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Revision of Cladiini (Hymenoptera: Tenthredinomorpha: Nematidae) From China (I)

: Notes on Cladiini and *Driocampus* Zhang With Revision of *Cladius* Illiger From China

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Abstract: The known genera of the tribe Cladiini and *Driocampus* Zhang are reviewed and the known species of genus *Cladius* Illiger are revised. A new species is described from China: *Cladius similis* sp. nov. *Priophorus cornicularius* (Zhelochovtsev 1952) comb. nov., P. *corniger* (Zhelochovtsev 1952) comb. nov. and P. *nubilis* (Konow 1897) comb. nov. are three new combinations transferred from *Cladius* to *Priophorus* Dahlbom 1835. *Cladius difformis* (Panzer) is a new record for China. A key to the world genera of the tribe is provided.

Key words: hymenoptera; nematidae; cladiini; *cladius*; *driocampus*
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The tribe Cladiini is a small tribe of the family Nematidae with less than 30 species have been described till present. Some researchers dealt with this group of sawflies as a subfamily Cladiinae[1~6,27]. But most of sawfly researchers recognised it as a tribe [7~18].

The tribe Cladiini is represented in the Holarctic Region with *Cladius difformis* (Panzer) spreading to North Africa. It includes 1 fossil and 3 living genera, all represented in China. Benson[8] and Muche[10] revised respectively the British and German species of the tribe. Zhelochovtsev[5] and Zhelochovtsev et al[12] revised the tribe from the former USSR including 4 endemic, 3 European and 4 Holarctic species. Smith[13] revised the tribe from North America including 4 endemic and 4 Holarctic species. However, the tribe in Eastern Asia has never been revised. Benson[9] ever recorded a few species of the tribe from S. E. Asia. Until 1999 Nine living species, namely *Priophorus nigricans* (Cameron)[6], *P. padi* (L.) (= *P. pallipes* Lep.)[19], *P. hyalopterus* Jakovlev, *P. wui* Wei[20], *P. nigrotarsalis* Wei[21], *P. leucotrochanteris* Wei[22], *Trichiocampus cannabis* Xiao et Huang, *Cladius pectinicornis* (Fourcroy)[23], *T. rufus* (Verzhutskii)[24] = *T. pseudoviminalis* Huang et Wang[25] have hitherto been recorded from China. Basing on the specimens preserved in the Insect Collection of Central South Forestry University, some specimens in the Insect Collection of Institute of Zoology, Academia Sinica, and some specimens borrowed from the Department of Biology, Nankai University as well as a few more specimens from other universities the author revised the Chinese Cladiini. Type materials of the new species are deposited in the Insect Collection of Institute of Zoology, Academia Sinica, Beijing, China (IZAS) and the Insect Collection of Central South Forestry University, Zhuzhou, China (CSFU). The fossil taxon of the tribe from China is also briefly discussed.

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1 Tribe Cladiini

Cladiinae Ashmead 1898 (part); MacGillivray 1906 (part); Rohwer 1911, 1916; Zhelochovtsev 1952; Ross 1937.

Cladiini Benson 1938, 1958, 1963; Muche 1969; Ross 1951, Zhelochovtsev 1988; Smith 1974, Takeuchi 1952, Wei 1998; Wei and Nie 1998.

The following combination of characters will separate the members of Cladiini from other taxa of Nematidae: vein R+M in front wing very short or punctiform, vein 2r missing, vein 1m-cu and 2m-cu in fore wing received on the vein M in different cells, anal cell divided into two by a wide medial constriction; penis valve with 2~3 slender apical processes.

1.1 Discussion on the characters used in defining genera of Cladiini

The species of Cladiini are superficially similar to each other, and some authors, such as Zhelochovtsev[5] treated all the species under the single genus *Cladius* Illiger. As suggested by Smith[13], however, there are three distinct phyletic lines in the tribe Cladiini, and a distinct gap is represented between each genus of the tribe. Hence, I follow the views of Benson[8] and Smith[13] with some modifications in the classification of the tribe.

The characters used to define each genus by different authors are rather different. There are few disputes on the genus *Cladius*, but the treatments on the other two genera are quite different. The character of antenna had been used to separate *Trichiocampus* from *Cladius* until 1917, when Mac Gillivray[26] introduced the character of relative length of the anterior basitarsus to separate *Trichiocampus* from other two living genera. Rohwer[27] followed this viewpoint. However, this character can only be used in separating species groups both in *Priophorus* and *Trichiocampus* when the Eastern Asian species are treated[24]. Benson[8] did not use genitalia characters as an important one at the generic level, but separated *Priophorus* from *Trichiocampus* by the relative length of the hind basitarsus, which is also unstable in the related species, and some other less stable characters. Rohwer[27] and Ross[4] used the character of female lancet to separate the two genera. Smith[13] used the combination of female lancet, male penis valve and antennal characters to distinguish the two genera. It is apparent, in fact, that those genital characters in both sexes are the soundest basis for separating the two genera.

