

# A new species of *Birka* Malaise (Hymenoptera: Tenthredinidae) from Lishui, China

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**Abstract:** A new species, *Birka jiulong* Liu, Li & Wei **sp. nov.**, is described, which belongs to subgenus *Lineobirka* in family Selandriidae. The major morphological characteristics and distribution of *Birka* are briefly discussed. A key to the species from China is provided.

**Key words:** Selandriinae; sawflies; taxonomy; key

## 中国丽水柄臀叶蜂属一新种（膜翅目：叶蜂科）

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**摘要:** 记述来自中国丽水的柄臀叶蜂属 *Birka* Malaise, 1944 线柄臀叶蜂亚属 *Lineobirka* 1 新种: 九龙柄臀叶蜂 *Birka jiulong* Liu, Li & Wei **sp. nov.**, 文中简述了柄臀叶蜂属的主要鉴别特征与分布状况, 编制了柄臀叶蜂属中国已知种的检索表。

**关键词:** 蕨叶蜂亚科; 叶蜂; 分类; 检索表

## Introduction

*Birka* Malaise, 1944 is a small genus of Selandriinae in Tenthredinidae. *Birka cinereipes* (Klug, 1816) is the type species of *Birka*. The genus contains two subgenera namely *Birka* and *Lineobirka*. *The World Catalog of Symphyta (Hymenoptera)* recorded five species of *Birka* and twelve species of *Lineobirka* (Blank *et al.* 2009, 2012; Taeger *et al.* 2010). Only one species, *B. nordica* D. R. Smith, 1969 is distributed in North America. Three species, *B. alpina* Lacourt,

Accepted 19 December 2019. Published 25 September 2020. Published online 29 August 2020.

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1990, *B. annulitarsis* (Thomson, 1870) and *B. cinereipes* (Klug, 1816) are found in Europe. Thirteen species distributed in East Asia, and East Asia may be the distribution center of this genus. In China, there are twelve known species in this genus, namely *B. albotegula* Wei, 1997, *B. elongata* Wei, 1997, *B. hupingshana* Wei, 1997, *B. koreana* (Takeuchi, 1941), *B. lineata* Wei & Nie, 1997, *B. longithecata* Wei, 1997, *B. ootheca*, Wei, 1997, *B. plata* Wei, 1997, *B. punctiformis* Wei, 1997, *B. sulcata* Wei, 1997, *B. tyllilla* Wei, 1997 and *B. yangangia* Wei, 1997 (Wei & Nie 1997; Wei *et al.* 2006).

Here, a new species from Lishui City in Zhejiang Province, China is described, and a key to the species of this genus in China is provided.

## Material and methods

The specimens were examined with a Motic-SMZ-171 stereomicroscope. Adults images were taken with a Nikon D700 digital camera and a Leica Z16APO. The genitalia were examined with a Motic BA410E microscope, and images of the genitalia were taken with a Motic Moticam Pro 285A. The series of images produced were montaged using Helicon Focus (HeliconSoft, Kharkiv, Ukraine) and further processed with Adobe Photoshop CS 11.0.

Morphological descriptions of this new species is based on the holotype. The terminology of genitalia follows Ross (1945) and that of general morphology follows Viitasaari (2002). For a few terms, including middle fovea, lateral fovea, and lateral walls, we follow Takeuchi (1952).

Specimens examined in this study are deposited in the Asian Sawfly Museum, Nanchang, China (ASMN), China, including the holotype and some paratypes of the new species. Other paratypes of the new species is deposited in the Scientific Research and Management Center of East China Pharmaceutical Botanical Garden, Lishui, Zhejiang, China (formerly LSAF).

Abbreviations. OOCL — The distance between a lateral ocellus and the occipital carina, or the hind margin of the head where this carina would be if it was developed (Benson 1954); OOL — The shortest distance between an eye and a lateral ocellus; POL — The distance between the mesal margins of the two lateral ocelli.

