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Scolopocryptops zhijinensis sp.n. and a key to species of scolopocryptopine centipedes from China (Scolopendromorpha: Scolopocryptopidae)

Scolopocryptops zhijinensis sp.n. и ключ для видов сколопокриптопиновых губоногих из Китая (Scolopendromorpha: Scolopocryptopidae)

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KEY WORDS**:** Cave, Chilopoda, taxonomy, new species, Guizhou, southern China.
КЛЮЧЕВЫЕ СЛОВА**:** Пещера, Chilopoda, новый вид, Гижу, Юэный Китай.

ABSTRACT**.** *Scolopocryptops zhijinensis* sp.n., a new scolopocryptopine centipede species, is described from a karst cave in Guizhou Province, China. By its morphological characters, *S. zhijinensis* sp.n. is close to *S. troglocaudatus* Chagas et Bichuette, 2015, a troglobite from a siliciclastic area of eastern Brazil. They share similar troglomorphic features, such as depigmentation and long appendages. In *S. zhijinensis* sp.n., the antennal segments are stout, only one basal article is sparsely setose, *vs.* the other segments being densely so; the anterior margin of the forcipular coxosternum is straight and the tooth-plates are narrow, not fused together at the midline; the tergite of the ultimate leg-bearing segment is margined; the coxopleurite has relatively sparse pores; the ventral spinous process of the prefemur of the ultimate pair of legs is long, *vs.* a short dorsomedial spinous process; the femur of the ultimate pair of legs is shorter than the prefemur and tibia combined. *Scolopocryptops zhijinensis* sp.n. is only the third troglobitic scolopocryptopine to be described in the world, and the first discovered in China. With the description of this new species, the number of *Scolopocryptops* species known from China amounts to eight, all being keyed.

