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贵州剑河八郎寒武系"清虚洞组"三叶虫
Duyunaspis Zhang and Qian *in* Zhou *et al*.,1977*

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提要 *Duyunaspis* Zhang and Qian *in* Zhou *et al*.,1977 是黔东、湘西北杷榔组掘头虫类三叶虫的重要分子。本文描述剑河八郎"清虚洞组"的 *Duyunaspis*,这些新材料的头鞍中部膨大且向前略有收缩,前颊类型面线,成虫具 10 个胸节;而杷榔组的 *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al*.,1977 头鞍桶状,背沟较平直,后颊类型面线,成虫 10 个胸节,二者明显不同。本文将"清虚洞组"的 *Duyunaspis* 定为一个新种:剑河都匀盾壳虫 *Duyunaspis jianheensis* sp. nov.。研究显示,*D. jianheensis* 与杷榔组的 *D. duyunensis* 具有形态相似性,后者可能为其祖先种。

关键词 *Duyunaspis* 三叶虫 "清虚洞组" 寒武系 贵州剑河

1 前 言

贵州剑河松山剖面寒武系"清虚洞组"含有大量三叶虫化石,经不断发掘,共有 8 科 15 属 17 种(王铭坤,2016),耸棒头虫目 7 属、褶颊虫目 6 属、莱得利基虫目 1 属及未定目的 *Burlingia* 1 属(杨兴莲等,2010;罗绣春等,2013,2014;孙宗元等,2013;王铭坤等,2014,2016;王铭坤、赵元龙,2016;Yuan and Ng,2014),其中 *Duyunaspis* 过去被描述为 *D.* cf. *duyunensis*(杨兴莲等,2010),罗绣春等(2014)也曾报道该组产有 *Duyunaspis*。*Duyunaspis* 由张文堂和钱义元建立(见周天梅等,1977),分布于黔东杷榔组(彭进,2009;闫巧洁等,2014)、"清虚洞组"(杨兴莲等,2010)以及湘西北杷榔组地层中(雷倩萍、彭善池,2014;McNamara *et al*.,2006;Lei,2016;Dai *et al*.,2017);有学者先后对其属征进行了补充与修订(钱义元、林焕令,见尹恭正、李善姬,1978;张文堂等,1980;雷倩萍、彭善池,2014;McNamara *et al*.,2006),及对模式种 *D. duyunensis* 做了个体发育研究(McNamara *et al*.,2006;Lei,2016;Dai *et al*.,2017)。雷倩萍和彭善池(2014)将 *Duyunaspis* 的一些种做了归并,认为 *Duyunaspis songtaoensis* Qian and Lin *in* Zhou *et al*.,1977,*Duyunaspis guzhangensis* Zhou *in* Zhou *et al*.,1977,*Duyunaspis briaris* Chien and Lin *in* Yin and Li *et al*.,1978,*Duyunaspis laevigatus* Qian and Lin *in* Zhang *et al*.,1980;*Duyunaspis obesis* Qian and Lin *in* Zhang *et al*.,1980,都是模式种 *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al*.,1997 的晚出异名,同时认为成虫有 9 个胸节,前颊类面线。Dai 等(2017)报道了 *D. duyunensis*10 个胸节的成虫,其面线类型在分节期 0—6 期为前颊类型,在分节期 7—8 期变为角颊类型,分节期 9 期至成虫期再变为后颊类型。本文通过对贵州剑河八郎松山剖面"清虚洞组"的 *Duyunaspis* 的研究,描述为 1 新种,即剑河都匀盾壳虫 *Duyunaspis jianheensis* sp. nov.,并对 *Duyunaspis* 的属征进行补充。

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2 地质背景

研究区位于贵州省黔东南州剑河县革东镇八郎村，出露的寒武系由老至新为留茶坡组顶部、牛蹄塘组、九门冲组、变马冲组、杷榔组、“清虚洞组”、凯里组、甲劳组、娄山关组(Zhao *et al*.，2012)(插图 1)。松山剖面位于革东镇屯州村西北面，与全球寒武系第 5 阶候选层型剖面——乌溜-曾家崖剖面相邻。

松山剖面“清虚洞组”属寒武纪黔东世都匀期地层，厚 272 m，由赵元龙等 2014 年测制，自上而下为：中厚层白云岩；灰色中厚层泥岩、泥质灰岩及灰黄色页岩；灰色中厚层至厚层灰岩，属于较深水的陆棚沉积为主的环境(杨兴莲等，2010)。

