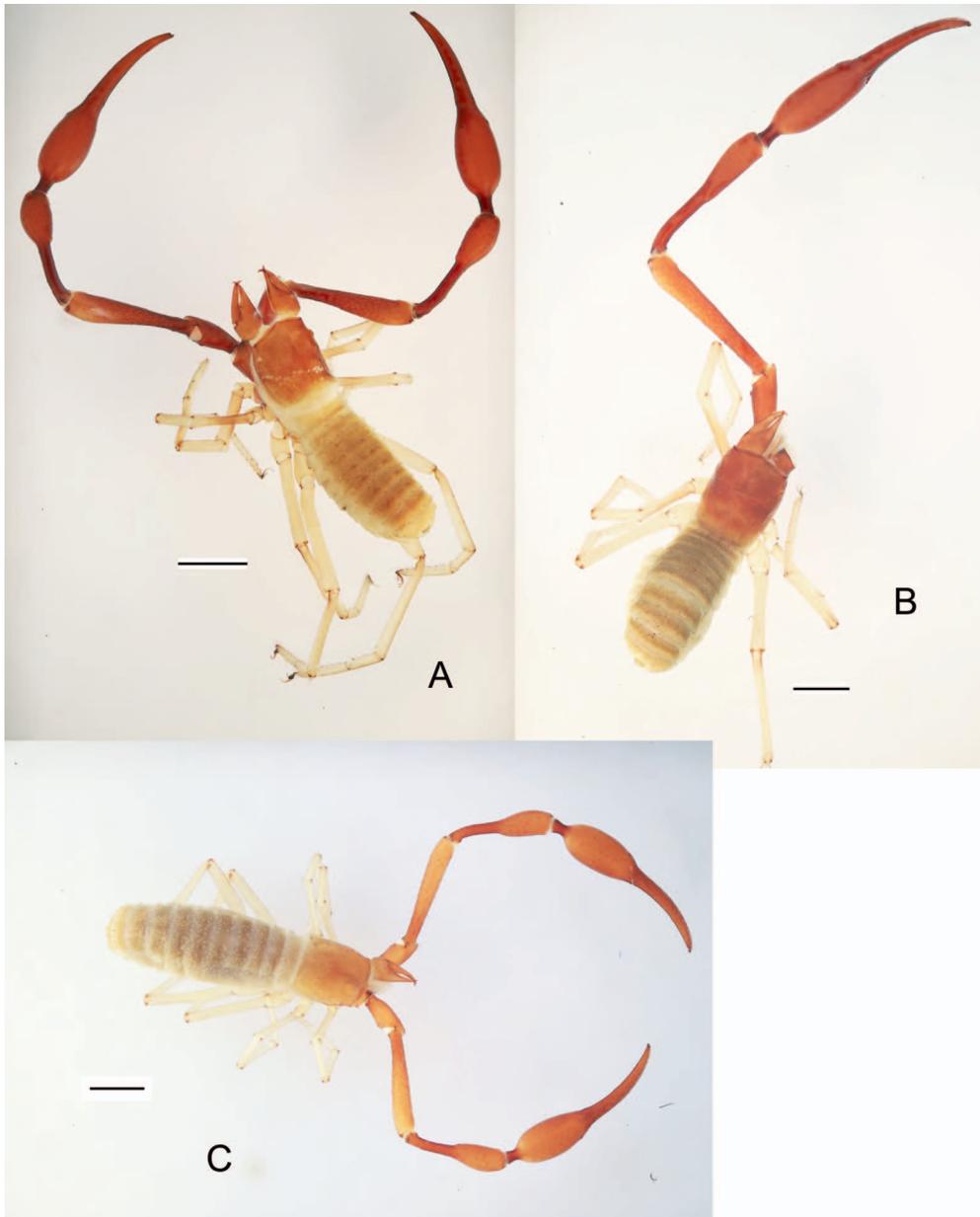


Figure 27.—*Bisetocreagris* species, dorsal views: A, *Bisetocreagris xianduhensis* Li & Shi, sp. nov., paratype female; B, *B. xiniuyanensis* Li & Shi, sp. nov., holotype female; C, *B. yaolinensis* Li & Shi, sp. nov., holotype female. Scale bars: 1.00 mm (A–D).

4.16–4.25  $\times$  (length 2.78–2.84) longer than broad, the patella very thin and long, pedicel distinctly longer than the widened part of patella (club), with rounded retrolateral margin, and 17–18 setae around the eye-spots.

**Etymology.**—Latinized adjective, derived from the type locality, namely Xianduhe Cave.

**Description (male holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen brown, legs yellowish.

**Carapace** (Fig. 18A): Smooth, 1.18–1.20  $\times$  longer than broad; with 2 (anterior) eye-spots, length 0.06mm, breadth 0.05mm; epistome small, triangular; with a total of 35–38 setae, including 6 on the anterior margin and 6–7 on the posterior margin, with 17–18 setae around the eyespots.

**Chelicera:** Hand with 6–7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 12–13 teeth, movable finger with 15–16 teeth (Fig. 18B). Galea divided into 4 main branches, the apical one not forked (Fig. 18C). Serrula exterior with about 44–48 blades and serrula interior with 32–36. Rallum composed of 8 blades, distal one separated, proximal one short (Fig. 18D).

**Abdomen:** Tergal chaetotaxy (I–XI): 7: 8: 8: 10: 10: 12: 12: 12: 14: 7 (2 tactile setae); sternal chaetotaxy (III–XI): 2x5+12: 2x5+10: 13: 13: 12: 13: 15: 12: 8 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 7 setae, coxa I 7, II 6, III 5, IV 7–9. Genital operculum of male with

42–44 setae, sternite III with anteromedian groove flanked medially with 1 small seta on each side (Fig. 18H).

