

A new species in the *Macrophya coxalis* group (Hymenoptera: Tenthredinidae) with a revised key to Chinese species

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Abstract: A new species, *Macrophya pseudotrimicralba* Liu, Li & Wei **sp. nov.**, in the genus *Macrophya* Dahlbom (Hymenoptera: Tenthredinidae) from China is described. A key to known Chinese species of the *Macrophya coxalis* group is revised.

Key words: sawflies; Tenthredininae; taxonomy

中国深碟钩瓣叶蜂种团一新种暨中国种类分种检索表（膜翅目：叶蜂科）

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摘要: 记述中国深碟钩瓣叶蜂种团 1 新种: 拟三斑钩瓣叶蜂 *Macrophya pseudotrimicralba* Liu, Li & Wei **sp. nov.**。修订了中国深碟钩瓣叶蜂种团已知种的分种检索表。

关键词: 叶蜂; 叶蜂亚科; 分类

Introduction

Macrophya Dahlbom, 1835, the third largest genus in the subfamily Tenthredininae (Hymenoptera: Tenthredinidae) contains 323 species worldwide Until December 31, 2022 (Liu *et al.* 2022). In China, 183 *Macrophya* species have been recorded (Liu *et al.* 2022).

Thirteen species from China, *Macrophya coxalis* (Motschulsky, 1866), *M. albannulata* Wei & Nie, 1998, *M. allominutifossa* Wei & Li, 2013, *M. hyaloptera* Wei & Nie, 2003, *M. latimaculana* Li, Dai & Wei, 2013, *M. linzhiensis* Wei & Li, 2013, *M. minutifossa* Wei & Nie, 2003, *M. oligomaculella* Wei & Zhu, 2009, *M. paraminutifossa* Wei & Nie, 2003, *M. pseudocoxalis* Li, Liu & Wei, 2019, *M. shangae* Li, Liu & Wei, 2017, *M. trimicralba* Wei,

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2006 and *M. zhoui* Wei & Li, 2013 (Li *et al.* 2018, 2019) are similar in general morphology and form this unique species group in *Macrophya*. In this study, the new species *Macrophya pseudotrimicralba* Liu, Li & Wei **sp. nov.** belonging to this species group from Guangxi Zhuang Autonomous Region, Hunan and Zhejiang in China is described. A revised key to Chinese species in this species group is provided.

Material and methods

Specimens were examined with a Motic-SMZ-171 dissection microscope. Adult images were taken with a Nikon D700 digital camera and the series of images montaged using Helicon Focus (HeliconSoft, Kharkiv, Ukraine). All images were further processed with Adobe Photoshop CS 11.0.

Morphological description of the 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 (e.g. middle fovea and lateral fovea), we follow Takeuchi (1952).

The holotype and some paratypes are deposited in the Asian Sawfly Collection, Nanchang, China (ASMN). Some paratypes are deposited in the Scientific Research and Management Center of East China Medicinal 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 were developed (Benson 1954); OOL — the shortest distance between an eye and a lateral ocellus; POL — the shortest distance between the mesal margins of the two lateral ocelli.

Taxonomy

Macrophya coxalis species group

Diagnosis was provided by Li *et al.* (2018).

Key to the Chinese species of the *Macrophya coxalis* group

1. Hind tibia entirely black 2
- Hind tibia largely black, dorsal side with distinct white macula 4
2. Middle bottom of abdominal tergum 1 with transverse maculae about 0.4 times broader than broad, lateral sides with large and broad maculae of abdominal terga 2–4 distinctly in both sexes; metepimeral appendage with a distinct basin and about 0.5 times broader than diameter of a cenchrus; below pterostigma in fore wing with some smoky macula, but boundary not clear. China (Guangxi) *M. shangae* Li, Liu & Wei
- Middle bottom of abdominal tergum 1 with transverse and narrow maculae, lateral sides of abdominal terga 2–4 with white maculae smaller than the former; metepimeral appendage as broad as diameter of a cenchrus; fore wing hyaline, below pterostigma without smoky macula 3
3. Clypeus not entirely white, lower margin black; inner margin of abdominal tergum 1 with narrow white stripe, ventral side of abdominal terga 2–4 (5) with distinct white maculae, abdominal tergum 10 and inner margin of every sternite white; all coxae largely white; cell 2Rs as long as cell 1Rs in fore wing; each middle serrulae with 2 proximal and 16–17 distal denticles. China (Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, Zhejiang) *M. minutifossa* Wei & Nie