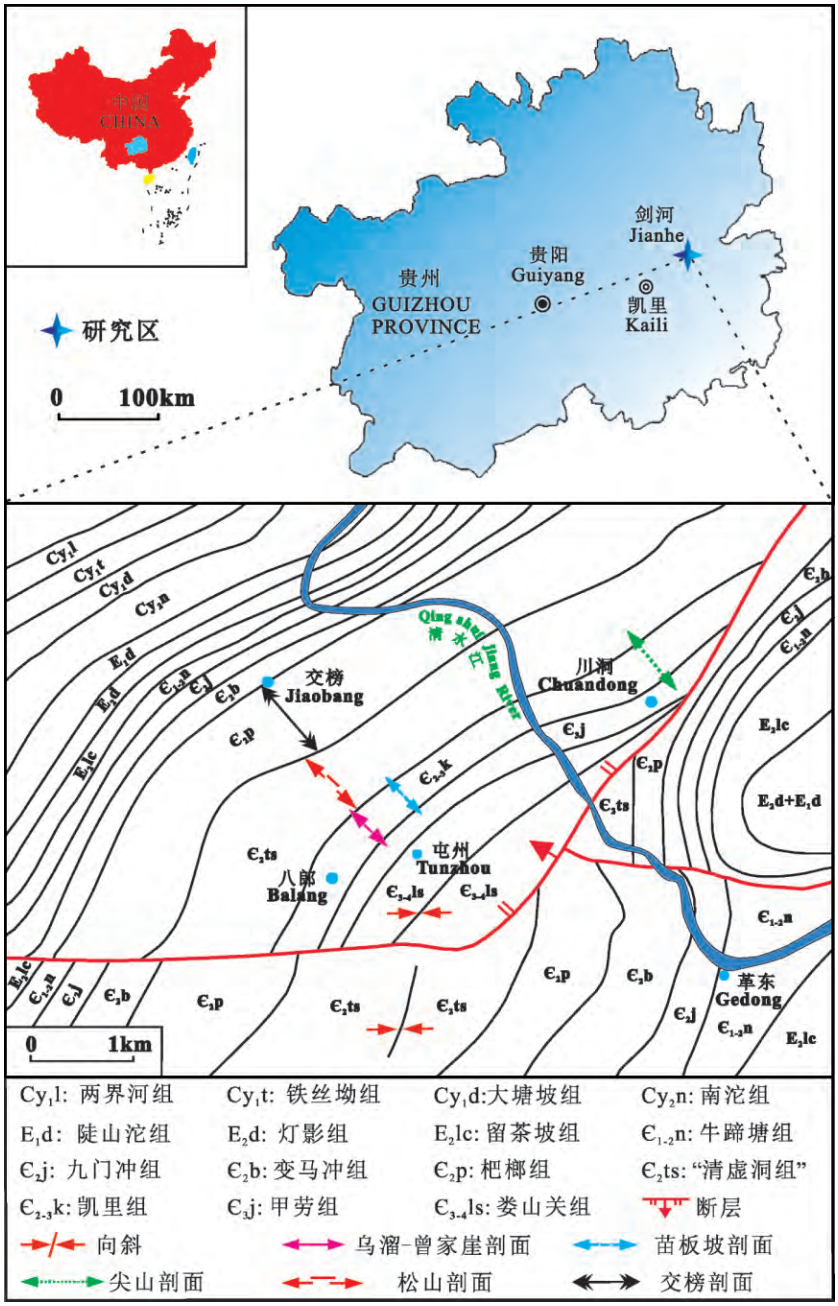

插图 1 松山剖面地理位置及地质图(据 Zhao *et al*.，2012)

Geological map and geographic map showing the location of the Songshan section(modified from Zhao *et al*.，2012)

松山剖面“清虚洞组”与黔北地区典型的岩性主要为鲕状灰岩夹豹皮状灰岩、白云质灰岩及白云岩和泥质白云岩的清虚洞组有所不同，故以“清虚洞组”来表示(张文堂等，1980；傅晓平等，2012；杨宇宁等，2012；罗绣春等，2014；王铭坤等，2014，2016；王铭坤、赵元龙，2016；刘玉娟，2015；张源等，2016；王

圆等，2017；陈婉怡等，2017）。

袁金良等在八郎一带“清虚洞组”内建立了两个化石带：上部为 *Protoryctocephalus wuxunensis* 带，下部为 *Arthricocephalites taijiangensis* 带（Yuan *et al*.，2011）。之后又将下部重新修订为 *Arthricocephalus jishouensis*-*Changaspis plana*（Yuan and Ng，2014；Yuan and Jorge，2015）。但在之后的采集及研究中，未在“清虚洞组”上部发现 *Protoryctocephalus wuxunensis*，而是采集到了大量的 *Protoryctocephalus arcticus*，认为此带难以成立（罗绣春等，2014），建议将此带拟建为 *Protoryctocephalus arcticus* 带（王铭坤等，2016；王铭坤、赵元龙，2016），笔者采纳这一意见。近来就 *Arthricocephalus* 的问题提出了一个新的观点，认为似节头虫亚属 *Arthricocephalus*（*Arthricocephalites*）Qian and Lin *in* Lu *et al*.，1974、漂游虫属 *Haliplanktos* Blaker and Peel，1997、似节头虫属 *Arthricocephalites* Qian and Lin *in* Lu *et al*.，1974 皆是 *Arthricocephalus* 的晚出异名，而过去归入 *Arthricocephalus chauveaui* 的有些标本应为 *Oryctocarella duyunensis*（彭善池等，2015；雷倩萍，2016；Peng *et al*，2017）。真正的 *Arthricocephalus chauveaui* 在“清虚洞组”中下部亦有分布，故 Zhao 等（2017）将杷榔组中上部及“清虚洞组”下部划为 *Arthricocephalus chauveaui* 带，将“清虚洞组”中上部划为 *Protoryctocephalus arcticus* 带。本文描述的 *Duyunaspis* 产于松山剖面“清虚洞组”上部 *Protoryctocephalus arcticus* 带（插图 2）。