## Taxonomy

### *Birka* Malaise, 1944

Diagnosis. Clypeus truncate or almost truncate; mandibles short and symmetrically bidentate, apical tooth roundly bent; malar space no longer than the diameter of median ocellus; temple short and contracted, occipital carina absent; eyes large, inner margins convergent downward in frontal view, distance between eyes no longer than height of eyes in lateral view; frons elevated slightly, without frontal walls; lateral fovea round and closed; antenna short, antennomere 2 as wide as long, antennomere 3 longer than antennomere 4, apical 4 antennomeres not strongly reduced in length; ventral corner of propleura acute and remote to each other; posterior half of mesoscutal middle lobe without distinct depression and middle carina; epicnemium broad, epicnemial suture distinct, upper part not reversed; mesepimeron without middle carina; inner apical spur of fore tibia bifurcate; metatarsomere 1 shorter than combined length of metatarsomeres 2–5; claw small and short, without basal lobe,

inner tooth very small or absent; forewing: apex of vein C enlarged; vein M parallel to vein 1r-m, or slightly convergent with each other, base of vein Rs+M weakly bent backward, cu-a meeting cell 1M at apical third, anal cross-vein absent; hind wing with anal cell shortly petiolate; apex of ovipositor sheath sharp; lancet with sub-hyaline stripe, without distinct suture, with 6–8 serrulae and 5–9 small alaspicula; male hind wing without marginal vein, abdomen without sexual furrow, valvaceps of penis valve distinctly oblique, with a short but distinct transverse lobe.

### Key to species of *Birka* Malaise in China

1. Female ..... 2
- Male ..... 13
2. Tegula entirely black ..... 3
- Tegula partly black or non-black ..... 8
3. Postocellar area 3.0 times as wide as long ..... 4
- Postocellar area less than 3.0 times as wide as long ..... 5
4. Head with dense hair warts; basal 2/3 of hind tibia yellowish brown; anterior of clypeus gently emarginate; lateral furrows dot-like, smaller than lateral ocelli; forewing with cell 2Rs longer than cell 1Rs. China (Shaanxi) ..... *B. tylilla* Wei
- Head smooth and shiny, without hair warts; basal 4/5 of hind tibia white; clypeus truncate; lateral furrows round pit-like, very deep, about as large as lateral ocelli; forewing with cell 2Rs shorter than cell 1Rs. China (Zhejiang) ..... *B. punctiformis* Wei
5. Apical margin of pronotum black brown or white; cenchri distance shorter than breadth of a cenchrus ..... 6
- Apex of pronotum white, and with a black spot at centre; cenchri distance as long as or longer than breadth of a cenchrus ..... 7
6. Apical margin of pronotum black brown; postocellar area 2.0 times as wide as long; interocellar furrow and postocellar furrow shallow; vein M in forewing parallel vein 1m-cu; petiole of hind anal cell 0.3 times as long as vein cu-a. China (Heilongjiang, Inner Mongolia, Hebei, Beijing, Shanxi); Korea, Siberia or Russia ..... *B. koreana* (Takeuchi)
- Apical margin of pronotum white; postocellar area 2.5 times as wide as long; interocellar furrow and postocellar furrow deep; forewing with vein M and vein 1m-cu convergent toward stigma; petiole of hind anal cell dot-like. China (Zhejiang) ..... *B. yandangia* Wei
7. Middle fovea smaller than lateral fovea, closed, not connected to frons; anterior wall of frons notched medially; postocellar area more than 2.0 times as wide as long; cenchri distance longer than breadth of a cenchrus; forewing with cell 2Rs significantly shorter than cell 1Rs; cross-vein 2r joining cell 2Rs at apical 0.5; in dorsal view, base of sheath constricted strongly, subbase enlarged strongly, and toward apex become sharp suddenly. China (Qinghai) ..... *B. elongata* Wei
- Middle fovea larger than lateral fovea, inverted T-shaped at bottom, connected to frons; anterior wall of frons not notched medially; postocellar area less than 2.0 times as wide as long; cenchri distance as long as breadth of a cenchrus; forewing with cell 2Rs slightly shorter than cell 1Rs; cross-vein 2r joining cell 2Rs at apical 0.25; in dorsal view, sheath tapering from base to apex. China (Beijing, Inner Mongolia, Jilin) ..... *B. lineata* Wei & Nie
8. Clypeus truncate; lateral furrows fine and long ..... 9
- Anterior of clypeus gently emarginate; lateral furrows broad and short, dot-like ..... 11
9. Interocellar furrow broad and deep; postocellar area with clearly mesosulcus; membrane region of abdominal tergum 1 small. China (Hunan, Guizhou) ..... *B. sulcata* Wei
- Interocellar furrow broad and shallow or fine and shallow; postocellar area without mesosulcus or with weak