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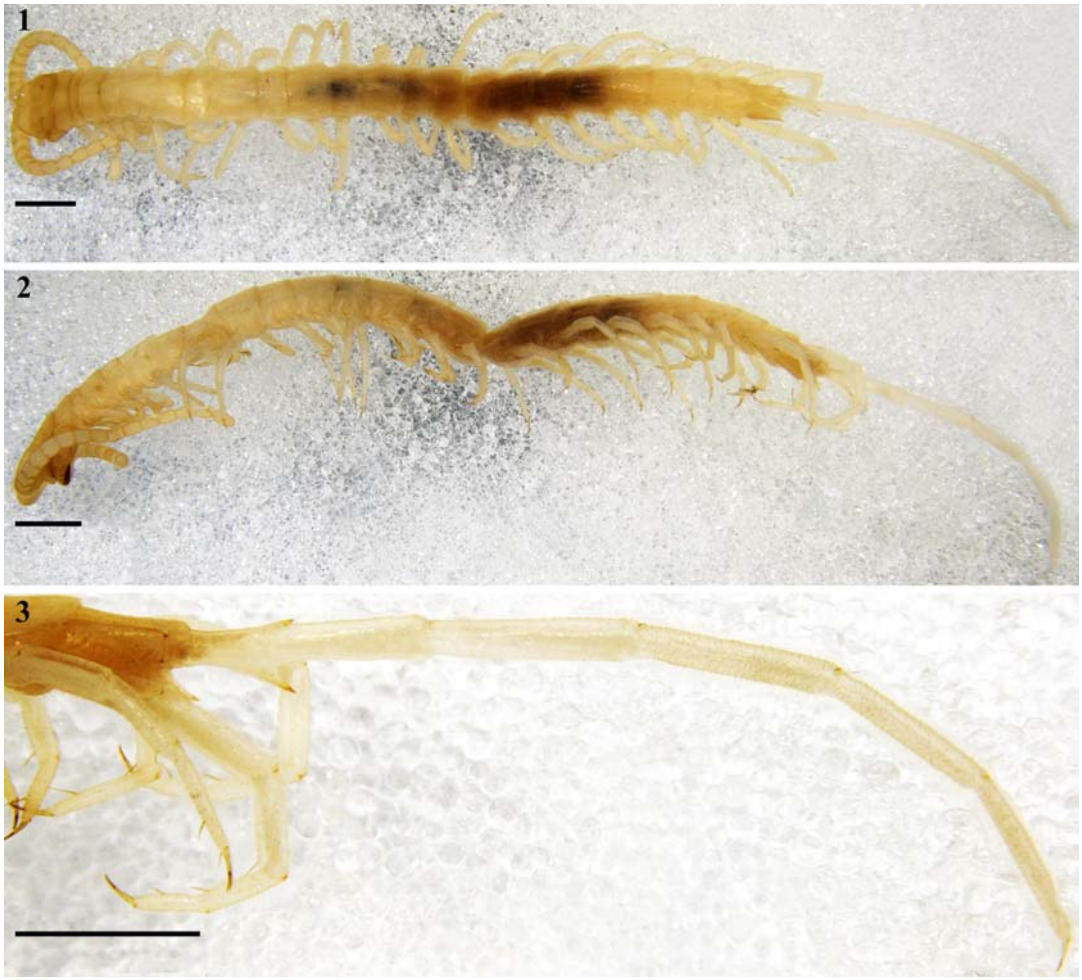
РЕЗЮМЕ**.** Из карстовой пещеры в провинции Гижу (Китай) описан *Scolopocryptops zhijinensis* sp.n., новый вид сколопокриптопиновых губоногих. По своим морфологическим признакам *S. zhijinensis* sp.n. близок к *S. troglocaudatus* Chagas et Bichuette, 2015, троглобионту из силикатного района Восточной Бразилии. Оба вида имеют такие сходные трогломорфные черты, как депигментированные покровы и длинные конечности. У *S. zhijinensis* sp.n. членики усиков приземистые, лишь один базальный членик с редкими щетинками, а прочие сегменты с густыми; передний край ногочелюстного коксостернума прямой, а зубные пластинки узкие и не сросшиеся по средней линии; тергит последнего несущего ноги сегмента окаймлен по краю; коксоплейрит со сравнительно редкими порами; вентральный шиповидный отросток предбедра последней пары ног длинный, а дорсомедиальный шиповидный отросток короткий; бедро последней пары ног короче предбедра и голени, вместе взятых. *Scolopocryptops zhijinensis* sp.n. — лишь третий троглобионтный вид сколопокриптопиновых губоногих, описываемый в мире, и первый, обнаруженный в Китае. С описанием нового вида число видов *Scolopocryptops*, известных в Китае, возросло до восьми, и для всех их дан ключ.

Introduction

Scolopocryptops species are blind scolopendromorphs with 23 pairs of legs, and the prefemur of the ultimate legs has one dorsomedial and one ventral spinous process [Chagas-Jr, Bichuette, 2015; Schileyko *et al*., 2020]. In China, Chao & Chang [2003] reported five species or subspecies from Taiwan: *S. capillipedatus* (Takakuwa, 1938), *S. curtus* (Takakuwa, 1939), *S. melanostomus melanostomus* Newport, 1845 (= *S. melanostoma melanostoma* Newport, 1845, see Bonato *et al*. [2016]), *S. rubiginosus* L. Koch, 1878, and *S. sexspinosus* (Say, 1821). Song *et al*. [2004] recorded three species from mainland China: *S. nigrimaculatus* Song, Song et Zhu, 2004 (Anhui, Hubei and Hunan provinces), *S. rubiginosus* L. Koch, 1878 (Si-



Figs 1–3. *Scolopocryptops zhijinensis* sp.n., holotype. Dorsal and lateral views, and right ultimate leg, respectively. Scale bars: 1 mm.
Рис. 1–3. *Scolopocryptops zhijinensis* sp.n., голотип. Соответственно виды сверху и сбоку и правая последняя нога. Масштаб 1 мм.

chuan Province), and *S. spinicaudus* (Wood, 1862) (Hunan Province). None of them is troglobitic. In addition, *Scolopocryptops broelemanni broelemanni* Kraepelin, 1903 has been recorded from Zoushan [Bonato *et al*., 2016], regarded as a *nomen dubium* by Song [2004: *Dinocryptops broelemanni* (Kraepelin, 1903)].