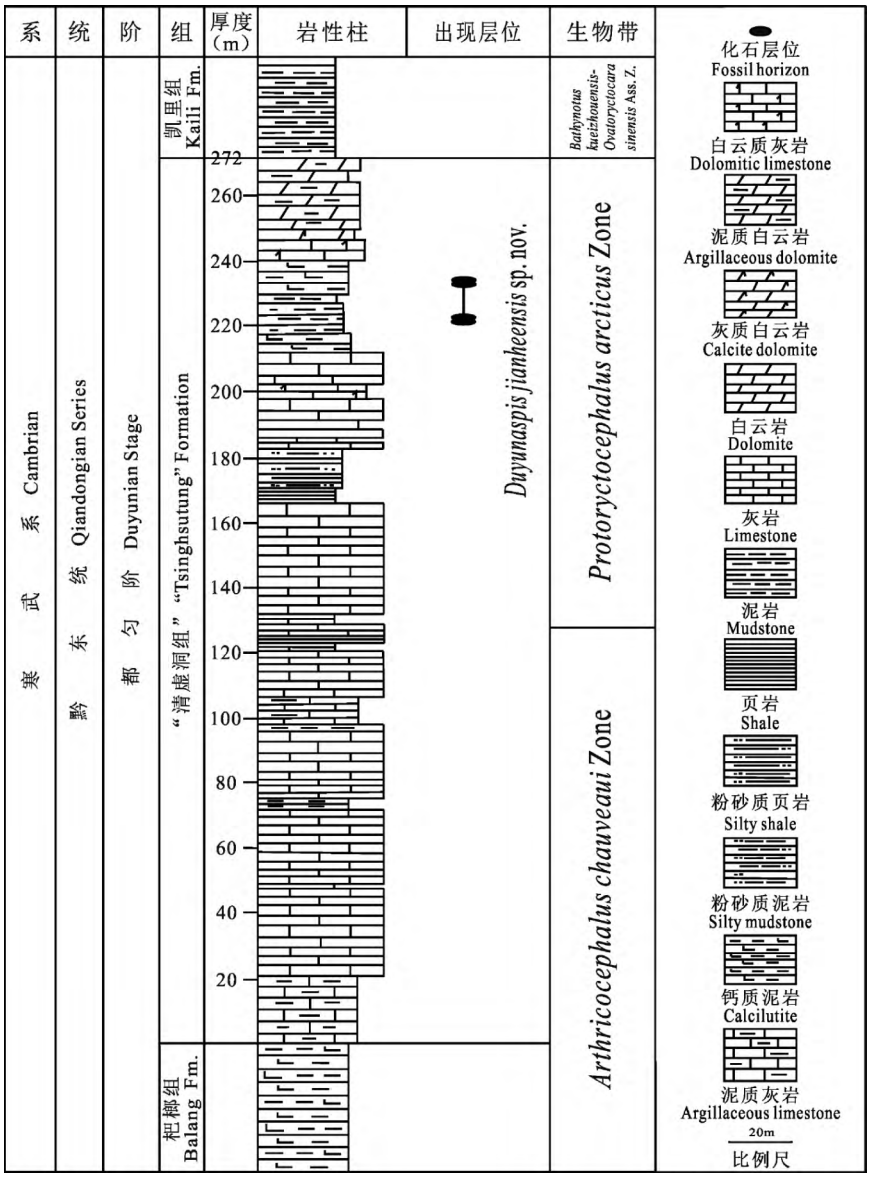

插图 2　松山剖面“清虚洞组”*Duyunaspis jianheensis* sp. nov. 地层分布图

Stratigraphic ranges of *Duyunaspis jianheensis* sp. nov. from the “Tsinghsutung Formation” of Songshan section（modified from Zhao *et al*.，2012）

3 系统古生物

耸棒头虫目 Order Corynexochida Kobayashi, 1935

掘头虫科 Family Oryctocephalidae Beecher, 1897

掘冠虫亚科 Subfamily Oryctocarinae Hupé, 1953

都匀盾壳虫属 Genus *Duyunaspis* Zhang and Qian *in* Zhou *et al*., 1977

1977 *Duyunaspis* Zhang and Qian *in* Zhou *et al*., 周天梅等, 131 页。

1978 *Duyunaspis* Zhang and Lin *in* Yin and Li, 尹恭正、李善姬, 443 页。

1980 *Duyunaspis* Zhang and Qian, 张文堂等, 273 页。

2006 *Duyunaspis* Zhang and Qian, McNamara *et al*., p. 7.

2009 *Duyunaspis* Zhang and Qian, 彭进, 91 页。

2014 *Duyunaspis* Zhang and Qian, 雷倩萍、彭善池, 354 页。

2016 *Duyunaspis* Zhang and Qian, Lei, p. 354.

2017 *Duyunaspis* Zhang and Qian, Dai *et al*., p. 527.

2017 *Duyunaspis* Zhang and Qian, Peng *et al*., p. 953.

模式种 *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al*., 1977

属征修订 对钱义元、林焕令(见尹恭正、李善姬, 1978)及雷倩萍(2014)对属征的描述进一步补充如下: 头鞍两侧近平行或略有膨大, 于第 1 对头鞍沟附近收缩; 具 4 对长坑状头鞍沟, 皆不与背沟相连, 且在头鞍中部不相连, 第 4 对模糊; 前颊类或后颊类面线; 成虫 9—10 个胸节。

讨论 *Duyunaspis* 由张文堂和钱义元建立(见周天梅等, 1977), 张文堂等(1980)将其置于 Feilongshaninae 亚科, 而 Whittington(1995)将其归为 Oryctocarinae 亚科, 雷倩萍(2014)认为 Feilongshaninae 亚科是 Oryctocarinae 亚科的晚出异名, 同意将 *Duyunaspis* 归为 Oryctocarinae 亚科。原始的属征描述为: 后颊类或角颊类面线, 胸节 7—8 节, 尾部后缘中部向上弯曲(张文堂、钱义元, 见周天梅等, 1977); 钱义元和林焕令(见尹恭正、李善姬, 1978)对属征作了修订, 将胸节数修改为 8 节; McNamara 等(2006)将成虫期面线类型修改为角颊型, 胸节数 7 节; 雷倩萍等(2014)修改属征为: 成虫胸节为 9 节, 尾后缘中部具缺刻或无。Dai 等(2017)将成虫面线类型修改为后颊类, 具 10 个胸节。

雷倩萍和彭善池(2014)依据种内差异或保存的差异, 认为 *Duyunaspis songtaoensis* Qian and Lin *in* Zhou *et al*., 1977, *Duyunaspis guzhangensis* Zhou *in* Zhou *et al*., 1977, *Duyunaspis briaris* Qian and Lin *in* Yin and Li, 1978, *Duyunaspis laevigatus* Qian and Lin *in* Zhang *et al*., 1980 是模式种 *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al*., 1977 的晚出异名, 并建立一新种 *Duyunaspis paiwuensis* Lei and Peng, 2014。加上本文所描述的 *Duyunaspis jianheensis* sp. nov., 目前 *Duyunaspis* 共有 3 个种。

剑河都匀盾壳虫(新种) *Duyunaspis jianheensis* sp. nov.