**Pedipalps** (Figs. 18E–F): Smooth, trochanter 2.70–2.82 × longer than broad, distal part of femur slightly enlarged, 5.60–5.68 × longer than broad, patella slender and longer, 4.16–4.25 × longer than broad, with very narrow pedicel, 7.52–7.73 × longer than broad, and narrow club, 1.93–1.94 × longer than broad, with rounded retrolateral margin, pedicel distinctly longer than the widened part of patella (club), femur 1.00–1.06 × longer than patella. Chela with pedicel 5.48–5.56 × longer than broad, hand with pedicel 2.68–2.77 × longer than broad; movable finger 1.03–1.12 × longer than hand (with pedicel) length. Fixed finger with 122–126 small cusped teeth, movable finger with 132–144 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *it* distinctly closer to fingertip than to *et*; on movable finger, *st* nearer to *t* than to *sb*, the latter halfway between *b* and *st*.

**Legs**: Typical for Neobisiidae, elongate. Leg I: trochanter 1.41–1.48 × longer than deep, femur 4.28–4.36 × longer than deep and 1.43–1.48 × longer than patella, patella 3.42–3.50 × longer than deep, tibia 7.28–7.35 × longer, basitarsus 2.70–2.83 × longer, telotarsus 5.85–5.92 × longer than deep, telotarsus 1.95–2.04 × longer than basitarsus. Leg IV: trochanter 1.98–2.06 × longer than deep, femur+patella 5.75–5.83 × longer than deep, femur shorter than patella, tibia 9.02–9.13 × longer than deep, basitarsus 3.78–3.88 × longer, telotarsus 5.70–5.82 × longer than deep. Basitarsus (near basal) and telotarsus (near middle) probably with a tactile seta (most setae lacking), subterminal seta forked, arolia shorter than claws.

**Description (female paratype)**.—Mostly the same as the holotype (MCWNU).

**Chelicera**: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 12 teeth, movable finger with 14 teeth.

**Abdomen**: Tergal chaetotaxy (I–XI): 7: 8: 7: 9: 10: 10: 9: 12: 9: 12: 5; sternal chaetotaxy (III–XI): 2x6+12: 2x5+9: 16: 15: 15: 14: 16: 14: 5; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5 marginal setae. Pedipalpal coxa with 7 setae, coxa I 9, II 7, III 4, IV 11. Genital operculum of female with 12 setae (Fig. 18I).

**Pedipalps**: Smooth, trochanter 2.71–2.80 × longer than broad, distal part of femur slightly enlarged, 5.85–5.91 × longer than broad, patella 4.70–4.83 × longer than broad, femur 0.99–1.02 × longer than patella. Chela with pedicel 5.19–5.35 × longer than broad, hand with pedicel 2.59–2.68 × longer than broad; movable finger 1.08–1.15 × longer than hand (with pedicel) length.

**Measurements** (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length 5.13–5.36; carapace 1.38–1.46/1.15–1.20. Pedipalps: trochanter 1.38–1.43/0.50–0.55, femur 2.79–2.85/0.49–0.53, patella 2.78–2.84/0.65–0.69, hand with pedicel 2.03–2.07/0.74–0.79, length of finger 2.10–2.16, length of chela 4.15–4.21/0.74–0.79. Leg I: trochanter 0.40–0.48/0.28–0.32, femur 1.03–1.09/0.22–0.26, patella 0.70–0.76/0.19–0.23, tibia 1.02–1.08/0.13–0.14, basitarsus 0.36–0.40/0.13–0.14, telotarsus 0.74–0.80/0.13–0.14. Leg IV: trochanter 0.63–0.68/0.30–0.34, femur+patella 2.29–

2.35/0.38–0.44, tibia 2.15–2.21/0.22–0.26, basitarsus 0.70–0.74/0.19–0.20, telotarsus 1.01–1.06/0.18–0.19.

**Female** (paratypes): Body length 5.55–5.72; carapace 1.42–1.55/1.19–1.25. Pedipalps: trochanter 1.20–1.33/0.43–0.47, femur 2.39–2.47/0.39–0.45, patella 2.41–2.50/0.49–0.56, hand with pedicel 1.85–1.96/0.70–0.74, length of finger 1.85–1.93, length of chela 3.74–3.80/0.70–0.74. Leg I: trochanter 0.42–0.49/0.29–0.33, femur 1.20–1.29/0.24–0.29, patella 0.78–0.82/0.22–0.26, tibia 1.15–1.21/0.13–0.15, basitarsus 0.43–0.47/0.13–0.14, telotarsus 0.82–0.86/0.13–0.14. Leg IV: trochanter 0.63–0.68/0.32–0.36, femur+patella 1.93–2.06/0.38–0.44, tibia 1.92–1.99/0.22–0.26, basitarsus 0.63–0.72/0.16–0.18, telotarsus 0.95–1.01/0.16–0.18.

**Distribution**.—This species is only known from Xianduhe Cave, near Qijiang District in Chongqing Province, China.

***Bisetocreagris xiniuyanensis*** Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/93CECCE3-22C1-4213-B674-14FD90FA95AD>  
(Figs. 19, 27B)

**Type material**.—*Holotype female*. CHINA: Guangxi Province: Laibin City, Wuxuan County, Xiniuyan Cave, 23°33′22.82″N, 109°32′55.39″E, 116 m, 15 January 2021, Ming-Yi Tian (MCWNU).