Until now, only two troglobitic species are known in the subfamily Scolopocryptopinae: *S. guacharensis* Manfredi, 1957, from Venezuela (Cueva Del Guacharo) [Manfredi, 1957] and *S. troglocaudatus* Chagas et Bichuette, 2015 from Brazil (Gruna do Cantinho Cave, Gruna Rio dos Pombos Cave and Gruna Lava Pé Cave) [Chagas-Jr, Bichuette, 2015]. These species show some degree of depigmentation and strongly elongated ultimate legs, which could be interpreted as troglomorphisms [Chagas-Jr, Bichuette, 2015]. Here, we describe the third troglobite in the subfamily Scolopocryptopinae, a new species of *Scolopocryptops* from China.

Material and methods

The type material was first collected and examined under a stereomicroscope (Motic K700), and then fixed in 75% alcohol. Photographs and length measurements were taken using a Leica stereo microscope (M205A). The scales (in millimeters, mm) were made from photographs of specimens taken on a computer screen. The descriptive terminology follows Lewis *et al*. [2005] and Bonato *et al*. [2010]. The repository acronym is MHBU (Museum of Hebei University, Baoding, China).

Taxonomy

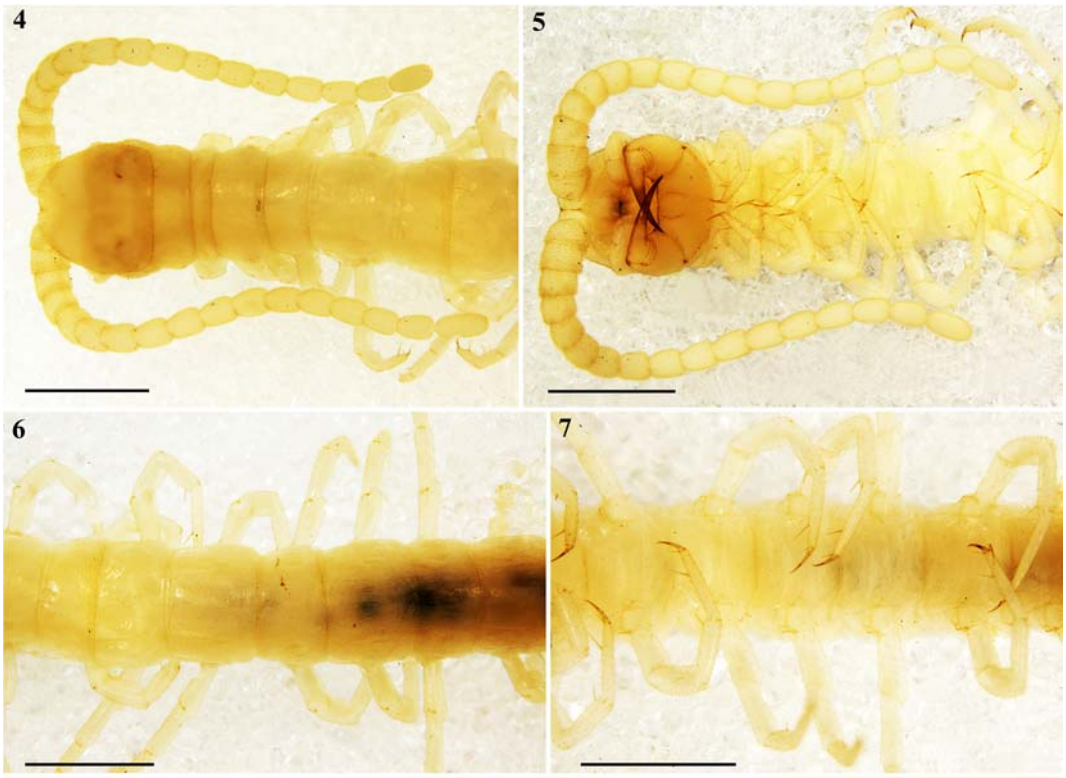
Order Scolopendromorpha Pocock, 1895
Family Scolopocryptopidae Pocock, 1896
Subfamily Scolopocryptopinae Pocock, 1896
Genus *Scolopocryptops* Newport, 1844

