Review of *Cladiucha* Konow (Hymenoptera: Tenthredinidae) with description of a new species from China

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Abstract: The genus *Cladiucha* Konow, 1902 is reviewed. The generic characters are redescribed based on new material. A new species of this genus is described from Yunnan, China: *C. punctata* Wei **sp. nov.**, and a key to species is also provided.

Key words: Tenthredinomorpha; Megabelesinae; Cladiuchini; taxonomy; Magnoliaceae

枝膜叶蜂属评述暨中国枝膜叶蜂属一新种（膜翅目：叶蜂科）

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摘要：简要评述了枝膜叶蜂属 *Cladiucha* Konow, 1902，根据新材料重新描述了本属特征。记述中国 1 新种：刻胸枝膜叶蜂 *C. punctata* Wei **sp. nov.**。编制了本属分种检索表。

关键词：叶蜂亚目；巨基叶蜂亚科；枝膜叶蜂族；分类；木兰科

Introduction

Magnoliaceae is an ancient plant family and a basal lineage of Angiosperms. The family is distributed in eastern and southern Asia, as well as North and Central America. About 150 extant species are known, belonging to about 15 genera, and most of them occur in South Asia (Wu *et al*. 2003).

Only a few sawflies feed on plants of Magnoliaceae. Until the end of 2018, only 6 species belonging to 2 genera of Tenthredinidae have been known to feed on the leaves of Magnoliaceae: *Megabeleses crassitarsis* Takeuchi, 1952 feeding on leaves of *Magnolia kobus* DC. and *Michelia compressa* Sarg. (Okutani 1970); *Megabeleses liriodendrovorax* Xiao, 1993 feeding on leaves of *Liriodendron chinense* (Xiao 1993); *Megabeleses magnoliae* Wei, 2010 feeding on leaves of *Magnolia denudata* Desr. and *M. liliflora* Desr. (Wei 2010a); *Cladiucha magnoliae* Xiao, 1994 feeding on leaves of *Magnolia officinalis*, *Cladiucha manglietiae* Xiao (1994) feeding on leaves of *Manglietia hainanensis* Dandy (Xiao 1994, 1998), and *Cladiucha megatheca* Wei, 2010 feeding on leaves of *Magnolia officinalis* Rehd & Wils (Wei 2010b). Besides Tenthredinidae, there is only 1 species of Cephidae bores the twigs of *Magnolia liliflora* Desr. (Wei & Xiao 2011).

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Cladiucha Konow, 1902 is a peculiar sawfly genus in the Tenthredinidae with the antenna in both sexes quite similar to that of Diprionidae and much different from normal taxa of Tenthredinidae. Except for the peculiar antenna and the female lance which has a peculiar long membranous lobe, this genus is similar to the taxa of Allantinae in general appearance. Benson (1938) erected a tribe for this genus within Allantinae. This treatment was followed by Abe & Smith (1990) and Taeger *et al.* (2010). But, Wei & Nie (1998) placed this genus into Megabelesinae, which stands between Allantinae and Tenthredinidae.

Four species of this genus have been described: *Cladiucha insolita* Konow from North Vietnam (Konow 1902; Smith 2017), *C. manglietiae* Xiao from Hainan of China, *C. magnoliae* Xiao from Chongqing and Hunan, China (Xiao 1994), and *C. megatheca* Wei from Chongqing and Guangxi, China (Wei 2010).

Material and methods

Specimens were examined with a Motic-SMZ-168 stereomicroscope. Adult images were taken with a Nikon D700 digital camera and the series of images were montaged using Helicon Focus (©HeliconSoft). All images were further processed using Adobe Photoshop CS 11.0.

Morphological descriptions of new species are based on the holotype. The terminology of sawfly genitalia follows Ross (1945) and that of general morphology follows Niu & Wei (2010).

Abbreviations used are: OOL — distance between the eye and outer edge of lateral ocellus; POL — distance between the mesal edges of the lateral ocelli; OCL — distance between a lateral ocellus and the occipital carina or hind margin of the head.

The type specimens of this new species are deposited the Insect Collection of the Asian Sawfly Museum, Nanchang (ASM).

Taxonomy

Cladiucha Konow, 1902

Cladiucha Konow, 1902: 389. Type species: *Cladiucha insolita* Konow, 1902, by monotypy.