*Paratype*. CHINA: Guangxi Province: 1 ♀, same data as the holotype (MCWNU).

**Diagnosis**.—Troglolobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 4 eyespots; epistome indistinct; pedipalps femur 6.12–6.18 × (length 2.87–2.91) and patella 5.92–5.96 × (length 2.89–2.93) longer than broad, pedicel about the same length as the widened part of patella (club), with slightly rounded retrolateral margin and almost straight prolateral margin. The new species resembles *B. cavernarum* but can be distinguished by *sb* nearer to *b* than to *st*, hand of pedipalps smooth (*sb* on movable finger halfway between *b* and *st*, distal part of hand finely granular at dorsal and median part in *B. cavernarum*).

**Etymology**.—Latinized adjective, derived from the type locality, namely Xiniuyan Cave.

**Description (female holotype)**.—Carapace, chelicerae and pedipalps reddish brown, abdomen brown, legs yellowish.

**Carapace** (Fig. 19A): Smooth, 1.32–1.34 × longer than broad; with 4 small eye-spots, 2 anterior eye-spots length 0.05 mm, breadth 0.02 mm, 2 posterior eye-spots length 0.03 mm, breadth 0.02 mm; anterior margin with a small, rounded and knob-like epistome; with a total of 30 setae, including 6 on the anterior margin and 8 on the posterior margin.

**Chelicera**: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed cheliceral finger with 12–13 teeth, movable finger with 10–11 teeth (Fig. 19B). Galea could not be investigated because it was probably broken. Serrula exterior with about 44 blades and serrula interior with 30. Rallum composed of 8 blades, proximal one short (Fig. 19C).

**Abdomen**: Tergal chaetotaxy (I–XI): 9: 10: 10: 11: 10: 11: 12: 11: 12: 8; sternal chaetotaxy (III–XI): 2x8+18: 2x7+12: 16: 17: 15: 15: 14: 14: 6; anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 4–5 marginal setae.

Pedipalpal coxa with 8 setae, coxa I 12, II 9, III 6, IV 12. Genital operculum of female with 26–28 setae (Fig. 19G).

*Pedipalps* (Figs. 19D–F): Smooth, trochanter  $2.88\text{--}2.92 \times$  longer than broad, distal part of femur slightly enlarged,  $6.12\text{--}6.18 \times$  longer than broad, patella slender,  $5.92\text{--}5.96 \times$  longer than broad, with narrow pedicel,  $6.32\text{--}6.44 \times$  longer than broad, and narrow club,  $2.86\text{--}2.89 \times$  longer than broad, with a slightly rounded retrolateral margin, but an almost straight pro-lateral margin, the pedicel about the same length as the widened part of patella (club), femur  $0.98\text{--}1.01 \times$  longer than patella. Chela with pedicel  $5.93\text{--}5.97 \times$  longer than broad, hand with pedicel  $2.84\text{--}2.88 \times$  longer than broad; movable finger  $1.20\text{--}1.22 \times$  longer than hand (with pedicel) length. Fixed finger with 130–136 small cusped teeth, movable finger with 142–148 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* distinctly nearer to *et-it* than to *ist*; *et-it* at the same level near fingertip; on movable finger, *st* distinctly nearer to *t* than to *sb*, the latter nearer to *b* than to *st*.

*Legs*: Typical for Neobisiidae, elongate. Leg I: trochanter  $1.32\text{--}1.36 \times$  longer than deep, femur  $5.20\text{--}5.24 \times$  longer than deep and  $1.42\text{--}1.46 \times$  longer than patella, patella  $3.90\text{--}3.97 \times$  longer than deep, tibia  $7.72\text{--}7.78 \times$  longer, basitarsus  $3.45\text{--}3.51 \times$  longer and telotarsus  $6.07\text{--}6.11 \times$  longer than deep, telotarsus  $1.54\text{--}1.56 \times$  longer than basitarsus; leg IV: trochanter  $2.06\text{--}2.09 \times$  longer than deep, femur+patella  $4.35\text{--}4.41 \times$  longer than deep, femur shorter than patella, tibia  $8.28\text{--}8.34 \times$  longer than deep, basitarsus  $3.55\text{--}3.60 \times$  longer, telotarsus  $6.75\text{--}6.81 \times$  longer than deep. Tactile setae probably present (most setae lacking) on basitarsus (near base of segment), telotarsus with a tactile seta near the middle (TS = 0.66), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length  $5.24\text{--}5.40$ ; carapace  $1.68\text{--}1.73/1.26\text{--}1.30$ . Pedipalps: trochanter  $1.36\text{--}1.41/0.46\text{--}0.49$ , femur  $2.87\text{--}2.91/0.45\text{--}0.48$ , patella  $2.89\text{--}2.93/0.47\text{--}0.51$ , hand with pedicel  $2.10\text{--}2.15/0.72\text{--}0.77$ , length of finger  $2.56\text{--}2.59$ , length of chela  $4.40\text{--}4.45/0.72\text{--}0.77$ . Leg I: trochanter  $0.45\text{--}0.49/0.33\text{--}0.37$ , femur  $1.40\text{--}1.43/0.25\text{--}0.27$ , patella  $0.97\text{--}0.99/0.23\text{--}0.27$ , tibia  $1.38\text{--}1.43/0.17\text{--}0.19$ , basitarsus  $0.57\text{--}0.61/0.16\text{--}0.18$ , telotarsus  $0.89\text{--}0.94/0.14\text{--}0.15$ . Leg IV: trochanter  $0.70\text{--}0.75/0.33\text{--}0.37$ , femur+patella  $2.16\text{--}2.22/0.48\text{--}0.53$ , tibia  $2.23\text{--}2.29/0.25\text{--}0.29$ , basitarsus  $0.69\text{--}0.74/0.19\text{--}0.21$ , telotarsus  $1.06\text{--}1.10/0.16\text{--}0.17$ .