***Scolopocryptops zhijinensis* sp.n.**

Figs 1–18.

HOLOTYPE (MHBU), immature and unsexed, collected by Guchun Zhou, 28/3/2014, in Zhijin Cave (about 120 km from Guiyang), Guanzhai Town, Zhijin County, Guizhou Province, China.

ETYMOLOGY. The specific name refers to the type locality, Zhijin Cave, Zhijin County.



Figs 4–7. *Scolopocryptops zhijinensis* sp.n., holotype. 4 — dorsal view of antennae, cephalic plate and first seven tergites; 5 — ventral view of antennae, forcipular coxosternum and first seven sternites; 6 — tergites 5–12; 7 — sternites 7–13. Scale bars: 1 mm.

Рис. 4–7. *Scolopocryptops zhijinensis* sp.n., голотип. 4 — вид сверху усиков, головной капсулы и первых семи тергитов; 5 — вид снизу усиков, ногочелюстного коксостернума и первых семи стернитов; 6 — тергиты 5–12; 7 — стерниты 7–13. Масштаб 1 мм.

DIAGNOSIS. *Scolopocryptops zhijinensis* sp.n. is basically faint yellow. The antennal articles are stout, the first article is sparsely setose, the following ones are short and densely setose. The anterior margin of the forcipular coxosternum is straight, the tooth-plates are narrow, not fused together at the midline. The tergite of the ultimate leg-bearing segment is margined; the ventral spinous process of the prefemur of the ultimate pair of legs is long, *vs.* a short dorsomedial spinous process; the femur of the ultimate pair of legs is shorter than both prefemur and tibia combined; ultimate legs (from prefemur to pretarsus) are up to 40% of body length.

DESCRIPTION. Length: body (anterior margin of cephalic plate to posterior margin of tergite 23) about 14.0 mm (Figs 1–2, but as the specimen is immature, its length cannot represent adult body length).

Pigmentation (in alcohol for six years): ground colour faint yellow, cephalic plate, last segment, and coxosternite yellow (Figs 1–12).

Cephalic plate: longer than wide (length: 1.26 mm; width: 1.10 mm), smooth, with neither marginal ridges nor sutures, nor sulci, nor depressions, its posterior margin overlying tergite 1 (Figs 4, 8).

Antennae: extending to anterior margin of T8 (Figs 4, 5), very thick; 17 articles; first article with sparse setae (Fig. 8); segments 2–17 covered with short and dense setae; antennomeres 1–6 wider than long (right antennomere 6: length: 0.25 mm, width: 0.27 mm); right antennomere 7: length: 0.27 mm, width: 0.24 mm; right terminal article: length: 0.40 mm; width: 0.21 mm (Figs 4, 5, 8).

Forcipular coxosternum: anterior margin straight; tooth-plates not fused together at midline. Process of forcipular trochanteroprefemur short, slightly pointed and dentate (Figs 5, 9).

