



中国西北地区下侏罗统三工河组原沫蝉科 (昆虫纲: 半翅目)一新属种(英文)*

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提要 本文根据一枚产自中国新疆维吾尔自治区下侏罗统三工河组的昆虫化石标本建立1新属新种——秉氏巨沫蝉(*Magnicercopis pingi* Zhang, Chen et Zhang, gen. et sp. nov.), 归入已灭绝的半翅目原沫蝉科。本新属的衍征包括: MP脉3分支, 存在横脉 im , MP脉分支处于CuA脉分支处的基侧。本文对新属种与中国侏罗纪的原沫蝉科类群, 尤其是*Longucercopis xinjiangensis* Zhang, Chen et Zhang, 2022进行了详细的翅脉对比: *M. pingi*盖翅长约为*L. xinjiangensis*的两倍、MP脉3分支(后者2分支)、MP脉首次分支处位于CuA脉分支处基侧(后者位于CuA脉分支处端侧)、*M. pingi*具横脉 im (后者未见 im 脉)。这一发现不仅提高了对原沫蝉科多样性的认识, 也丰富了该科的翅脉信息。

关键词 *Magnicercopis pingi* gen. et sp. nov. 原沫蝉科 早侏罗世晚期 准噶尔盆地

中文引用 张前旗, 陈军, 王博, 张海春, 2023. 中国西北地区下侏罗统三工河组原沫蝉科(昆虫纲: 半翅目)一新属种(英文). 古生物学报, 62(4): 598–604. DOI: 10.19800/j.cnki.aps.2023032

英文引用 Zhang Qian-qi, Chen Jun, Wang Bo, Zhang Hai-chun, 2023. A new genus and species of Procercopidae (Insecta: Hemiptera) from the Lower Jurassic Sangonghe Formation of NW China. Acta Palaeontologica Sinica, 62(4): 598–604. DOI: 10.19800/j.cnki.aps.2023032

A new genus and species of Procercopidae (Insecta: Hemiptera) from the Lower Jurassic Sangonghe Formation of NW China

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Abstract A new extinct procercopid (Hemiptera) genus and species, *Magnicercopis pingi* Zhang, Chen et Zhang, gen. et sp. nov., is established based on a tegmen specimen collected from the Lower Jurassic Sangonghe Formation near Urumqi, northern Xinjiang, NW China. The new genus is unique in having three MP terminals, the presence of

收稿日期: 2023-09-14; 改回日期: 2023-11-23; 录用日期: 2023-11-24

*国家自然科学基金(42125201, 42288201)和沈阳师范大学博士启动项目(BS202209)联合资助。

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crossvein *im*, and forking level of MP basal to that of CuA. A detailed comparison of venation is made between this new taxon and other Jurassic procercopids from China, especially its closest relative, *Longucercopis xinjiangensis* Zhang, Chen et Zhang, 2022. This finding not only increases the diversity of the Procercopidae but also provides some tegmen information for this family.

Key words *Magnicercopis pingi* gen. et sp. nov., Procercopidae, late Early Jurassic, Junggar Basin

1 Introduction

Ping (1935) started the studies of Jurassic insects from Xinjiang Uygur Autonomous Region, NW China and reported four species from the Turpan Basin. In the same year, Pan (1935) briefly described a blattarian insect, *Turfanoblata tingi* Pan, 1935, from the Upper Jurassic of Turpan with neither plates nor illustrations provided in the publication.

Martynova (1949) reported a mecopteran insect, *Scharabittacus pictus* Martynova, 1949 from the Lower Jurassic of Turpan (Novokshonov, 1993). Hong (1983) and Hong *et al.* (1995) reported six species from the Kezilenuer and Sanjianfang formations. From then on, more insect species have been discovered in Xinjiang and most of them were assigned to new taxa (Zhang, 1996a, b, 1997a, b; Zhang *et al.*, 2003; Zheng *et al.*, 2016, 2018, 2019; Wang *et al.*, 2019; Wang *et al.*, 2022; Zhang, 2022, 2023).