**Distribution.**—This species is only known from Xiniuyan Cave, near Wuxuan County in Guangxi Province, China.

*Bisetocreagris yaolinensis* Li & Shi, sp. nov.

<http://zoobank.org/NomenclaturalActs/36EFE35E-4CEE-47FC-8626-DBB622C6CA89>

(Figs. 20, 27C)

**Type material.**—*Holotype female*. CHINA: Guizhou Province: Duyun City, Xiaoweizhai Town, Yaolin Village, Xian Cave,  $26^{\circ}13'5.63''\text{N}$ ,  $107^{\circ}31'57.58''\text{E}$ , 842 m, 7 November 2020, Ming-Yi Tian (MCWNU).

*Paratypes*. CHINA: Guizhou Province: 2 ♀, 1 tritonymph, same data as the holotype (MCWNU).

**Diagnosis.**—Troglobiont habitus. This new species can be easily distinguished from other members of the genus *Bisetocreagris* by the following combination of characters: carapace with 2 eyespots; epistome indistinct; pedipalps femur  $5.70\text{--}5.85 \times$  (length  $2.06\text{--}2.12$ ) and patella  $4.32\text{--}4.43 \times$  (length  $1.90\text{--}1.94$ ) longer than broad, pedicel about the same length as the widened part of patella (club), with a slightly rounded retrolateral margin. The new species resembles *Bisetocreagris guangshanensis* Gao, Chen & Zhang, 2017 but can be distinguished by the anterior margin of carapace with 8 setae (4 setae in *B. guangshanensis*), femur and patella of pedipalp smooth, lateral side of hand finely granulated at the base of the fixed finger (pedipalp with all segments that appear scale-like, except for chela, which are smooth in *B. guangshanensis*).

**Etymology.**—Latinized adjective, derived from the village of Yaolin, near the type locality.

**Description (female holotype).**—Carapace, pedipalps and chelicerae reddish brown, abdomen weakly brown, legs yellowish.

*Carapace* (Fig. 20A): Smooth,  $1.21\text{--}1.25 \times$  longer than broad; with 2 (anterior) eyes having indistinct lenses, length 0.07 mm, breadth 0.03 mm; anterior margin without distinct epistome; with a total of 26–30 setae, including 8 on the anterior margin and 6–8 on the posterior margin.

*Chelicera*: Hand with 7 setae and one lyrifissure located dorsally, movable finger with 1 submedial seta; fixed finger with 13 teeth, movable finger with 17 teeth (Fig. 20B). Galea could not be investigated because it was probably broken. Serrula exterior with about 38–42 blades and serrula interior with 30–34. Rallum composed of 8 pinnate blades, distal one separated and expanded at base, proximal one short (Fig. 20C).

*Abdomen*: Tergal chaetotaxy (I–XI): 8: 7: 7: 7: 8: 9: 8: 9: 9: 5–6 (2 tactile setae); sternal chaetotaxy (III–XI):  $2 \times 9 + 9\text{--}11$ :  $2 \times 6 + 6\text{--}7$ : 11: 12: 11: 11: 12: 6 (2 tactile setae); anal cone with 2 dorsal and 2 ventral setae. Manducatory process rounded, with 5–6 marginal setae. Pedipalpal coxa with 8–9 setae, coxa I 5–6, II 5, III 35, IV 5–6. Genital operculum of female with 11 setae (Fig. 20G).

*Pedipalps* (Figs. 20D–F): Lateral side of hand finely granulated at the base of fixed finger, trochanter  $2.63\text{--}2.66 \times$  longer than broad, distal part of femur slightly enlarged,  $5.70\text{--}5.85 \times$  longer than broad, patella slender,  $4.32\text{--}4.43 \times$  longer than broad, with narrow pedicel,  $4.71\text{--}4.83 \times$  longer than broad, and very narrow club,  $2.27\text{--}2.29 \times$  longer than broad, with slightly rounded retrolateral margin, pedicel about the same length as the widened part of patella (club), femur  $1.08\text{--}1.11 \times$  longer than patella. Chela with pedicel  $4.95\text{--}5.07 \times$  longer than broad, hand with pedicel  $2.61\text{--}2.70 \times$  longer than broad; movable finger  $1.11\text{--}1.18 \times$  longer than hand (with pedicel) length. Fixed finger with 109–121 small cusped teeth, movable finger with 125–131 teeth; venom duct in fixed finger, very short. Fixed chelal finger with 8 trichobothria, movable finger with 4, *eb-esb* on distal lateral hand side; *ib*, *ist* and *isb* closely grouped at the base of the fixed finger; *est* nearer to *et/it* than to *ist*; on movable finger, *st* nearer to *t* than to *sb*, the latter slightly nearer to *b* than to *st*.