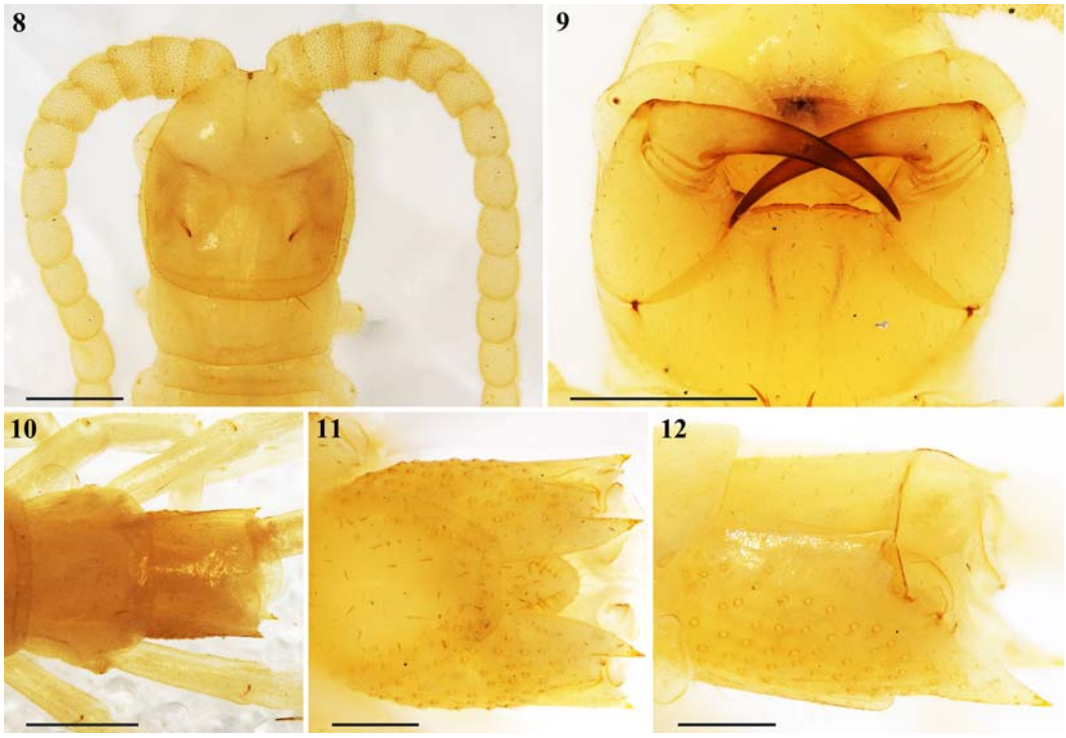
Tergites: smooth. Tergite 1 (T1) and T2 not margined. T3 to T22 margined (Figs 4, 6, 8, 10). T7 with incomplete, short, paramedian sutures; T8 to T18 each with nearly complete paramedian sutures. Tergite of ultimate leg-bearing segment completely margined (Figs 10, 12).

Sternites: smooth, wider than long (Figs 5, 7). Sternite of ultimate leg-bearing segment narrow posteriorly, longer and nearly as wide, posterior margin nearly straight (Fig. 11).

Coxopleuron: Coxopleural process long, parallel-sided and pointed. Pore field with relatively sparse pores and covering almost entire coxopleura (Figs 11, 12).

Legs: Legs 1 to 21 with undivided tarsi. Legs 1 to 17 each with one tibial spur and one lateral tibial spur (Figs 13–15), legs 18 to 22 each with one tibial spur (Fig. 16), but without lateral tibial spur except for left leg 19 bearing a lateral tibial spur, leg 23 without spurs (Fig. 17); legs 1 to 21 each with one tarsal spur, while leg 22 with two spurs (Figs 13–16).

Ultimate pair of legs longer (length of right ultimate leg: 5.98 mm) (Figs 3, 17, 18). Ventral spinous process of prefemur strong (large), dorsomedial spinous process short (Figs 17, 18). Prefemur (length of right prefemur: 1.43 mm) longer than femur (length of right femur: 1.14 mm) or tibia (length of right tibia: 1.17 mm); tarsus 1 (length of right



Figs 8–12. *Scolopocryptops zhijinensis* sp.n., holotype. 8 — dorsal view of part of antennae, cephalic plate and first two tergites; 9 — forcipular coxosternum; 10 — last two tergites; 11 — last sternite and coxopleura; 12 — lateral view of last tergite and coxopleura. Scale bars: 0.5 mm (8–10), 0.2 mm (11, 12).