- . Clypeus not entirely black, middle part with transverse white stripes; ventral sides of abdominal terga 2–3 with small white maculae, inner margin of abdominal tergum 7 white, other abdominal terga entirely black; all coxae largely black; cell 2Rs clearly longer than cell 1Rs in fore wing; each middle serrulae with 2 proximal and 9–11 distal denticles. China (Taiwan, Yunnan)..... *M. allominutifossa* Wei & Li
4. Dorsal side of hind tibia with reddish brown maculae more or less 5
- . Dorsal side of hind tibia without reddish brown macula absolutely..... 6
5. Clypeus not entirely white, lower margin black; anterior margin of clypeus arcuate; mesoscutellum elevated, but not as high as upper surface of mesonotum in lateral view, without vertex; low-lying area of metepimeron with some sparse punctures; metepimeral appendage with a shallow basin, distance between cenchri 3 times as long as breadth of a cenchrus; outer side of hind coxa with a large oval white macula; hind femur entirely black; subapical 1/3 of dorsal side of hind tibia with white maculae, basal 3/4 of dorsal side with reddish brown stripes; hind tarsus entirely black, with few reddish stripes. China (Anhui, Hunan) *M. zhoui* Wei & Li
- . Clypeus not entirely black, middle part with transverse white stripes; apical margin of clypeus slightly curved, bottom more flattened; mesoscutellum distinctly elevated, much higher than upper surface of mesonotum in lateral view, with a cone vertex at the top; low-lying area of metepimeron with distinct punctures; metepimeral appendage with a deep basin; distance between cenchri 2.5 times as long as breadth of a cenchrus; outer side of hind coxa with broad and long white stripes, not oval; apex in dorsal side of hind femur with distinct white macula; subapex of dorsal side of hind tibia with a small sub-triangular white macula, others brownish black, with less reddish brown; hind tarsus largely black, dorsal side with small white maculae. China (Tibet) *M. linzhiensis* Wei & Li
6. Abdomen entirely black, lateral sides without white macula 7
- . Abdomen with distinct lateral white maculae or posterior margins of abdominal terga white..... 8
7. Hind trochanter entirely white; metepimeral appendage with a distinct basin, approximately 1.6 times broader than diameter of median ocellus and distinctly larger than a cenchrus; distance between cenchri approximately 2.5 times as long as breadth of a cenchrus; petiole of anal cell in hind wing as long as vein 1r-m. China (Anhui, Fujian, Heilongjiang, Hubei, Hunan, Jiangxi, Jilin, Liaoning, Zhejiang); Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu)..... *M. coxalis* (Motschulsky)
- . Ventral side of hind trochanter with clear black macula; metepimeral appendage with a distinct basin, approximately 2 times broader than diameter of median ocellus and distinctly larger than a cenchrus; distance between cenchri approximately 3 times as long as breadth of a cenchrus; petiole of anal cell in hind wing approximately 2 times length of vein 1r-m. China (Henan, Hubei) *M. pseudocoxalis* Li, Liu & Wei
8. Dorsal side of hind tibia with a long and slender white macula, not shorter than half of hind tibia 9
- . Dorsal side of hind tibia with a broad and short white macula, distinctly shorter than half of hind tibia ... 13
9. Middle part of mesepisternum and mesoscutellum with a small white macula 10
- . Mesopleuron and metapleuron entirely black 11
10. Frontal field with sparse punctures, interspace between puncture slightly broader than diameter of a puncture, with fine microsculpture; mesoscutellum not entirely black, median part white, mesoscutellar appendage entirely black; metepimeral appendage with a dished depression, clearly smaller than diameter of a cenchrus; basal margin of hind femur white, ventral side with white macula approximately 1/5 length of hind tibia, dorsal side without white macula. China (Guangdong, Guizhou, Hunan, Zhejiang) *M. trimicralba* Wei
- . Frontal field with dense punctures, interspace between punctures very narrow, without microsculpture; mesoscutellum entirely black, lateral areas except median of mesoscutellar appendage with white maculae; metepimeral appendage with a dished depression, broader than diameter of a cenchrus; basal 1/5 of hind