As an ancient lineage of the hemipteran subfamily Cercopoidea and a transitional unit to extant groups, the extinct family Procercopidae Handlirsch, 1906 is important to the early evolution of Cercopoidea (Shcherbakov and Popov, 2002; Wang *et al.*, 2012; Chen *et al.*, 2020). So far, 12 genera from the Laurasia (China, England, Germany, Kyrgyzstan, Myanmar, North Korea and Russia), dated from the Early Jurassic (Hettangian) to Late Cretaceous (Cenomanian), have been reported and assigned to the family Procercopidae. These genera include *Anthoscytina* Hong, 1983, *Burmocercopis* Fu, Cai et Huang, 2020, *Cretocercopis* Ren, 1995, *Jurocercopis* Wang et Zhang, 2009, *Longucercopis* Zhang, Chen et Zhang, 2022, *Paranthoscytina* Fu, Cai et Huang, 2020, *Procercopina* Martynov, 1937, *Procercopis* Handlirsch, 1906, *Sinocercopis* Hong, 1982, *Stellularis* Chen, Yao et Ren, 2015, *Titanocercopis* Chen, Zhang et Wang, 2015, and *Valdicopis* Li, Chen et Jarzembowski, 2021 (Handlirsch, 1906; Martynov,

1937; Bode, 1953; Hong, 1982, 1983; Shcherbakov, 1988; Ren, 1995; Wang and Zhang, 2009; Chen D *et al.*, 2015; Chen J *et al.*, 2015, 2020; Fu *et al.*, 2020; Jon *et al.*, 2020; Li *et al.*, 2021; Zhang *et al.*, 2022). Chen *et al.* (2020) and Zhang *et al.* (2022) discussed the phylogenetic positions of these procercopid genera in Procercopidae and the particular family within Cercopoidea. Here, we establish a new genus and species from the Lower Jurassic Sangonghe Formation on the southern margin the Junggar Basin, Xinjiang Uygur Autonomous Region, NW China.

2 Geological Setting

The specimen was collected from the Sangonghe Formation at the Haojiagou section about 50 km southwest of Urumqi City, Xinjiang Region (Zhang *et al.*, 2022). The Lower Jurassic (mainly Toarcian) Sangonghe Formation is widely distributed along the northern margin of the Tianshan Mountains or in the marginal areas of the Junggar and Turpan basins in Xinjiang.

The Sangonghe Formation, from 30 to 766 meters thick, conformably overlies the Badaowan Formation and underlies the Xishanyao Formation (All China Commission of Stratigraphy, 2017). The Sangonghe Formation consists of alternating uneven beds of grayish green sandstones, siltstones, and mudstones (Zhang SX, 2009). Diverse fossil taxa including bivalves, clam shrimp, fish, gastropods, insects, and plants have been reported.

Up to now, at least nine orders of insects have been reported from the Sangonghe Formation of the Junggar and Turpan basins. Deng *et al.* (2010) proposed the *Rhipidoblattina robusta* - *Liaossogomphites xinjiangicus* assemblage referring to the fossil insects preserved in the Sangonghe Formation. However, only six species, i.e., *Artematopodites insculptus* (Zhang, 1997) Yan et Zhang, 2010 (Coleoptera), *Eofulgoridium tenellum* Zhang, Wang et

Zhang, 2003, *Longucercopis xinjiangensis* Zhang, Chen et Zhang, 2022 and *Sinoscarterella incompleta* Nel, Fu et Huang, 2022 (Hemiptera), *Sinagryllus xinjiangensis* Wang et al., 2019 (Orthoptera), and *Liassorhyphus liaoi* Nel et Huang, 2022 (Diptera) have been formally described (Zhang, 1997a; Zhang et al., 2003; Yan and Zhang, 2010; Wang et al., 2019; Xu et al., 2019; Wang et al., 2022; Zhang et al., 2022).