(插图 3)

2010 *Duyunaspis* cf. *duyunensis* Zhang and Qian *in* Zhou *et al*., 杨兴莲等, 316 页, 图版 3, 图 10。

词源 种名源自化石标本采集地贵州剑河(Jianhe)。

正模 标本 Q52-562, 完整背壳; 采自贵州剑河八朗松山剖面 220 m 处。

材料 205 块完整背壳。

种征 背壳长椭圆形。头盖亚梯形, 前端微凸; 头鞍中部膨大, 在 S1 附近向内微收缩; 4 对长坑状头鞍沟, 与背沟不相连, 第 4 对头鞍沟微弱。眼脊微弱; 眼叶大, 位置与 S1—S3 的区域相对应。前颊类面线。胸部 10 个胸节, 中轴宽。尾部 2—4 个轴节及一末叶, 尾后缘中部具一向内凹缺。

描述 背壳长椭圆形, 最大标本长 9.71 mm。头盖亚梯形。外边缘窄, 为一线状凸起, 边缘沟深。头鞍长桶状, 横向较宽且中部明显向外膨凸: 在 S1 处微向内收敛并向前扩大, 在 S2 处或附近达到最宽后向前微缩, 前端宽圆, 具 4 对头鞍沟, 与背沟皆不相连, S1—S3 为坑状, 横向平伸, S4 为不明显的坑状, S1—S4 中间不相连。颈沟平直, 两端加深呈长坑状。面线成虫期为前颊类型: 前支短, 由与 S3 相对应的位置处先向外侧方前伸, 再向内弯曲; 后支由与 L1 相对应的位置处向后微斜伸, 交于头部侧边缘。眼脊与背沟相连, 向后斜伸。眼叶较长, 约为头鞍长度的 1/2, 向外侧弯曲, 眼叶的前端和后端分别与 S3 和 S1 相对应。后侧翼横向宽, 后边缘沟内侧较深, 向外变浅, 近平伸并略向前斜。固定颊窄, 眼区部分仅为头鞍宽度的 1/3 左右。活动颊窄, 颊角圆润。