- femur white, white macula in ventral side longer than dorsal side. China (Guangxi, Hunan, Zhejiang)
 *M. pseudotrimicralba* Liu, Li & Wei **sp. nov.**
11. Lateral sides of all abdominal terga with long and narrow white maculae, distinctly shorter than 1/2 abdominal tergum breadth. China (Anhui, Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Shaanxi, Sichuan, Zhejiang) *M. albannulata* Wei & Nie
- . Lateral sides of abdominal tergum 1 at least with broad and short white maculae, distinctly broader than 1/2 abdominal tergum breadth 12
12. Labrum and clypeus not entirely black, lateral sides of labrum and base of clypeus with black maculae; posterior margin of abdominal tergum 1 with narrow white maculae, lateral sides of abdominal terga 2–4 with distinctly white maculae, abdominal terga 5–8 entirely black; all legs largely white, base in ventral side of fore and middle legs and most parts of hind coxa black; hind femur entirely black, ventral side without white band. China (Fujian, Guangxi, Hunan, Jiangxi, Zhejiang) *M. oligomaculella* Wei & Zhu
- . Labrum and clypeus entirely white; posterior 1/3 of abdominal tergum 1 with white maculae, lateral sides of abdominal terga 2–8 with white and distinctly broad maculae; all coxae largely white, base of fore and middle coxae and ventral side largely of hind coxa with a big triangular macula, black; hind femur largely black, ventral side with distinct white bands. China (Fujian, Guizhou, Jiangxi, Zhejiang)
 *M. latimaculana* Li, Dai & Wei
13. Labrum and clypeus largely white, with short black maculae; dorsum of head shiny, interspaces between punctures on frontal area broader than diameter of puncture; tegula entirely black; lateral sides of abdominal tergum 2 with broad and short white maculae, lateral sides of abdominal terga 3–4 with long and narrow white maculae; fore and middle trochanters largely black, hind trochanter entirely white. China (Fujian, Gansu, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Yunnan, Zhejiang)
 *M. hyaloptera* Wei & Nie
- . Labrum and clypeus entirely white; dorsum of head less shiny, interspaces between punctures on frontal area narrower than diameter of puncture; basal 1/2 of tegula white, apical 1/2 black; lateral sides of abdominal terga 2–4 with broad and short white maculae; all trochanters entirely white. China (Fujian, Guangdong, Guizhou, Hunan, Jiangxi, Zhejiang) *M. paraminutifossa* Wei & Nie

***Macrophya pseudotrimicralba* Liu, Li & Wei sp. nov.** (Figs 1–10)

Female. Holotype. Body length 11–11.5 mm. Body largely black; following parts white: palp, basal half of mandibles, labrum, clypeus, posterior margin and outer margin of pronotum, anterior margin of tegula, a small macula at median of mesepisternum, posterior margins of abdominal terga 1–9, abdominal tergum 10 and posterior broad bands of all sterna; posterior white maculae at median of abdominal terga 6–7 not connected; fore and middle legs largely white, but dorsal sides of coxae, dorsal sides of femurs, posterior sides of tibiae and apices of all tarsi, black; hind leg largely black, but apical half of coxa and outer side basally with an oval macula and long macula at middle approximately 2/3 length of hind tibia, white. Body hairs short and dense, silver; setae on sheath long and curved, pale yellowish brown. Wings hyaline, without smoky macula, pterostigma and largely veins blackish brown (Figs 1, 2).

Labrum and clypeus less shiny, without clear puncture, microsculpture fine (Fig. 4); dorsum of head less shiny, frontal field densely and coarsely punctate, interspaces between punctures clearly narrower than diameter of a puncture; lateral sides of postocellar area with small smooth areas, without puncture or microsculpture (Fig. 3). Mesonotum less shiny, with dense punctures, punctures on mesonotum smaller than punctures on head, interspaces between punctures clearly narrower than diameter of a puncture and with fine microsculpture;

mesoscutellum less shiny, center with some large punctures; mesoscutellar appendage with sparse and shallow punctures (Fig. 5). Mesepisternum less shiny, densely punctured, interspaces narrower than diameter of a puncture, upper 1/2 with large punctures, lower 1/2 with small punctures; anepimeron dull, densely wrinkled; posterior margin of mesepisternum and anterior 1/3 of katepimeron smooth, without punctures and microsculptures, strongly shiny; posterior 2/3 of katepimeron shiny, sparsely and largely punctate, microsculptures distinct; metepisternum dim, densely and minutely punctate, microsculpture fine; metepimeron shiny, large parts smooth, dorsal side with some coarse punctures, microsculptures fine; metepimeral appendage largely smooth and with a distinct basin, center with long hairs (Fig. 6). Dorsal side of abdominal tergum 1 shiny, center of abdominal tergum 1 smooth, lateral sides with some punctures; dorsal side of other abdominal terga with minute and sparse punctures, microsculptures fine. Hind coxa and outer side of hind femur with minute and dense punctures, interspaces between punctures narrow; lateral side of ovipositor sheath with minute and fine punctures, microsculpture fine.