Рис. 8–12. *Scolopocryptops zhijinensis* sp.n., голотип. 8 — вид сверху части усиков, головной капсулы и первых двух тергитов; 9 — ногочелюстной коксостернум; 10 — два последних тергита; 11 — последний стернит и коксоплейра; 12 — вид сбоку последнего тергита и коксоплейры. Масштаб: 0,5 мм (8–10), 0.2 мм (11, 12).

tarsus:1.03 mm), tarsus 2 (length of right tarsus 2: 1.00 mm) and pretarsus (length of right pretarsus: 0.21 mm).

TYPE LOCALITY. Zhijin Cave, Zhijin County, Guizhou Province, China.

DISTRIBUTION. China (Guizhou Province).

Key to species of the genus *Scolopocryptops* from China (based on Chao & Chang [2003, 2008], Schileyko & Stoev [2016], Song *et al*. [2004])

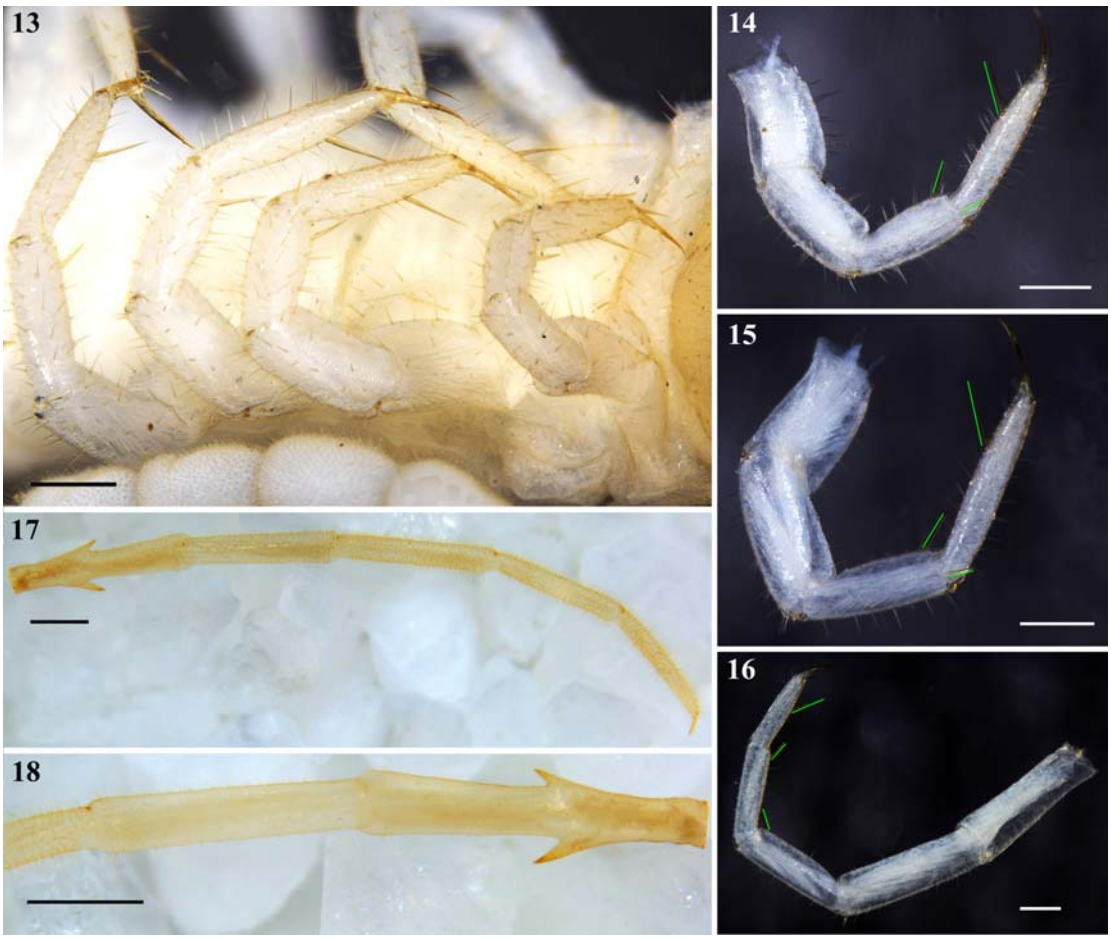
1. Length of ultimate legs (from prefemur to pretarsus) up to 40% of body length ..... *S. zhijinensis* sp.n.
– Length of ultimate legs (from prefemur to pretarsus) less than a third of body length 2
2. Tergites with black spots 3
– Tergites without black spots 4
3. Antennal articles 1–4 with sparse dorsal setae, tergites 3–20 each with complete paramedian suture .... *S. melanostoma melanostoma*
– Antennal articles 1 and 2 with sparse dorsal setae, tergites 8–20 each with complete paramedian suture .... *S. nigrimaculatus*
4. Tergites with complete paramedian sutures 5
– Tergites without complete paramedian sutures 6
5. Coxopleuron with a long coxopleural process, and a large coxopleural spine ..... *S. rubiginosus*
– Coxopleuron with a very short coxopleural process, and a small coxopleural spine ..... *S. curtus*
6. Ultimate legs with numerous long setae (hairs) .... *S. capillipedatus*
– Ultimate legs with sparse setae .... the *S. sexspinosus* complex group (including *S. spinicaudus* and *S. sexspinosus*: Chao & Chang [2003, 2008], Song *et al*. [2004]).