1.2 Key to the genera of Cladiini

1　Basal half of vein M in hind wing free; 1cu-a in fore wing received on cell 1M at basal 3rd. Fossil
Driocampus Zhang

--　M combined with Cu in basal half in hind wing; 1cu-a in fore wing received on cell 1M at about the middle　2

2　Antenna with long apical projections in male; 3rd antennal segment in female about 3x longer than broad, with ventral emargination; lancet with 8 unfurcate serrulae; penis valve with 2 apical processes and 1 lower pilose lobe, inner margin of gonolacinia strongly curved　*Cladius* Illiger

--　Antenna without long apical projection in male; 3rd antennal joint in female at least 4x longer than broad and not emarginated ventrally; inner margin of gonolacinia straight or feebly curved　3

3　Lancet with 7-9 furcate serrulae; annuli with large teeth; penis valve with a long apical process and 1 or 2 short and unpilose membranous lobes　*Priophorus* Dahlbom

--　Lancet with more than 12 serrulae, annuli without large tooth; penis valve with 2 apical processes and 1 lower pilose lobe　*Trichiocampus* Hartig

2 *Cladius* Illiger

Cladius Illiger, 1807: 190; Dalla Torre 1894: 290; Konow 1905: 47; Zhelochovtsev 1952: 257 (in part); Benson 1968: 141; Smith 1974: 3; Zhelochovtsev 1988: 66.

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Type species: *Tenthredo diffformis* Panzer, designated by Latreille 1810.

Diagnosis. : third antennal segment short, less than three times longer than broad and slightly emarginated beneath; lancet short, with 8 serrulae and large annular teeth; cerci longer than half the length of sheath in dorsal view. : basal segments of flagellum furcate; penis valve with two apical processes and one lower pilose lobe, inner margin of gonolacinia strongly concave.

Range. China; Holarctic.

This is a small genus of about 3 known species (one fossil species). One species has already been recorded from China. Here three species are described including one new record and one new species.

2.1 Key to the species of *Cladius*

1 Lancet short, total length of serrulae not more than 2.5x width of 2nd annulus; 1st annulus toothed and strongly curved backwards in lower half; harpe short and broad; cerci in dorsal view not shorter than saw sheath 2

– – Lancet slender, total length of serrulae 3.5x width of 2nd annulus; 1st annulus straight and oblique forwards with two teeth below; harpe rather slender; male antenna with 4 long projections; cerci in dorsal view half as long as saw she *C. similis* sp. nov.

2 Total length of serrulae 2.5x width of 2nd annulus; male antenna with 3 long projections; 3rd and 4th antennal joints in female with a minute apical projection above *C. diffformis* (Panzer)

– – Total length of serrulae 2x width of 2nd annulus; male antenna with 5 long projections; 3rd to 5th antennal joints in female with a minute apical projection above *C. pectinicornis* Fourcroy

2.2 Description and notes on species of *Cladius* Illiger

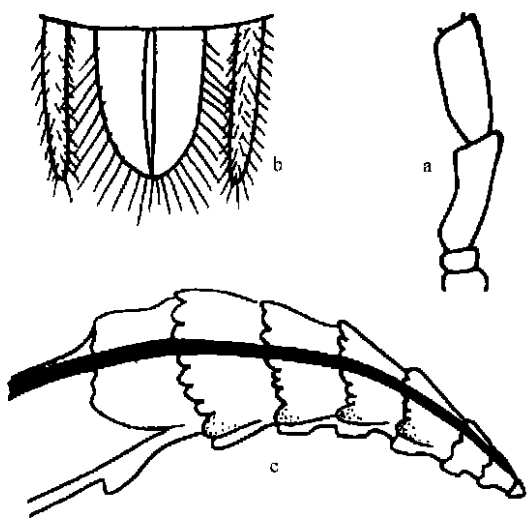
Cladius diffformis (Panzer) (Fig. 1)

Tenthredo diffformis Panzer, 1799: 62.

Cladius diffformis: Illiger 1807: 190.

(See Smith[13] for synonyms and citations)

Notes. . Body length about 6mm. Body black, tegulae white; legs black, extreme apex of each femur, each tibia entirely except for apex of hind one, front and middle tarsi white to pale brown; basal part of hind basitarsus whitish. Wings subhyaline, stigma blackish brown. Basal joints of antenna as in Fig. 1a, apical upper corners of the 3rd and 4th segments distinctly though slightly produced; sheath in dorsal view as in Fig. 1b, cercus as long as sheath; lancet as in Fig. 1c, the 1st annulus distinctly curved forwards in lower half.



a Basal four segments of female antenna, b Sheath and cerci in dorsal view, c Lancet

Fig. 1 ***Cladius diffformis***

Distribution. China: Liaoning, Hubei, Zhejiang; Holarctic.