*Legs*: Typical for Neobisiidae, elongate. Leg I: trochanter  $1.32\text{--}1.38 \times$  longer than deep, femur  $4.75\text{--}4.82 \times$  longer than deep and  $1.45\text{--}1.52 \times$  longer than patella, patella  $3.38\text{--}3.45 \times$

longer than deep, tibia  $6.93\text{--}7.06 \times$  longer, basitarsus  $4.15\text{--}4.22 \times$  longer and telotarsus  $5.80\text{--}5.88 \times$  longer than deep, telotarsus  $1.39\text{--}1.42 \times$  longer than basitarsus. Leg IV: trochanter  $1.50\text{--}1.56 \times$  longer than deep, femur+patella  $5.50\text{--}5.62 \times$  longer than deep, femur shorter than patella, tibia  $8.70\text{--}8.82 \times$  longer than deep, basitarsus  $4.10\text{--}4.12 \times$  longer, telotarsus  $6.07\text{--}6.16 \times$  longer than deep. Basitarsus probably with a tactile seta near base (most setae lacking), telotarsus with a tactile seta near the middle (TS=  $0.40\text{--}0.45$ ), subterminal seta forked, arolia shorter than claws.

*Measurements* (length/breadth or, in the case of the legs, length/depth in mm) (holotype and paratypes): Body length

$5.50\text{--}5.65$ ; carapace  $1.23\text{--}1.26/1.00\text{--}1.08$ . Pedipalps: trochanter  $1.00\text{--}1.01/0.36\text{--}0.40$ , femur  $2.06\text{--}2.12/0.34\text{--}0.38$ , patella  $1.90\text{--}1.94/0.42\text{--}0.46$ , hand with pedicel  $1.73\text{--}1.78/0.65\text{--}0.70$ , length of finger  $1.92\text{--}1.97$ , length of chela  $3.32\text{--}3.41/0.65\text{--}0.70$ . Leg I: trochanter  $0.34\text{--}0.38/0.25\text{--}0.30$ , femur  $1.12\text{--}1.18/0.23\text{--}0.26$ , patella  $0.76\text{--}0.82/0.22\text{--}0.25$ , tibia  $1.01\text{--}1.09/0.14\text{--}0.15$ , basitarsus  $0.44\text{--}0.49/0.10\text{--}0.11$ , telotarsus  $0.62\text{--}0.68/0.10\text{--}0.11$ . Leg IV: trochanter  $0.46\text{--}0.52/0.30\text{--}0.34$ , femur+patella  $1.74\text{--}1.81/0.30\text{--}0.34$ , tibia  $1.72\text{--}1.78/0.19\text{--}0.23$ , basitarsus  $0.60\text{--}0.68/0.14\text{--}0.15$ , telotarsus  $0.82\text{--}0.90/0.13\text{--}0.14$ .

*Distribution*.—This species is only known from Xian Cave, near Duyun City in Guizhou Province, China.

#### KEY TO THE CAVE-INHABITING SPECIES OF *BISETOCREAGRIS* KNOWN FROM CHINA

1. Chelal finger shorter than hand with pedicel ..... 2  
Chelal finger longer or at least equal, but never shorter than the hand with pedicel ..... 3
2. Rallum with 7–8 pinnate blades; chelicera hand with 5 setae ..... *B. mahneri* Li & Shi, sp. nov.  
Rallum with 13 pinnate blades; chelicera hand with 7 setae ..... *B. titanium* (Mahnert, 2003)
3. Pedicel of pedipalpal patella shorter than widened part of patella (club) ..... 4  
Pedicel of pedipalpal patella longer or at least equal, but never shorter than the widened part of patella (club) ..... 6
4. Patella with thick pedicel and ovoid club, club with very strongly rounded retrolateral margin (Figs. 3E, 16E) ..... 5  
Patella with narrow pedicel and long ovoid club, club with slightly rounded retrolateral margin (Fig. 9D) .....  
..... *B. ganxiaoensis* Li & Shi, sp. nov.
5. Carapace with 2 eyespots; manducatory process with 7 marginal setae ..... *B. bangenensis* Li & Shi, sp. nov.  
Carapace with 4 eyes; manducatory process with 3–5 marginal setae ..... *B. tianyangensis* Li & Shi, sp. nov.
6. Pedicel of pedipalpal patella about the same length as the widened part of patella (club) (Figs. 21A–C) ..... 7  
Pedicel of pedipalpal patella distinctly clearly longer than the widened part of patella (club) (Figs. 21F–G) ..... 25
7. Pedipalpal patella not divided into 2 obvious sections (Fig. 21C) ..... 8  
Pedipalpal patella divided into 2 obvious sections (Figs. 21A–B) ..... 14
8. Carapace without eyes or eyespots ..... 9  
Carapace with eyes or eyespots ..... 11
9. Carapace anterior margin with a small and triangular epistome ..... 10  
Carapace anterior margin without epistome but with a small rounded knob ..... *B. baozinensis* Mahnert & Li, 2016
10. Rallum with 10 pinnate blades; femur of pedipalps  $6.00 \times$  longer than broad ( $2.58/0.43$  mm), patella  $5.45 \times$  longer than broad ( $2.57/0.47$  mm) ..... *B. sanhensis* Li & Shi, sp. nov.  
Rallum with 8 pinnate blades; femur  $7.11 \times$  longer than broad ( $1.99/0.28$  mm), patella  $6.41 \times$  longer than broad ( $2.05/0.32$  mm) ..... *B. duolangpingensis* Li & Shi, sp. nov.
11. Carapace with 2 (anterior) eyespots ..... 12  
Carapace with 4 eyes or eyespots ..... 13
12. Rallum with 8 pinnate blades; carapace anterior margin with 6 setae ..... *B. shahensis* Li & Shi, sp. nov.  
Rallum with 5 pinnate blades; carapace anterior margin with 8 setae ..... *B. tuanjiensis* Li & Shi, sp. nov.
13. Trichobothrium *sb* closer to *b* than to *st*; hand of pedipalps smooth ..... *B. xiniuyanensis* Li & Shi, sp. nov.  
Trichobothrium *sb* on movable finger halfway between *b* and *st*; distal part of hand finely granular at dorsal and median part ..... *B. cavernarum* Mahnert & Li, 2016
14. Patella with very narrow club, club with slightly rounded retrolateral margin ..... 15  
Patella with ovoid club, club with rounded retrolateral margin ..... 21
15. Carapace without eyes or eyespots ..... 16  
Carapace with eyes or eyespots ..... 17
16. Rallum with an expanded base; femur of pedipalp smooth ..... *B. changchaoensis* Li & Shi, sp. nov.  
Rallum without an expanded base; femur of pedipalp with granulations basally *B. maomaotou* Gao, Wynne & Zhang, 2018
17. Carapace with 2 (anterior) eyespots ..... 18  
Carapace with 4 eyespots ..... *B. daxingensis* Li & Shi, sp. nov.
18. Rallum with 8 pinnate blades ..... 19  
Rallum with 10 pinnate blades ..... *B. chinacavernicola* (Schawaller, 1995)
19. Carapace with epistome ..... 20  
Carapace without epistome ..... *B. yaolinensis* Li & Shi, sp. nov.
20. Carapace anterior margin with 6 setae; femur and patella of pedipalp smooth ..... *B. baiyunensis* Li & Shi, sp. nov.  
Carapace anterior margin with 4 setae; femur and patella of pedipalp with scale-like appearance .....  
..... *B. guangshanensis* Gao, Chen & Zhang, 2017
21. Carapace with 4 eyes or eyespots ..... 22