3 Material and methods

The new species is represented by an isolated giant tegmen specimen (NIGP203450) collected from the Upper Member (Toarcian, Lower Jurassic) of the Sangonghe Formation at the Haojiagou section. Specimen images were obtained using a Zeiss Stereo Discovery V16 stereomicroscope system at the Nanjing Institute of Geology and Palaeontology, Chinese Academy of Sciences (NIGPAS, CAS), Nanjing, Jiangsu Province, China. Line drawings and reconstructions were completed using CorelDRAW 2019. The specimen is stored at NIGPAS.

The venation terminology adopted here follows

Nel et al. (2012) and Chen et al. (2018). The nomenclatural acts established herein are registered in Zoo-Bank LSID urn:lsid:zoobank.org:pub:BCCF60B0-3FBE-480A-AD6D-64FB9DEDB294.

4 Systematic palaeontology

Order Hemiptera Linnaeus, 1758

Suborder Cicadomorpha Evans, 1946

Superfamily Cercopoidea Leach, 1815

Family Procercopidae Handlirsch, 1906

Type genus *Procercopis* Handlirsch, 1906

***Magnicercopis* Zhang, Chen et Zhang, gen. nov.**

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(Fig. 1A–1C)

Type species *Magnicercopis pingi* gen. et sp. nov., by present designation and monotypy.

Etymology The generic name is from the Latin adjective “*magnus*” (referring to large tegmen) and the generic name “*Cercopis*”.

Diagnosis Same as for the type species.

Included species Type species only.

Age and distribution Late Early Jurassic; northern Xinjiang, NW China.

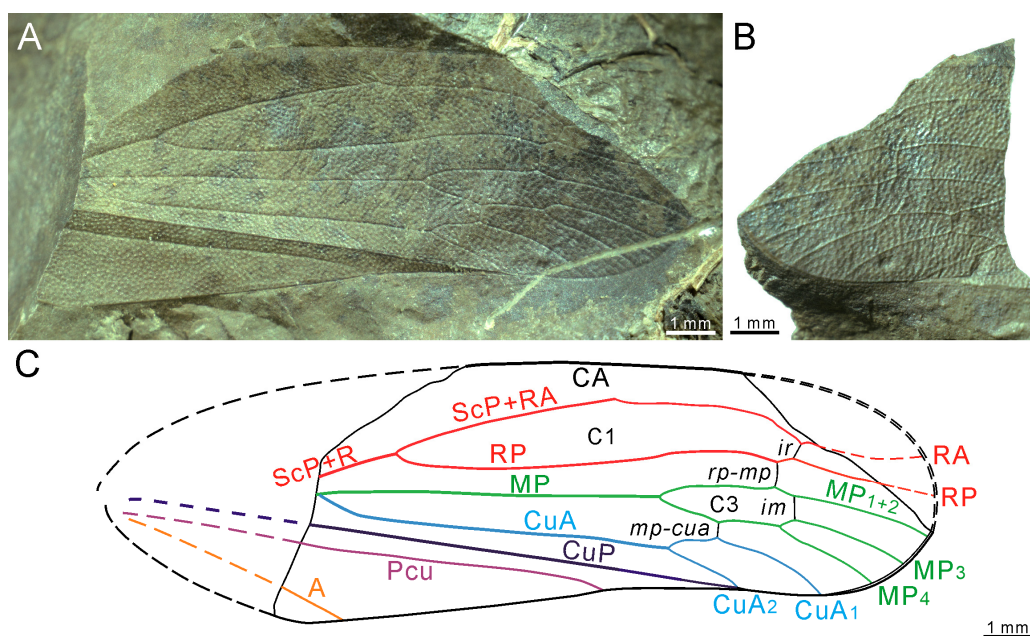


图 1 *Magnicercopis pingi* Zhang, Chen et Zhang, gen. et sp. nov., 正模(NIGP203450), 盖翅

Fig. 1 *Magnicercopis pingi* Zhang, Chen et Zhang, gen. et sp. nov., holotype (NIGP203450), tegmen