Middle part of labrum elevated, apical margin of labrum truncate, clypeus slightly elevated, base distinctly broader than distance between lower corner of eyes; lateral sides convergent forwards, anterior margin deeply incised to about 1/4 length of clypeus, lateral corners short and obtuse (Fig. 4); malar space 0.5 times as long as diameter of median ocellus; frons flat, slightly lower than top of eyes in lateral view; middle fovea shallow and fine; lateral foveae furrow-like; interocellar furrow weak, postocellar furrow indistinct; POL : OOL : OCL = 22 : 54 : 30; postocellar area slightly elevated, approximately 2.5 times broader than long, lateral furrows shallow and clearly divergent backwards; head narrowed behind eyes in dorsal view, occipital carina complete (Fig. 5). Antenna slender, as long as combined head and thorax, shorter than abdomen; antennomere 2 broader than long; antennomere 3 about 1.83 times as long as antennomere 4 (11 : 6), as long as antennomeres 4 and 5 together, subapical antennomeres dilated, apical antennomeres 6–9 reduced (Fig. 7). Mesoscutellum roundly elevated, with weak peak, as high as top of mesonotum in lateral view; mesoscutellar appendage with lower and short median carina; metascutellar appendage with acute middle carina; dorsal-posterior platform of mesepimeron as broad as diameter of median ocellus; metepimeral appendage with a distinct basin, larger than diameter of a cenchrus; mesopleuron and metapleuron as Fig. 6; distance between cenchri approximately 2 times as long as breadth of a cenchrus. Inner tibial spur of hind leg 0.67 times length of metabasitarsus (30 : 45); metabasitarsus slender, as long as following 4 tarsomeres together; claw with inner tooth shorter and broader than outer tooth. Ovipositor sheath slightly longer than metabasitarsus (48 : 45), apical sheath longer than basal sheath (29 : 19), apical margin roundish in lateral view (Fig. 8), setae on sheath slightly curved. Fore wing with vein cu-a joining cell 1M at basal 1/4, vein 2r joining cell 2Rs at apical 1/4, cell 2Rs shorter than cell 1Rs, vein 2r-m slightly curved and oblique, anal cell with a middle petiole as long as vein 1r-m; petiole of anal cell in hind wing half length of vein cu-a. Lancet with 23 serrulae (Fig. 9), serrulae slightly oblique and weakly protruding, sub-triangular, each middle serrulae with 2 proximal and 8–9 distal denticles, annular spine bands not narrow, spine sparse, the 6th–8th serrulae at base as Fig. 10.

Male. Unknown.



Figures 1–10. *Macrophya pseudotrimicralba* sp. nov., ♀, holotype. 1. Female adult, dorsal view; 2. Female adult, lateral view; 3. Head of female, dorsal view; 4. Head of female, anterior view; 5. Thorax and abdominal terga 1–3, dorsal view; 6. Thorax and abdominal terga 1–3, lateral view; 7. Antennae, lateral view; 8. Ovipositor sheath, lateral view; 9. Lancet; 10. The middle serrulae of lancet. Scale bars = 2 mm (Fig. 1); 200 μ m (Fig. 9); 50 μ m (Fig. 10).

Holotype. ♀, **China**, Guangxi, Tianlin County, Mt. Cenwanglao, Langping, N. 24°28.42', E. 106°22.97', alt. 1543 m, 07-V-2013, Yaffei SHANG, Mengmeng LIU & Liwei QI

(CSCS13030). **Paratypes.** 1♀, **China**, Zhejiang, Lin'an District, Mt. Tianmu, Chanyuan Temple, N. 30.323°, 119.442°, alt. 405 m, 17-IV-2021, Zejian LI & Mengmeng LIU (LSAF21017); 1♀, **China**, Hunan, Liuyang City, Mt. Dawei, Limuqiao, N. 28°25.520', E. 114°05.198', alt. 980 m, 30-IV-2014, Biao CHU (CSCS14040); 1♀, **China**, Guangxi, Tianlin County, Mt. Cenwanglao, Yanjiaping, N. 24°26.42', E. 106°22.20', alt. 1407 m, 05-V-2013, Meicai WEI & Gengyun NIU (CSCS13035); 1♀, **China**, Guangxi, Tianlin County, Mt. Cenwanglao, Weather Station, N. 24°25'17", E. 106°23'0", alt. 1333 m, 01-V-2012, Zejian LI & Yafei SHANG (CSCS12043).

Etymology. The species epithet "*pseudotrimicralba*" refers to this new species being very similar to *M. trimicralba* Wei, 2006.

Host plant. Unknown.

Variety. Median part of mesepisternum with a small white macula to varying degrees.

Remarks. This new species is very close to *M. trimicralba* Wei, 2006 in general appearance. See the key above for the differences between these two species.

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