- mesosulcus; membrane region of abdominal tergum 1 large ..... 10
10. Middle fovea transverse groove-like; postocellar area 1.8 times as wide as long; interocellar furrow fine; antennomere 3 approximately 1.4 times as long as antennomere 4. China (Zhejiang) ..... *B. jiulong* Liu, Li & Wei **sp. nov.**
- . Middle fovea round; postocellar area 1.5 times as wide as long; interocellar furrow broad; antennomere 3 approximately 1.8 times as long as antennomere 4. China (Fujian, Shaanxi, Guizhou) ..... *B. ootheca* Wei
11. Outer margin of tegula brown, and the rest black; middle fovea transverse curved-like; interocellar furrow fine and deep; median mesoscutal groove deep; cenchri distance as long as breadth of a cenchrus. China (Hunan) ..... *B. hupingshana* Wei
- . Tegula white or yellowish brown; middle fovea round or subround; interocellar furrow broad and shallow or absent; median mesoscutal groove shallow; cenchri distance shorter than breadth of a cenchrus ..... 12
12. Tegula white, metatarsomere 1 yellowish-brown; middle fovea round, as large as lateral fovea; interocellar furrow broad and shallow; postocellar area 3.2 times as wide as long. China (Zhejiang, Shanghai) ..... *B. longithea* Wei
- . Tegula yellowish-brown, metatarsomere 1 black; middle fovea subround, larger than lateral fovea; interocellar furrow absent; postocellar area about 2.0 times as wide as long. China (Anhui, Hunan) ..... *B. plata* Wei
13. Tarsal claw with inner tooth ..... 14
- . Tarsal claw without inner tooth ..... 15
14. Postocellar area less than 2.0 times as wide as long; interocellar and postocellar furrow shallow, lateral furrows fine and long; antennomere 3 approximately 1.3 times as long as antennomere 4; cenchri distance as long as breadth of a cenchrus; forewing with vein M parallel with vein 1m-cu ..... *B. lineata* Wei & Nie
- . Postocellar area 2.5 times as wide as long; interocellar and postocellar furrow deep, lateral furrows broad and short; antennomere 3 approximately 1.5 times as long as antennomere 4; cenchri distance shorter than breadth of a cenchrus; forewing with vein M and vein 1m-cu convergent toward stigma ..... *B. yandangia* Wei
15. Tegula entirely black; postocellar area 2.0 times as wide as long ..... *B. koreana* (Takeuchi)
- . Tegula partly black or non-black; postocellar area less or more than 2.0 times as wide as long ..... 16
16. Anterior of clypeus gently emarginate; postocellar area 3.2 times as wide as long; middle fovea round ..... *B. longithea* Wei
- . Clypeus truncate; postocellar area less than 3.0 times as wide as long; middle fovea transverse groove-like ..... 17
17. Postocellar area slightly elevated, 1.5 times as wide as long; lateral furrows short; antennomere 3 1.6 times as long as antennomere 4; apical of antennomeres 3–8 with spiny hairs; forewing with vein R+M dot-like. China (Chongqing) ..... *B. albotegula* Wei
- . Postocellar area distinctly elevated, more than 1.5 times as wide as long; lateral furrows long; antennomere 3 less than 1.6 times as long as antennomere 4; apical of antennomeres 3–8 without spiny hairs; forewing with vein R+M distinct, and line-like ..... 18
18. Most parts of tegula black; postocellar area 2.2 times as wide as long, interocellar furrow fine, lateral furrows slightly shallow ..... *B. jiulong* Liu, Li & Wei **sp. nov.**
- . Most parts of tegula white to pale yellowish; postocellar area 1.6 times as wide as long, interocellar furrow broad, lateral furrows deep ..... *B. sulcata* Wei

***Birka jiulong* Liu, Li & Wei sp. nov.** (Figs. 1–15)

Female. Body length 6.0 mm (6.0–7.0 mm). Body black; labrum black brown; most parts of pronotum, most parts of tegula, apex of all coxae, ventral sides of hind trochanter, most parts of ventral fore femur, apex of middle and hind femora, most parts of all tibiae, most parts

of ventral fore tarsomeres, ventral sides of mesotarsomeres 1–2, cenchrus yellowish white. Wings semihyaline toward apex, base of forewing with brownish smoky macula, stigma and veins largely black brown (Fig. 1).

Body smooth and shiny, without distinct puncture or microsculpture.