A. 为正面照片 (左右镜像); B. 为反面照片(左右镜像); C. 盖翅翅脉及复原图(瘤状纹饰已省略)。

A. Photograph of part; B. Photograph of counterpart; C. Line drawing of tegmenal venation (granules not illustrated).

***Magnicercopis pingi* Zhang, Chen et Zhang, gen. et sp. nov.**

urn:lsid:zoobank.org:pub:BCCF60B0-3FBE-480A-AD6D-64FB9DEDB294 (Fig. 1-A–1-C)

Etymology The species epithet refers to Dr. Chi Ping, a famous Chinese zoologist and the founder of paleoentomological studies in Xinjiang Uygur Autonomous Region.

Holotype NIGP203450, a tegmen with basal and apical parts missing; housed at NIGPAS.

Locality and horizon Upper Member of the Sangonghe Formation (upper Lower Jurassic); Haojiagou section, Urumqi, Xinjiang, China.

Diagnosis Tegmen more than 10 mm long, length/width ratio < 4. Observed anterior margin straight to slightly curved; stem ScP+R two, forked at about basal half of tegminal length; RA and RP single and curved; MP forked twice to form three terminal branches; CuA two-branched, with forking of CuA merely apical of initial forking level of MP; *mp-cua* crossvein connected to MP₃₊₄, earlier than *rp-mp* and *ir* crossveins; Pcu and A single and straight; observed appendix narrow.

Description Tegmen densely covered with granules; basal part of remigium and clavus, and apex not observed. Observed tegmen 13.39 mm long and 5.32 mm wide, with estimated length/width ratio about 3.2. CA about 1/3 left, slightly convex; Costal area basally wide, gradually tapered, narrowest near end level of Pcu. Stem ScP+R straight, bifurcating into ScP+RA and RP at basal half of tegmen, more anterior of stems MP and CuA forking; ScP+RA first stretched anteriorly, nearly straight, then slightly curved apically, connecting with RP by oblique *ir* crossvein at closest point with RP, terminal deletion; RP single, slightly curved on membrane, subparallel to CA and RA, observed terminal straight; crossvein *rp-mp* perpendicular to anterior margin, anterior of crossveins *ir* and *im*. Observed MP straight, along median flexion-line, bifurcating into MP₁₊₂ and MP₃₊₄ after mid-tegmen, more apical of stem ScP+R, but less basal of CuA; MP₁₊₂ single, MP₃₊₄ forking into two terminal branches (MP₃ and MP₄) at level of crossvein *rp-mp*, crossvein *im* oblique near level of

ir. CuA basally curved with crossvein *cua-cup* not observed, then stretched straightly until forking into CuA₁ and CuA₂ basal of MP forking; CuA₁ curved, about twice as long as CuA₂; crossvein *mp-cua* connecting MP₃₊₄ with CuA₁, basal of levels of CuP end and crossveins *rp-mp*, *ir*, and *im*. CuP straight and strong, parallel to Pcu in general; Pcu convex to tegmen with terminal end slightly curved posteriorly. Partially observed A stretched close to posterior margin. Appendix thin. Cell C1 fusiform; C3 arrow-head-shaped.