Discussion

Scolopocryptops zhijinensis sp.n. resembles juvenile *S. troglocaudatus* from Brazil in such growth characteristics as a light colour, pale legs, and a sharp margin of the forcipular trochanteroprefemur. Accordingly, the holotype of *S. zhijinensis* sp.n. is also a juvenile or immature.

Chagas-Jr & Bichuette [2015] described the following differences between juveniles and adults of the Neotropical troglomorphic *S. troglocaudatus*: in the juveniles, the body and leg colour is lighter; the chitinous crest of the tooth-plates' margin and the process of the forcipular trochanteroprefemur are sharper, and the dorsomedial and ventral spinous processes of the prefemur of the ultimate pair of legs are longer. Similar differences may well be presumed to exist also between the juveniles and adults of *S. zhijinensis* sp.n.

Scolopocryptops zhijinensis sp.n. is the first scolopocryptopine to be found in a cave in China. It differs obviously from the other Chinese scolopocryptopines because of its light colour, the thin cuticle, and the



Figs 13–18. *Scolopocryptops zhijinensis* sp.n., holotype. 13 — first four left legs; 14 — right third leg; 15 — right seventh leg; 16 — left 22nd leg; 17, 18 — right ultimate leg. Green lines show the length of spurs. Scale bars: 0.2 mm (13–15), 0.5 mm (16–18).

Рис. 13–18. *Scolopocryptops zhijinensis* sp.n., голотип. 13 — первые четыре левые ноги; 14 — правая третья нога; 15 — правая седьмая нога; 16 — левая 22-я нога; 17, 18 — правая последняя нога. Зеленые линии обозначают длину шпор. Масштаб: 0,2 мм (13–15), 0,5 мм (16–18).

longer and slender antennae and legs. Morphologically, *S. zhijinensis* sp.n. resembles *S. troglocaudatus*, but there are obvious differences (characters in the latter species are given in parentheses): (1) tergite 1 without anterior transversal sulcus (with a sulcus); (2) tergite of ultimate leg-bearing segment completely margined (not margined); (3) margin of tooth-plates slightly granulated, without (with) a chitinous crest on each side [Chagas-Jr, Bichuette, 2015: fig. 19]; (4) each tibia, tarsus 1 and tarsus 2 of leg 22 with one spur (without spurs).

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