Cladiucha (*Acladiucha*) Wei, 1997: 75. Type species: *Cladiucha magnoliae* Xiao, 1994, by original designation.

Diagnosis. Body large and robust, metallic blue; antenna dimorphic with 16–20+3 antennomeres, female antenna short serrate, male antenna bipectinate; mandibles symmetrically bidentate; anterior margin of clypeus truncate; hind coxa enlarged with apex reaching 4th sternite; claw with inner tooth much longer than apical tooth; cu-a of fore wing meeting cell 1M at its base; cell Rs of hind wing open, anal cell closed; lance with a distinct membranous lobe; larvae gregariously feeding on leaves of Magnoliaceae.

Description. Body robust with strong bluish tinge. Labrum short and transverse, anterior margin round; mandibles symmetrically bidentate, inner tooth short, apical tooth weakly bent; eyes medium-sized, inner margins weakly convergent downward, distance between eyes longer than longest axis of eye; clypeus broad, anterior margin truncate or indistinctly incised;

malar space shorter than diameter of median ocellus; distance between toruli much shorter than breadth of inner orbit; supraantennal tubercles low or absent; frontal wall low and obtuse; postocellar area broader than long; occipital carina present but short; head not elongated behind eyes; antenna dimorphic in female and male, female antenna short serrate with 16–20+3 antennomeres, apical 3 antennomeres merged together and with antennal organs, male antenna bipectinate with 22–23 antennomeres; anterior lobe of pronotum short, broadest part about 2 times as long as diameter of median ocellus, anterior margin smooth, without carina, lateral furrow of lateral lobe distinct; ventral margins of propleuron broadly meeting; mesoscutellum weakly elevated, anterior corner protruding; mesoscutellar appendage flat, without middle ridge; distance between cenchri about 2 times the longest axis of a cenchrus; middle of metapostnotum very narrow; epicnemium absent, anterior marginal carina of mesepisternum distinct; mesepimeron broad, post thoracic spiracle covered by middle corner of mesepimeron, metapleuron broad; fore and middle coxa small, hind coxa enlarged with apex reaching 4th sternite; inner tibial spur of fore leg simple with a narrow membranous lobe; hind tibia as long as tarsus, metabasitarsus about as long as following 4 tarsomeres combined, tibial spur slightly longer than apical breadth of tibia; claw with a short and obtuse basal lobe, inner tooth much longer than apical tooth; fore wing with vein R+M punctiform, vein 1M parallel to 1m-cu, vein 2r present, cu-a meeting cell 1M at its base, anal cross vein at middle of cell A and strongly oblique, cell 2Rs shorter than cell 1R1 and 1Rs combined; anal cell of hind wing closed and shortly petiolate, cell Rs open, cell M open or closed; lobe of first tergum subtriangular, membranous blotch distinct; ovipositor sheath simple, lance with a distinct membranous lobe, lancet narrow and long, serrulae almost flat with small subbasal teeth; penis valve simple, without lateral lobe, apical hook or large spine.

Host plants. Species of Magnoliaceae (Xiao 1994, 1998).

Distribution. Eastern Asia (China; North Vietnam).

The five species can be separated by the following key.

Key to species of *Cladiucha*

1. Clypeus entirely bluish black; cell M usually open in hind wing; female antenna with 19–22+3 antennomeres, total length clearly shorter than 2 times head breadth, if antenna as long as 2 times head breadth, then malar space 0.6 times lateral ocellus ····· 2

-. Clypeus partly or entirely white; cell M in hind wing usually closed; female antenna clearly longer than 2 times head breadth, if antenna shorter than 2 times head breadth, then female antenna with only 16–17+3 antennomeres, if antenna as long as 2 times head breadth, then malar space about 0.2 times diameter of lateral ocellus ····· 4

2. Upper half of mesepisternum impunctate; antenna clearly shorter than 2 times head breadth; cercus simple, tapering toward apex, about 4 times as long as broad; malar space about 0.2–0.3 times as long as diameter of lateral ocellus; supraantennal tubercles and frontal wall distinctly elevated; mesoscutellum flat without posterior slope, sparsely punctured; ventral margin of lance membrane straight; left lance with 6–7 dorsal apical large teeth, middle serrulae distinctly protruding with 6–8 subbasal teeth····· 3