5 Discussion

According to the key to genera in Procercopidae proposed by Zhang *et al.* (2022), *Magnicercopis pingi* gen. et sp. nov. is taxonomically closest to *Longucercopis* Zhang, Chen et Zhang, 2022 by the following tegminal characteristics: length/width > 3.0, singular RA and RP, MP two-branched, and presence of crossvein *mp-cua* (Zhang *et al.*, 2022). *Longucercopis xinjiangensis* is also reported from the Sangonghe Formation at the Haojiagou outcrop. Whilst the tegmen and venation differences between the two species are obvious: (1) The tegmen of *Magnicercopis pingi* gen. et sp. nov. is more than twice as long as that of *L. xinjiangensis*; (2) MP of *M. pingi* is more developed with three terminal branches than that of *L. xinjiangensis* with two terminals; (3) The initial forking level of MP is basal to that of CuA while it is apical in *L. xinjiangensis*; and (4) The crossvein *im* is present in *M. pingi* while it is absent in *L. xinjiangensis* (Fig. 2A-B). The Early Jurassic procercopids *Procercopina delicata* Zhang *et al.*, 2003 and *P. shawanensis* Zhang *et al.*, 2003 from the Badaowan Formation in the Junggar Basin are different from *M. pingi* gen. et sp. nov. by having two RP branches. Three genera of Procercopidae have been reported from the Middle Jurassic Haifanggou/Jiulongshan Formation of the Daohugou area in Inner Mongolia including *Anthoscytina* Hong, 1983, *Jurocercopis* Wang and Zhang, 2009, and *Titanocercopis* Chen, Zhang and Wang, 2015. The former two genera differ from *M. pingi* gen. et sp.

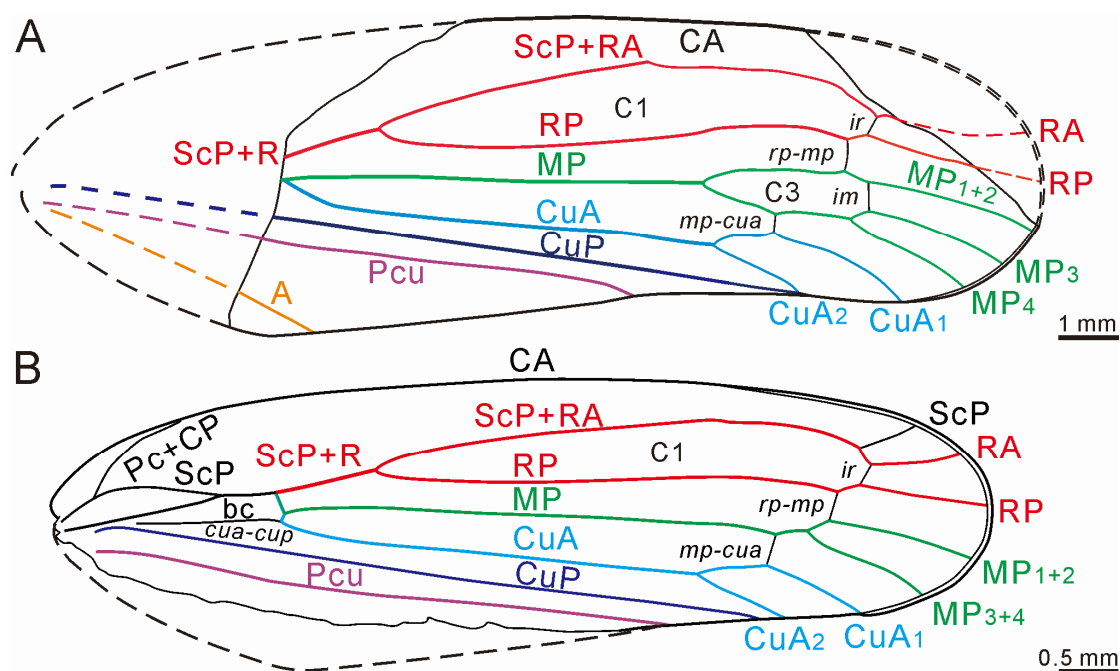


图 2 三工河组原沫蝉科两属种翅脉对比图

Fig. 2 Comparison of venation of two procercopids from the Sangonghe Formation

A. *Magniceropsis pingi* Zhang, Chen et Zhang, gen. et sp. nov.; AB. *Longuercopsis xinjiangensis* Zhang, Chen et Zhang, 2022.

nov. by their forking levels of CuA, which are generally more basal than MP. The genus *Titanocercopis* has larger tegmen with more MP branches than *M. pingi* gen. et sp. nov.

Acknowledgements We are grateful to the anonymous reviewer for their helpful comments and corrections on the manuscript. We also sincerely thank editors for improving the manuscript linguistically.

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