成虫 10 个胸节, 轴部较宽, 略宽于两侧的肋叶。肋沟深, 位于肋节中后部。肋节末端尖, 三角形。

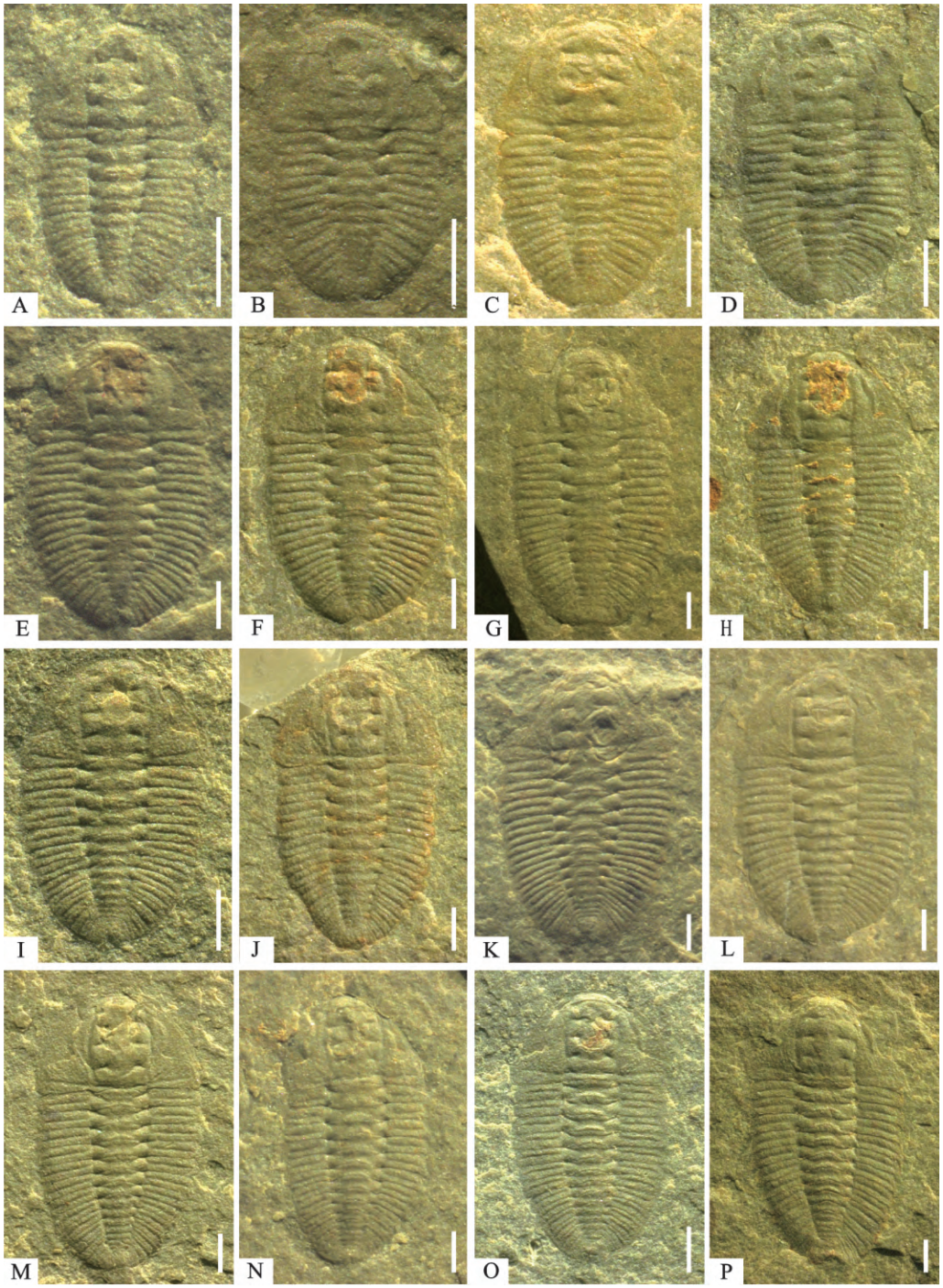

插图 3　松山"清虚洞组"*Duyunaspis jianheensis* sp. nov.

Duyunaspis jianheensis sp. nov. from the "Tsinghsutung Formation" at the Songshan section

分节期及成虫期背壳,化石标本均保存于贵州大学贵州省古生物研究中心。所有比例尺都为 1 mm。A. **分节期** 4 **期背壳,标本编号**:Q52-2221;B. **分节期** 5 **期背壳,标本编号**:Q51-1882;C—D. **分节期** 6 **期背壳,标本编号**:C. Q51-5001,D. Q52-1671;E—H. **分节期** 7 **期背壳,标本编号**:E. Q52-1418,F. Q51-1105,G. Q52-1617,H. Q52-3665;I—L. **分节期** 8 **期背壳,标本编号**:I. Q52-1785,J. Q52-255,K. Q51-1142,L. Q52-1091;M. **分节期** 9 **期背壳,标本编号**:Q52-1199;N—P. **成虫期背壳**(10 **个胸节**),**标本编号**:N. Q51-457,O. Q52-562,P. Q52-1306。

Meraspides and holaspides of *Duyunaspis jianheensis* sp. nov. from the "Tsinghsutung Formation" at Balang village, Jianhe County, Guizhou Province. All specimens are deposited in Guizhou Research Centre for Palaeontology, Guizhou University. Scale bars=1 mm. A. Meraspid degree 4 exoskeletons, specimen No.: Q52-2221; B. Meraspid degree 5 exoskeletons, specimen No.: Q51-1882; C-D. Meraspid degree 6 exoskeletons, specimen Nos.: C. Q51-5001, D. Q52-1671; E-H. Meraspid degree 7 exoskeletons, specimen Nos.: E. Q52-1418, F. Q51-1105, G. Q52-1617, H. Q52-3665; I-L. Degree 8 exoskeletons, specimen Nos.: I. Q52-1785, J. Q52-255, K. Q51-1142, L. Q52-1091; M. Degree 9 exoskeletons, specimen No.: Q52-1199; N-P. Holaspides exoskeletons, specimen Nos.: N. Q51-457, O. Q52-562, P. Q52-1306.

尾部小，尾轴具 4 个轴节及一个末叶，后缘中部有一向内凹缺。

比较　本种与产自杷榔组的 *D. duyunensis* 很相似，主要的区别是前者的面线是前颊类，而后者为后颊类。两者详细的对比见下文讨论。

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4　*Duyunaspis jianheensis* sp. nov. 个体发育