-. Upper half of mesepisternum distinctly punctured; antenna as long as 2 times head breadth; cercus stout with slender apical process, about 2.5 times as long as broad; malar space 0.6 times as long as diameter of lateral ocellus; posterior of mesoscutellum densely punctured with a short but distinct perpendicular slope; ventral margin of lance membrane curved; left lance with 12–13 dorsal apical small teeth, middle serrulae weakly protruding with 8–9 subbasal teeth; (metabasitarsus stout, about 4.3 times as long as broad; ventral apical

process of middle antennomeres triangular, much shorter than basal breadth of each antennomere; apical third of vein 2A+3A quite weak but present, basal anal cell closed). China (Yunnan)…… ……*C. punctata* Wei **sp. nov.**

3. Pronotum without lateral white spot; female antenna with ventral apical process of middle antennomeres slender, almost as long as basal breadth of each antennomere; metabasitarsus distinctly enlarged, less than 5 times as long as broad; apical third of vein 2A+3A vestigial but present, basal anal cell closed; body length 15–17 mm in female and 10–13 in male. Laos; Vietnam ……*C. insolita* Konow

-. Pronotum with a lateral white spot; female antenna with ventral apical process of middle antennomeres short and triangular, about half basal breadth of each antennomere; metabasitarsus slender, more than 6 times as long as broad; apical third of vein 2A+3A absent, basal anal cell open at apex; body length about 14 mm in female and 10 mm in male. China (Hainan)……*C. manglietiae* Xiao

4. Female antenna with 16–17+3 antennomeres and much shorter than 2 times head breadth, ventral process of middle antennomere short and subtriangular, clearly shorter than basal breadth of antennomere; cercus 2 times as long as broad; ovipositor sheath narrow, clearly shorter than head breadth, about as long as metabasitarsus; lancet with 27 annuli, middle serrulae each with 6–7 subbasal teeth; body length 12–13 mm in female and 9–11 mm in male. China (Hubei, Hunan, Chongqing, Guizhou)……*C. magnoliae* Xiao

-. Female antenna with 19–22+3 antennomeres and as long as 2 times head breadth, ventral process of middle antennomere long and slender, slightly longer than basal breadth of antennomere; cercus 4 times as long as broad; ovipositor sheath broad, clearly longer than head breadth and much longer than metabasitarsus; lancet with 31–33 annuli, middle serrulae each with 12–13 subbasal teeth; body length 15–16 mm in female, male unknown. China (Chongqing, Guizhou, Guangxi)….*C. megatheca* Wei

***Cladiucha punctata* Wei sp. nov.** (Figs 1, 2)

Female (Fig. 1). Body length 14 mm; body and legs black with strong metallic blue tinge, antenna black and dim, a small round spot just behind lateral spiracle of first tergum white; a long and narrow lateral stripe on hind coxa, a long and narrow dorsal stripe on middle and hind femora white, anterior side of fore femur, fore and middle tibiae with their tarsi largely, a short stripe near base of hind tibia yellowish white. Fore wings weakly infuscate, cells R, 1M, 1Cu and 2Cu hyaline, pterostigma and veins black brown. Body hairs and setae on sheath pale brown.

Clypeus, supraclypeal area, lower inner orbits, frons and ocellar area densely punctured, punctures on upper inner orbits and anterior of temple large and sparse with distinct smooth interspaces, postocellar area and posterior of temple scattered with minute punctures (Figs 2A, 2B); mesoscutal middle lobe and top of lateral lobes moderately punctured, other part of lateral lobe sparsely punctured; anterior of mesoscutellum sparsely punctured, posterior 2/3 of mesoscutellum and appendage with large and dense punctured; bottom of parapsis microsculptured; mesepisternum distinctly punctured with broad and smooth interspaces (Fig. 2E), bottom of mesepimeron densely microsculptured, metepisternum densely punctured; abdominal tergites 1 and 2 largely smooth, impunctate, other tergites and sternites with shallow and large punctures, interspaces between punctures smooth, strongly shiny; outer side of hind coxa and hind femur with large punctures.