Figures 1–15. *Birka jiulong* Liu, Li & Wei **sp. nov.** 1, 3, 4, 6, 8–10, 12, 13. ♀, holotype; 2, 5, 7, 14, 15. ♂, paratype. 1. Female adult, dorsal view; 2. Male adult, dorsal view; 3. Head of female, dorsal view; 4. Head of female, frontal view; 5. Head of male, frontal view; 6. Antenna of female, lateral view; 7. Antenna of male, lateral view; 8. Mesopleuron and metapleuron of female; 9. Ovipositor sheath, dorsal view; 10. Ovipositor sheath, lateral view; 11. Subgenital plate, ventral view; 12. Lanceet; 13. Lamnium; 14. Gonoforceps; 15. Penis Valve.

Base of labrum elevated distinctly, and apex rounded; clypeus large, truncate at apex; malar space 0.2 times as long as diameter of median ocellus; inner margins of eyes convergent downward in frontal view, distance between eyes 1.5 times as long as height of eyes (Fig. 4). Middle fovea transverse groove-like, shallow; lateral fovea round, slightly deep; frons not elevated, anterior ridge and lateral ridge low and obtuse; interocellar furrow fine and shallow, postocellar furrow broad and shallow; POL : OOL : OCL = 0.9 : 1.0 : 0.7; postocellar area distinctly elevated, about 1.8 times as wide as long, mesosulcus faint, lateral furrows fine and long, divergent backward; in dorsal view, vertex about 0.3 times as long as eyes, inner margins of eyes divergent (Fig. 3). Antenna short, slightly longer than breadth of head, antennomere 3 approximately 1.4 times as long as antennomere 4 and approximately 4.2 times as long as broad, antennomere 8 approximately 1.5 times as long as broad (Fig. 6). Median mesoscutal groove slightly shallow and broad; mesoscutellum without middle ridge, length equal to width, lower than top of mesonotum in lateral view; mesoscutellum appendage about 0.3 length of scutellum, without middle ridge; cenchri distance about 0.6 times as long as breadth of a cenchrus. Protarsomere 1 as long as following 3 tarsomeres together; inner apical spur of hind tibia 0.4 times as long as metatarsomere 1, hind tibia 1.4 times as long as hind tarsus, metatarsomere 1 about 0.8 times as long as following 4 tarsomeres together; tarsal claw with very small inner tooth. Forewing with vein M subparallel with vein 1m-cu; cross-vein cu-a joining cell 1M at basal 0.7, cross-vein 2m-cu joining cell 2Rs at basal 0.2, cell 2Rs 0.8 times as long as cell 1Rs; petiole of hind anal cell 0.5 times as long as vein cu-a. Ovipositor sheath 1.3 times as long as metatarsomere 1 and 0.7 times as long as front tibia, apical sheath 1.5 times as long as basal sheath; in lateral view, sheath almost truncate at apex (Fig. 10); in dorsal view, cercus very short, sheath distinctly enlarged at middle, apex sharp (Fig. 9). Lancet with 8 serrulae, without distal teeth, with 5 distinct alaspicula and 7 spiculella at apex (Figs. 12, 13).

Male. Body length 5.0–6.0 mm; body color and structure similar to female except following characters (Figs. 2, 5, 7): most parts of tegula black; fore tibia except for black streak at ventral side, middle tibia, foretarsomere 1 and mesotarsomere 1 white; malar space linear, about 0.1 times as long as diameter of median ocellus; subgenital plate 1.2 times as long as wide, apical margin roundish (Fig. 11); length of harpe approximately equal to its width, gonoforceps as in Fig. 14; valviceps sickle-shaped, penis valve as in Fig. 15.