研究标本包括分节期 4 期至成虫期，分节期 4 期之前的标本尚未发现。在 205 块标本中选取 97 块保存较好的标本做了个体发育序列观察（插图 4）。

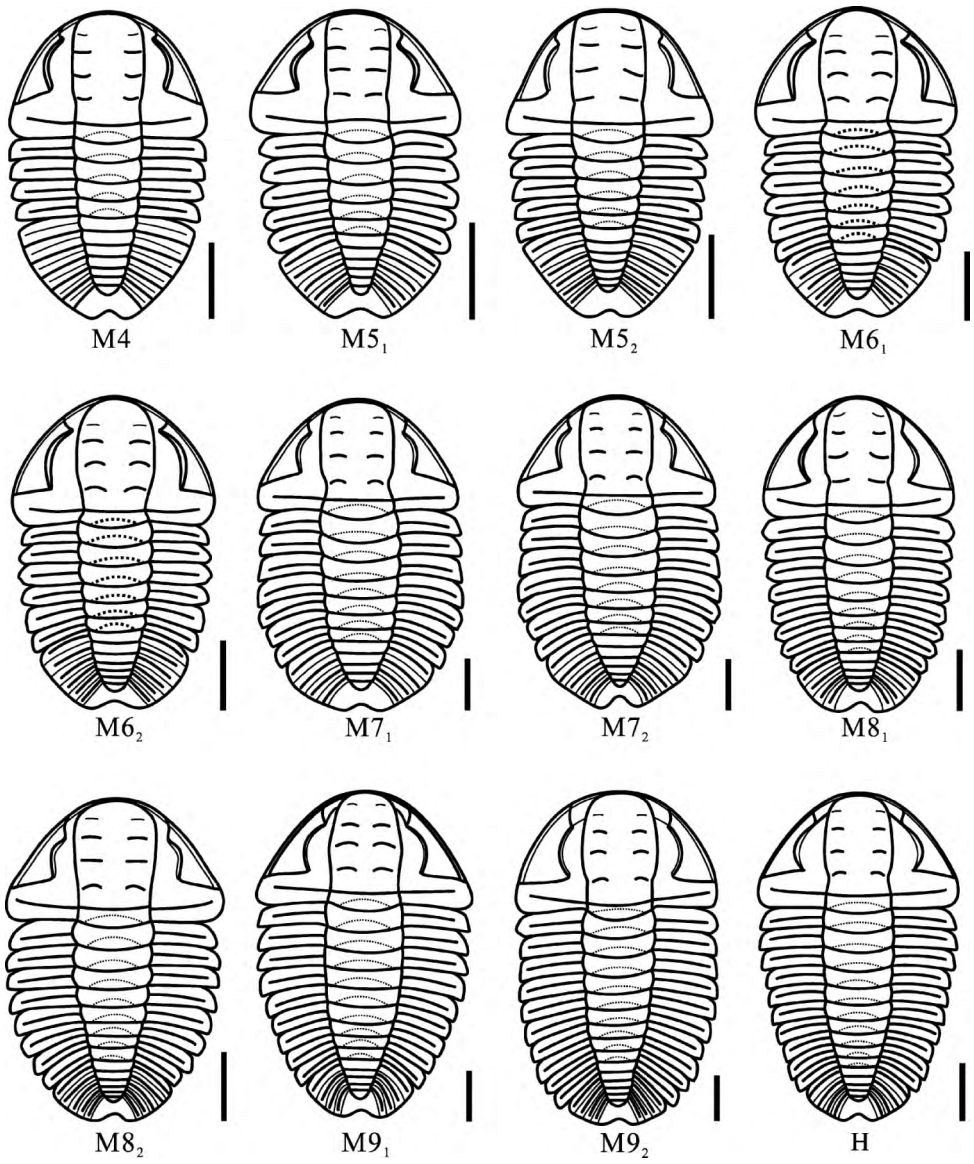

插图 4　*Duyunaspis jianheensis* sp. nov. 个体发育序列复原图

Reconstruction of the ontogeny of *Duyunaspis jianheensis* sp. nov. based on the specimens in Fig. 3

M4–M10. 分节期 4 期—分节期 10 期；H. 成虫期。所有比例尺都为 1 mm。

M4–M10. degree 4 – degree 10; H. holaspide. Scale bars = 1 mm

（1）分节期

分节期 4 期（M4）：仅有 1 块标本。背壳长椭圆形，长 3.13 mm。头盖亚梯形。前边缘窄，外边缘呈脊状，没有内边缘。头鞍长桶状，背沟两侧近平行。见 3 对坑状头鞍沟，S1 与背沟相连（可能是由于保存原因），S2、S3 未与背沟相连。颈环（L0）纵向长度比 L1 要短，颈沟清晰。前颊类型面线，面线后支于 S1 与 S2 中间向后微斜伸。眼叶位于头鞍侧叶 L2 和 L4 之间，眼区最大宽度约为头鞍宽度的 1/2。后侧翼纵向短，约为 L1 纵向的长度，其横向

较宽。后边缘沟向前微斜伸，未延伸至侧边缘。后边缘纵向短横向宽。胸部 4 个胸节，中轴横向宽度大于肋区，内沟清晰，保存有关节半环。尾部大，具 7 个轴节，尾边缘中部见一凹缺。

分节期 5 期（M5）：有 1 块标本。背壳长椭圆形，长 3.21 mm。头部保存不清晰，头鞍长桶状，背沟两侧近平行，除多一胸节（5 个胸节）以外，与分节期 4 期相似（插图 5）。

分节期 6 期（M6）：共 2 块标本。长 3.73—4.24 mm。头鞍长桶状，于 S1 和 S2 中间处膨大。见 4 对坑状头鞍沟，第 4 对（S4）头鞍沟模糊，S1—S3 长坑状，皆不与背沟相连。颈环（L0）横宽纵短，颈沟清晰。前颊类型面线，形状与分节期 5 期相似。胸部 6 个胸节。尾部小，具 6 或 7 个轴节，尾边缘中部具一凹缺。

分节期 7 期（M7）：共 9 块标本。背壳长椭圆形，长 4.30—6.38 mm。头盖亚梯形。前边缘窄，外边缘呈脊状，没有内边缘。胸部 7 个胸节。尾部小。具 5 或 6 个轴节。与分节期 6 期相似。

分节期 8 期（M8）—分节期 9 期（M9）：除胸节的增加外，整体与分节期 7 期相似。

（2）成虫期

共 46 块标本。背壳长椭圆形，长 5.33—9.71 mm。前颊类面线，具 10 个胸节，尾部小，具 3 或 4 个轴节。与分节期 9 期相似。

在分节期 4 期（M4）至成虫期（H），*D. jianheensis* 整体变化不大，背壳整体呈长椭圆形，长度在 3.13—9.71 mm 之间，主要的变化有：（1）头部在分节 4 期（M4）至成虫期（H），长宽比逐渐增大，成虫期约为 1/2；（2）头鞍在分节 4 期（M4）到分节 5 期（M5）呈长柱状，背沟近似平行，在分节 6 期（M6）至成虫期（H）于中部明显膨大，且在前端微缩；（3）头鞍沟在分节 4 期（M4）至成虫期（H）都不与背沟相连，S1—S3 都较清晰，但 S4 始终较为模糊不清；（4）面线在分节 4 期（M4）至成虫期（H）都为前颊类型，面线前支在与 S3 相对应的位置向前斜伸然后收缩，交头部前缘，面线后支交头部后侧边缘，位置与 L1 相对；（5）眼脊在前期都很微弱，不清晰，在分节 9 期（M9）至成虫期（H）逐渐变得清晰；（6）尾后缘中部在分节 4 期（M4）至成虫期（H）都具有一向内的凹缺。