Carapace with 2 (anterior) eyespots .....	<i>B. chuanensis</i> Mahnert & Li, 2016
22. Carapace with 4 eyespots .....	23
Carapace with 4 eyes .....	<i>B. martii</i> (Mahnert, 2003)
23. Trichobothrium <i>sb</i> distinctly closer to <i>b</i> than to <i>st</i> .....	24
Trichobothrium <i>sb</i> slightly closer to <i>st</i> than to <i>b</i> .....	<i>B. shangshanensis</i> Li & Shi, sp. nov.
24. Lateral margin of hand with fine granules .....	<i>B. dongjiensis</i> Li & Shi, sp. nov.
Lateral margin of hand without fine granules .....	<i>B. baimensis</i> Li & Shi, sp. nov.
25. Patella very thin and long, not divided into 2 obvious sections (Fig. 21F) .....	26
Patella divided into 2 obvious sections (Fig. 21G) .....	<i>B. xianduhensis</i> Li & Shi, sp. nov.
26. Carapace with 2 (anterior) eyespots .....	27
Carapace without eyes or eyespots .....	28
27. Rallum with 9–11 pinnate blades .....	<i>B. juanxuae</i> Mahnert & Li, 2016
Rallum with 7–8 pinnate blades .....	<i>B. xiaoensis</i> Li & Liu, 2017
28. Carapace anterior margin with 4 setae .....	29
Carapace anterior margin with 10 setae .....	30
29. Rallum with 9 pinnate blades; carapace posterior margin with 6 setae .....	<i>B. scaurum</i> (Mahnert, 2003)
Rallum with 7 pinnate blades; carapace posterior margin with 9 setae .....	<i>B. gracilenta</i> Gao, Chen & Zhang, 2017
30. Trichobothrium <i>est</i> nearer to <i>et/it</i> than to <i>ist</i> .....	31
Trichobothrium <i>est</i> nearer to <i>ist</i> than to <i>et/it</i> .....	<i>B. diaojiangensis</i> Li & Shi, sp. nov.
31. Rallum with 11 pinnate blades; carapace without distinct epistome .....	<i>B. guanyinensis</i> Li & Shi, sp. nov.
Rallum with 13 pinnate blades; carapace with distinct epistome, triangular .....	<i>B. matuoensis</i> Li & Shi, sp. nov.

## DISCUSSION

Only a small number of cave-dwelling species from the Yunnan–Guizhou Plateau have been described to date. Twelve species and one unnamed species, all from China, are currently placed in the genus *Bisetocreagris* (Mahnert & Li 2016; Gao et al. 2017, 2018; Li et al. 2017). The low number of cave-dwelling pseudoscorpions in the Yunnan–Guizhou Plateau potentially demonstrates the lack of intensive biospeleological research rather than low diversity within this group (Fig. 28). Mahnert & Li (2016) divided this genus into three groups according to the length of the finger or the pedicel of pedipalpal patella. However, some modifications are required given the new more data obtained in this study, especially with the discovery of 20 new species.

**Group 1:** pedicel of the pedipalpal patella about the same length as the widest part of the patella (club) (Fig. 21A–C)

*Subgroup 1A:* obviously divided, very narrow club, with a slightly rounded retrolateral margin (Fig. 21A): *B. baiyunensis* sp. nov., *B. changchaoensis* sp. nov., *B. chinacavernicola*, *B. daxingensis* sp. nov., *B. guangshanensis*, *B. maomaotou* and *B. yaolinensis* sp. nov.

*Subgroup 1B:* obviously divided, ovoid club, with a rounded retrolateral margin (Fig. 21B): *B. baimensis* sp. nov., *B. chuanensis*, *B. dongjiensis* sp. nov., *B. martii* and *B. shangshanensis* sp. nov.