Body robust; malar space 0.6 times the diameter of median ocellus, distance between lower corner of eyes 1.4 times the longest axis of eye; upper margin of toruli narrowly elevated, middle fovea small and shallow; frontal basin with a short but distinct middle ridge

in front of median ocellus, POL : OOL : OCL = 11 : 17 : 16; postocellar area elevated, clearly higher than ocelli, breadth about 1.8 times as long as length, lateral furrows shallow and roundly curved, weakly convergent backwards (Fig. 2B); temple length about 0.4 times as long as eye in dorsal view, lateral margin round; postorbital furrow distinct, occipital carina developed in lower third; antenna with 19+3 antennomeres, total length as long as head and thorax combined, slightly shorter than vein C of fore wing, antennomere 2 as long as broad, antennomere 3 about as long as antennomeres 4–6 combined, antennomeres 4–17 each with a short triangular ventral-apical process (Fig. 2G), antennomeres 17–21 with ventral antennal organ, venter of antennomeres 20–22 merged together (Fig. 2C). Mesoscutellum weakly elevated, posterior margin with a low and obtuse ridge, posterior slope short, almost perpendicular to posttergite (Fig. 2N). Inner tibial spur of hind leg slightly longer than apical breadth of tibia, about 2 times as long as outer spur and 0.38 times as long as metabasitarsus; metabasitarsus enlarged, about 4 times as long as its breadth and as long as following 4 tarsomeres combined (Fig. 2L); claw with inner tooth much longer than outer tooth (Fig. 2D). Apical third of vein 2A+3A in fore wing discolored and thin, but distinct, basal anal cell closed (Fig. 1). Cercus broad with a distinct apical digit, about 2.8 times as long as broad (Figs 2J, 2K); ovipositor sheath clearly shorter than hind femur, about 1.2 times as long as head breadth, apical sheath 1.2 times as long as basal sheath (Fig. 2J); in dorsal view sheath long and narrow (Fig. 2K); membranous lobe of lance narrow, middle part about 0.6 times as broad as lance at same position, ventral margin distinctly curved (Fig. 2H), left lance with 12–13 small dorso-apical teeth; lance with 30 annuli, serrulae hardly oblique (Fig. 2I), middle serrulae each with 9–10 distinct distal teeth and 1 proximal tooth (Fig. 2M).

Male. Unknown.

Holotype. ♀, **China,** Yunnan, Longling, Mt. Gaoligong, 98˚46.062′E, 24˚49.700′, alt. 2145 m, 02-VI-2009, Yihai ZHONG leg. **Paratype.** 1♀, **China,** data same as the holotype.

Etymology. The specific epithet refers to the distinctly punctured mesepisternum.

Figure 1. *Cladiucha punctata* Wei **sp. nov.** Female adult, holotype. Scale bar = 1 mm.

Figure 2. *Cladiucha punctata* Wei **sp. nov.**, ♀, holotype. A. Head, frontal view; B. Head, dorsal view; C. Antenna; D. Claw; E. Mesopleuron; F. mesoscutellum and appendage, dorsal view; G. Middle antennomeres; H. Lance; I. Lancet; J. Apex of abdomen and ovipositor sheath, lateral view; K. Apex of abdomen and ovipositor sheath, dorsal view; L. Hind tarsus; M. 11th–13th serrulae; N. Mesoscutellum and appendage, lateral view.

Remarks. This new species is similar to *Cladiucha insolita* Konow, 1902 from north Vietnam but differs from it by the followings: the mesepisternum with distinct punctures; the posterior slope of mesoscutellum perpendicular to posttergite and densely punctured; the cercus stout and about 2.8 times as long as broad with a distinct apical digit; the malar

space broad and about 0.6 times as long as the diameter of median ocellus; female antenna with 19+3 antennomeres and as long as head and thorax combined, the ventral apical process of middle antennomeres short and triangular in shape; the left lance with 12–13 small dorsal apical teeth, the ventral margin of the membranous lobe of lance distinctly curved, and the middle serrulae each with 9–10 distal subbasal teeth. In *Cladiucha insolita* Konow, the mesepisternum without distinct punctures; the posterior slope of mesoscutellum flat, not perpendicular to posttergite and sparsely punctured; the cercus narrow, about 4 times as long as broad and without apical digit; the malar space linear, about 0.2 times as long as the diameter of median ocellus; female antenna with 19–20+3 antennomeres, clearly shorter than head and thorax combined, the ventral apical process of middle antennomeres long and slender; the left lance with 6–7 large dorsal apical teeth, the ventral margin of the membranous lobe of lance straight, and the middle serrulae each with 6–7 distal subbasal teeth.

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