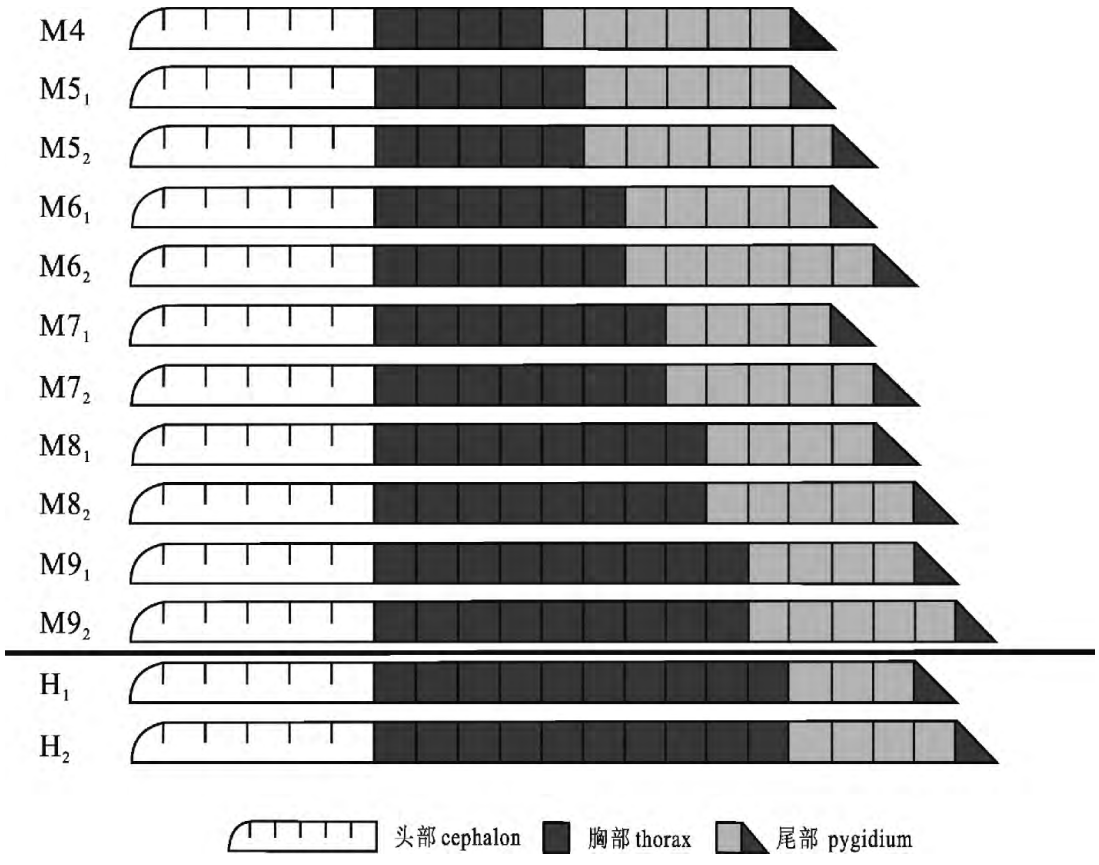

插图 5　*Duyunaspis jianheensis* sp. nov. **体节增长模式图**

Trunk segmentation schedule of *Duyunaspis jianheensis* sp. nov.

5 讨 论

D. jianheensis 与湘西杷榔组的 *D. duyunensis* 比较相似(见插图 6):头部的形态大致相似;鞍沟的形状、位置及其与背沟之间相连的情形,几乎并无太大区别;成虫期的胸节数都为 10 节;尾部形态相似。*D. jianheensis* 与 *D. duyunensis* 主要的区别是:*D. duyunensis* 的头部呈半圆形,*D. jianheensis* 的头部略向前凸;*D. jianheensis* 的头鞍于中部明显膨大,而 *D. duyunensis* 虽略有膨大,但其膨大程度较小;两者眼叶都很大,位置与 S1—S3 相对应,*D. jianheensis* 的眼叶较 *D. duyunensis* 更向外凸出;*D. duyunensis* 被认为成虫期是前颊类面线(雷倩萍、彭善池,2014;Lei,2016),而 Dai 等(2017)发现的同为湘西杷榔组的 *D. duyunensis* 成虫期为后颊类面线,*D. jianheensis* 的面线后支交于侧边缘,位置大致与 S1 相对,为明显的前颊类面线。

D. duyunensis 的产出层位较低,可能为 *D. jianheensis* 的祖先种,演化趋势主要是面线由后颊类变为前颊类。*D. duyunensis* 的面线在个体发育过程中由早期的前颊类变为角颊类,直至最后的后颊类(Dai *et al.*,2017),而 *D. jianheensis* 在分节 4 期(M4)至成虫期(H)一直都是前颊类型面线,面线的演化保持了 *D. duyunensis* 分节期早期的类型。新种与 *D. paiwuensis* 的主要区别在于后者头部相对较为宽短,头鞍较为狭长,固定颊眼区较宽,胸部分节较少。目前在剑河地区"清虚洞组"尚未发现 *D. paiwuensis*。*Duyunaspis* 三个种之间的主要区别,见下表(表Ⅰ)。