*Subgroup 1C:* not divided, narrow club, with a slightly rounded retrolateral margin and an almost straight prolateral margin (Fig. 21C): *B. baozinensis*, *B. cavernarum*, *B. duolangpingensis* sp. nov., *B. mahnerti* sp. nov., *B. sanhensis* sp. nov., *B. shahensis* sp. nov., *B. tuanjiensis* sp. nov. and *B. xiniuyanensis* sp. nov.

**Group 2:** pedicel of pedipalpal patella distinctly shorter than the widened part of patella (club) (Fig. 21D–E)

*Subgroup 2A:* obviously divided, with thick pedicel, ovoid club and a very strongly rounded retrolateral margin (Fig. 21D): *B. banganensis* sp. nov. and *B. tianyangensis* sp. nov.

*Subgroup 2B:* obviously divided, with narrow pedicel, long ovoid club and with a slightly rounded retrolateral margin (Fig. 21E): *B. ganxiaoensis* sp. nov.

**Group 3:** patella very thin and long, pedicel distinctly longer than patella widened part of patella (club) (Fig. 21F–G)

*Subgroup 3A:* not divided, club with slightly rounded retrolateral margin and patella very thin and long (Fig. 21F): *B. diaojiangensis* sp. nov., *B. gracilenta*, *B. guanyinensis* sp. nov., *B. juanxuae*, *B. matuoensis* sp. nov., *B. scaurum*, *B. titanium* and *B. xiaoensis*.

*Subgroup 3B:* obviously divided, club with a rounded retrolateral margin: *B. xianduhensis* sp. nov.

The genus *Parobisium* is quite similar to *Bisetocreagris*, but it differs by the absence of an elongate galea on the movable cheliceral finger and the absence of two small setae on each side of the anteromedian groove of sternite III in the male (Jia et al. 2010; Mahnert & Li 2016). *Parobisium* is characterised by the absence of a galea, a fixed chelal finger with a compact subterminal cluster with only three tactile setae (*et*, *it*, *est*) and a more diffuse subbasal to basal cluster of five tactile setae (*ish*, *ist*, *ib*, *esb* and *eb*) (Chamberlin 1962). However, the galea is often broken in museum specimens, especially when preserved and transported in a high ethanol concentration, so the distinction between *Parobisium* and *Bisetocreagris* can become rather difficult. Because there are no obvious traces of the galea, the following species may also belong to the genus *Parobisium*: *B. banganensis* sp. nov., *B. diaojiangensis* sp. nov., *B. dongjiensis* sp. nov., *B. guanyinensis* sp. nov., *B. matuoensis* sp. nov., *B. xiniuyanensis* sp. nov. and *B. yaolinensis* sp. nov. Nevertheless, they can be easily distinguished from the currently known species by comparisons of some of their characteristics below (*Parobisium laevigatum* Chen, Feng & Zhang, 2020; *Parobisium magangensis* Feng, Wynne & Zhang, 2019; *Parobisium motianense* Feng, Wynne & Zhang, 2020; *Parobisium muchonggouense* Chen, Feng & Zhang, 2020; *Parobisium qiangzhuang* Feng, Wynne & Zhang, 2020; *Parobisium sanlouense* Feng, Wynne & Zhang, 2020; *Parobi-*