**Holotype.** ♀, **China**, Zhejiang, Lishui City, Xinting Village, Jiulong Wetland, 28°24.12'N, 119°49.68'E; alt. 50 m, 22-III-2018, Zejian LI, Mengmeng LIU, Kaiwen GAO & Tingting JI leg.; **Paratypes.** 1♀4♂, **China**, Zhejiang, Lishui City, Xinting Village, Jiulong Wetland, 28°24.12'N, 119°49.68'E; alt. 50 m, 22-III-2018, Zejian LI, Mengmeng LIU, Kaiwen GAO & Tingting JI leg.; 1♂, **China**, Zhejiang, Lishui City, Xinting Village, Jiulong Wetland, 28°24.12'N, 119°49.68'E; alt. 50 m, 04-III-2018, Zejian LI, Mengmeng LIU, Kaiwen GAO & Tingting JI leg.; 1♀, **China**, Zhejiang, Lishui City, Xinting Village, Jiulong Wetland, 28°24.12'N, 119°49.68'E; alt. 50 m, 02-IV-2017, Kaiwen GAO & Tingting JI leg.; 1♀1♂, **China**, Zhejiang, Lishui City, Xinting Village, Jiulong Wetland, 28°24.12'N, 119°49.68'E; alt. 50 m, 27-III-2017, Kaiwen GAO & Tingting JI leg.; 3♀2♂, **China**, Zhejiang, Lishui City, Xinting Village, Jiulong Wetland, 28°24.12'N, 119°49.68'E; alt. 50 m, 26-III-2017, Zejian LI & Mengmeng LIU leg.; 5♂, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, 28°24.60'N, 119°49.80'E; alt. 105 m, 22-III-2015, Zejian LI leg.; 4♂, **China**, Zhejiang, Lishui City, Bihu Town, Xinting Village, 28°24.60'N, 119°49.80'E; alt. 105 m, 18-III-2015, Zejian LI

leg.

Etymology. The specific epithet “*jiulong*” is derived from its distribution in Jiulong Wetland belonging to Lishui City in Zhejiang Province where the holotype specimen was collected.

Variation. In females, half to most parts of ventral fore femora, most to almost entire of tegula white; in males, small to most of tegula black; apex to most of pronotum white; forewing with cross-vein 2r joining cell 2Rs at apical 0–0.3; in females and males, forewing with cross-vein 2m-cu joining cell 2Rs at basal 0.2–0.3, cell 2Rs 0.6–0.8 times as long as cell 1Rs; petiole of hind anal cell 0.3–0.5 times as long as vein cu-a.

Remarks. This new species is similar to *B. ootheca* Wei, 1997, but can be distinguished from the latter by the middle fovea transverse groove-like; the postocellar area 1.8 times as wide as long in female; the interocellar furrow fine and shallow; the antennomere 3 approximately 1.4 times as long as antennomere 4; and the antennomere 8 approximately 1.5 times as long as broad.

Distribution. China (Zhejiang).

## Acknowledgements

This research was supported by the National Natural Science Foundation of China (31672344) and the Zhejiang Provincial Natural Science Foundation of China (LY18C040001).

## References

- Benson RB. 1954 Some sawflies of the European Alps and the Mediterranean region (Hymenoptera: Symphyta). *Bulletin of the British Museum (Natural History), Entomology*, 3(7): 267–295.
- Blank SM, Groll EK, Liston AD, Prous M & Taeger A. 2012. ECatSym-Electronic World Catalog of Symphyta (Insecta, Hymenoptera). Program version 4.0 beta, data version 39. *Digital Entomological Information*, Müncheberg. Available from: <http://sdei.senckenberg.de/ecatsym/> (Accessed 18 December 2012)
- Blank SM, Taeger A, Liston AD, Smith DR, Rasnitsyn AP, Shinohara A, Heidema M & Viitasaari M. 2009. Studies toward a World Catalog of Symphyta (Hymenoptera). *Zootaxa*, 2254: 1–96.
- Ross HH. 1945. Sawfly genitalia: terminology and study techniques. *Entomological News*, 61(10): 261–268.
- Taeger A, Blank SM & Liston AD. 2010. World catalog of Symphyta (Hymenoptera). *Zootaxa*, 2580: 1–1064.
- Takeuchi K. 1952. *A Generic Classification of the Japanese Tenthredinidae (Hymenoptera: Symphyta)*. Kyoto, 90 pp.
- Viitasaari M. 2002. The suborder Symphyta of the Hymenoptera. In: Viitasaari M (Ed.), *Sawflies (Hymenoptera, Symphyta) I. A Review of the Suborder, the Western Palaearctic Taxa of Xyeloidea and Pamphilioidea*. Tremex, Helsinki, pp. 11–174.
- Wei M & Nie H. 1997. Studies on genus *Birka* Malaise of China (Hymenoptera: Selandriidae). *Journal of Central South Forestry University*, 17(supplement): 49–59.
- Wei M, Nie H & Taeger A. 2006. Sawflies (Hymenoptera: Symphyta) of China – Checklist and Review of Research. In: Blank SM, Schmidt S & Taeger A (Eds.), *Recent Sawfly Research: Synthesis and Prospects*. Goecke & Evers, Keltern, pp. 505–574.