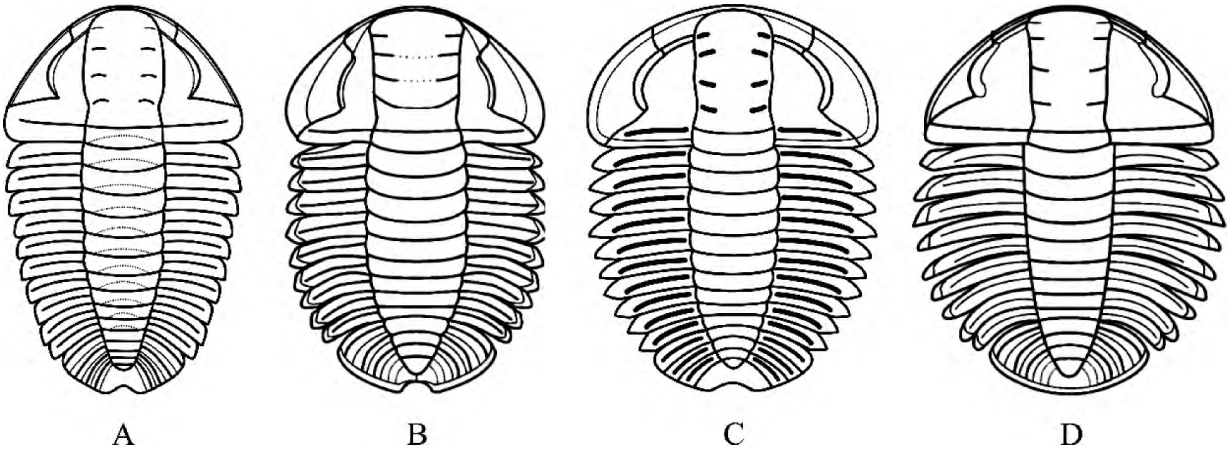

插图 6 *Duyunaspis jianheensis* sp. nov.,*Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al.*,1977 和 *Duyunaspis paiwuensis* Lei and Peng,2014 示意图

Reconstruction of *Duyunaspis jianheensis* sp. nov., *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al.*, 1977 and *Duyunaspis paiwuensis* Lei and Peng, 2014

A. *D. jianheensis* sp. nov.(据正模标本 Q52-562 进行复原),B. *D. duyunensis*(据雷倩萍、彭善池,2014),C. *D. duyunensis*(据 Dai *et al.*, 2017),D. *D. paiwuensis*(据雷倩萍、彭善池,2014)

A. *D. jianheensis* sp. nov. (based on the holotype Q52-562), B. *D. duyunensis* (after Lei and Peng, 2014), C. *D. duyunensis* (after Dai *et al.*, 2017), D. *D. paiwuensis* (after Lei and Peng, 2014)

表Ⅰ ***Duyunaspis jianheensis* sp. nov.,*Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al.*, 1977 和 *Duyunaspis paiwuensis* Lei and Peng, 2014 对比表**

Comparison of *Duyunaspis jianheensis* sp. nov., *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al.*, 1977 and *Duyunaspis paiwuensis* Lei and Peng, 2014

名称	*D. duyunensis*	*D. jianheensis*	*D. paiwuensis*
头部	头部半椭圆形	头部半椭圆形,略向前凸	头部扁、半椭圆形
	头鞍两侧近平形	头鞍中部明显膨大	头鞍长柱状,两侧近平行
	后颊类面线	前颊类面线	前颊类面线
胸节	10 个胸节	10 个胸节	9 个胸节
尾部	3 个轴环+1 个末叶	4 个轴环+1 个末叶	3 个轴环+1 个末叶

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DUYUNASPIS ZHANG AND QIAN *IN* ZHOU *ET AL.*, 1977(TRILOBITA) FROM THE "TSINGHSUTUNG FORMATION"(SERIES 2, STAGE 4) OF EASTERN GUIZHOU, SOUTH CHINA

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Key words *Duyunaspis*, trilobite, "Tsinghsutung Formation", Cambrian, Jianhe County

Abstract

A new oryctocephalid species *Duyunaspis jianheensis* sp. nov. is described from the Cambrian "Tsinghsutung Formation" (Series 2, Stage 4) at Songshan, Jianhe, eastern Guizhou, South China, revealing that the genus *Duyunaspis* ranges up from the slightly older Balang Formation (Cambrian Stage 4). The Balang Formation is widely exposed in the border area between eastern Guizhou and western Hunan and is dominated by oryctocephalids including *Duyunaspis*. *Duyunaspis jianheensis* sp. nov. is characterized by having a glabella that is more or less expanded at its mid-lengtha, a proparian suture, and a thorax with 10 segments in holaspids. Detailed exploration of ontogeny of *D. jianheensis* sp. nov. shows that the new species seems to be a descendent of *Duyunaspis duyunensis* of the Balang Formation.

SYSTEMATIC PALAEONTOLOGY

Order Corynexochida Kobayashi, 1935

Family Oryctocephalidae Beecher, 1897

Subfamily Oryctocarinae Hupé, 1953

Genus *Duyunaspis* Zhang and Qian *in* Zhou *et al.*, 1977

Type species *Duyunaspis duyunensis* Zhang and Qian *in* Zhou *et al.*, 1977

***Duyunaspis jianheensis* sp. nov.**

(Text-figs. 3)

Etymology After the Jianhe County, from where the fossils were collected.

Materials A total of 205 complete specimens from the same quarry, all are exoskeletons.

Holotype Q52-562, complete exoskeletons from the "Tsinghsutung Formation" at Balang village, Jianhe County, Guizhou.

Diagnosis Cephalon semi-elliptical, glabella more or less expanded at its mid-length; proparian suture; thorax with ten segments; and posterior margin of pygidium with broad indentation medially.

Description Exoskeleton oval in outline. Anterior border extremely narrow (sag.), of slightly convexity, defined by deeply border furrow. Glabella large, relatively wide (tr.), more or less expanded at mid-length; with four pairs of pit-like glabellar furrows, and not extending to dorsal furrows and not connected by transglabellar furrows; S4 short and faint. Occipital furrow deep and straight, pit-like on both ends. Eye ridge distinct, extending backward obliquely. Palpebral lobe large, crescentic in outline, extending between S1 and S3. Facial suture proparian with anterior branche short and slightly divergent anteriorly and posterior branch extending slightly obliquely outward, cutting lateral margin. Posterior border furrow deep, extending outward and slightly forward. Fixigenal narrow (sag.), about one-third of glabella width. Thorax with ten segments with axis rings wider than pleura. Pygidium small, tapering posteriorly and having an indentation at posterior margin medially.