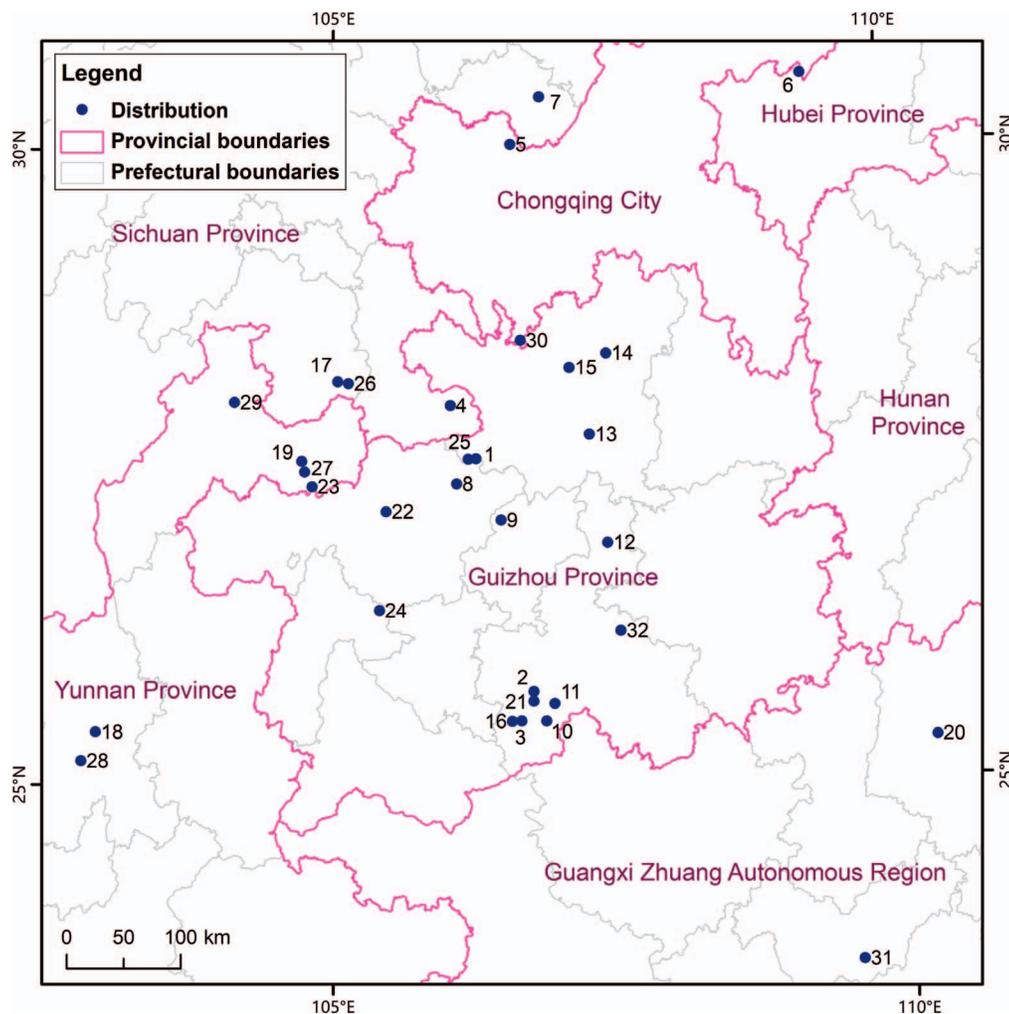


Figure 28.—Distribution of cave-inhabiting species of *Bisetocreagris* known from China: 1, *B. baiyunensis* Li & Shi, sp. nov.; 2, *B. baimensis* Li & Shi, sp. nov.; 3, *B. bangenensis* Li & Shi, sp. nov.; 4, *B. baozinensis* Mahnert & Li, 2016; 5, *B. cavernarum* Mahnert & Li, 2016; 6, *B. changchaoensis* Li & Shi, sp. nov.; 7, *B. chinacavernicola* (Schawaller, 1995); 8, *B. chuanensis* Mahnert & Li, 2016; 9, *B. daxingensis* Li & Shi, sp. nov.; 10, *B. diaojiangensis* Li & Shi, sp. nov.; 11, *B. dongjiensis* Li & Shi, sp. nov.; 12, *B. duolangpingensis* Li & Shi, sp. nov.; 13, *B. ganxiaoensis* Li & Shi, sp. nov.; 14, *B. gracilentia* Gao, Chen & Zhang, 2017; 15, *B. guangshanensis* Gao, Chen & Zhang, 2017; 16, *B. guanyinensis* Li & Shi, sp. nov.; 17, *B. juanxuae* Mahnert & Li, 2016; 18, *B. mahneri* Li & Shi, sp. nov.; 19, *B. martii* (Mahnert, 2003); 20, *B. maomaotou* Gao, Wynne & Zhang, 2018; 21, *B. matuoensis* Li & Shi, sp. nov.; 22, *B. sanhensis* Li & Shi, sp. nov.; 23, *B. scaurum* (Mahnert, 2003); 24, *B. shahensis* Li & Shi, sp. nov.; 25, *B. shangshanensis* Li & Shi, sp. nov.; 26, *B. tianyangensis* Li & Shi, sp. nov.; 27, *B. titanium* (Mahnert, 2003); 28, *B. tuanjiensis* Li & Shi, sp. nov.; 29, *B. xiaoensis* Li & Liu, 2017; 30, *B. xianduhensis* Li & Shi, sp. nov.; 31, *B. xiniuyanensis* Li & Shi, sp. nov.; 32, *B. yaolinensis* Li & Shi, sp. nov.

*sium tiani* Feng, Wynne & Zhang, 2020; *Parobisium yuantongi* Feng, Wynne & Zhang, 2019). The new species *B. bangenensis* sp. nov. differs from the other species mentioned above (except for *P. qiangzhuang*) as follows: a patella with a thick pedicel, an ovoid club and a very strongly rounded retrolateral margin. It differs from *P. qiangzhuang* by carapace with 4 eyespots (*B. bangenensis* sp. nov. with 2 eyespots). *B. diaojiangensis* sp. nov., *B. guanyinensis* sp. nov. and *B. matuoensis* sp. nov. differ from the other species mentioned above (except for *P. laevigatum*, *P. magangensis*, *P. muchonggouense* and *P. yuantongi*) by the very thin and long patella, but they can be distinguished by the carapace anterior margin with 10 setae (4 setae in *P. laevigatum*, *P. magangensis*, *P. muchonggouense* and *P. yuantongi*). *B. dongjiensis* sp. nov. differs from the other species mentioned above (except for *P.*

*motianense*) by the patella possessing a narrow pedicel and ovoid club, and the club has a rounded retrolateral margin. It differs from *P. motianense* by the cheliceral rallum having 8 pinnate blades (9 pinnate blades in *B. dongjiensis* sp. nov.), femur 4.66–4.90 × longer than broad and patella 3.09–3.39 × longer than broad (femur 4.36 × longer than broad and patella 2.96 × longer than broad in *B. dongjiensis* sp. nov.). *B. xiniuyanensis* sp. nov. differs from the other species mentioned above by a patella with a narrow club, with a slightly rounded retrolateral margin and an almost straight prolateral margin. *B. yaolinensis* sp. nov. differs from the other species mentioned above (except for *P. sanlouense* and *P. tiani*) by a patella with a narrow pedicel and a very narrow club, and a club with a slightly rounded retrolateral margin. It differs from *B. yaolinensis* sp. nov. by the carapace anterior margin with 8

setae (4 setae in *P. sanlouense* and *P. tiani*). Therefore, these species have been placed temporarily in the genus *Bisetocreagris*. Molecular sequencing data will be needed in the future to confirm the validity of this placement.

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