Host. Rosa spp. and *Fragaria* sp.[8, 23]

Specimens examined. 1 1 , Evrecea, China, VII. 10. 1929; 1 , Shennongjia, Hubei, VII. 13. 1983, X. Mao; 1 , West Tianmushan, Zhejiang, June 1~3, 1985, Liu Fuming.

Cladius pectinicornis (Fourcroy) (Fig. 2) *Tenthredo pectinicornis* Fourcroy, 1785: 374. *Tenthredo alces* Thunberg, 1789: 7. *Cladius ramicornis* Andr , 1880: 80. *Cladius crassicornis* Konow, 1884: 314. *Cladius hyalinopterus* Konow, 1886: 75. *Cladius ordubadensis* Konow, 1890: 244. *Cladius palmicornis* Konow, 1891: 212. *Cladius orientalis* Cameron, 1902: 448.

Note. . Basal joints of antenna as in Fig. 2a; lancet as shown in Figs. 2b, 1st annulus distinctly curved cau-

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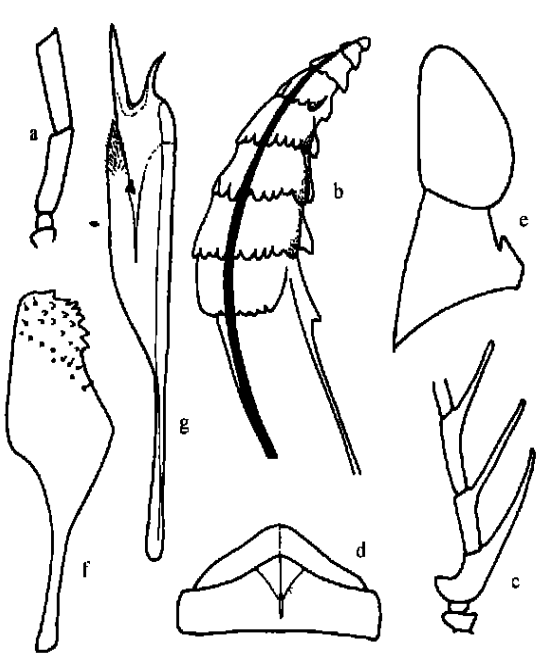
dalwards in lower half.　　. Basal joints of antenna as in Fig. 2c; the 8th and 9th tergites as in Fig. 2d; genitalia as in Fig. 2e– g, harpe short and broad.

Distribution. China: Heilongjiang, Inner Mongolia, Xinjiang, Gansu; Europe, Minor Asia, Siberia, Japan.

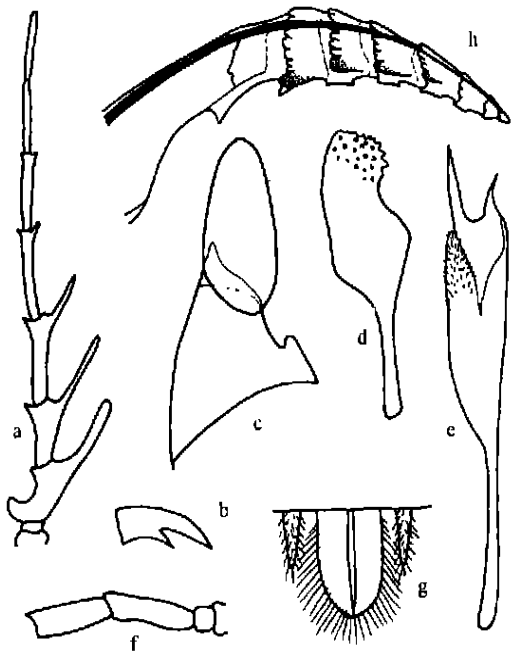
Host. *Rosa* spp., *Fragaria* spp., *Sanguisorba* sp.[8].

Specimens examined. 1　, Hebei, Minor Wutai Mt., 1 200~ 1 600m, B. Li; 1　, Manas, Xinjiang, 1 160 ~ 2 900 m, VII. 15. 1957, C. Hong; 1　, Hailar, Inner Mongolia, VII. 24. 1981, L. Zheng; 1　, Harbin, Heilongjiang, VIII. 8. 1964; 1　, Mt. Takao, Aug. 20, 1932; 1　, Xinglongshan, Gansu, Aug. 2, 1993, Lu Nan.



a Basal four segments of female antenna, b Lancet, c Basal five male antennal segments, d Apical two tergites in male, e Harpe and parapenis, f Gonolacinia, g Penis valve

Fig. 2 ***Cladius pectinicornis***



a Male antenna, b Claw, c Harpe and parapenis, d Gonolacinia, e Penis valve, f Basal four female antennal segments, g Sheath and cerci in dorsal view, h Lancet

Fig. 3 ***Cladius similis***

Cladius similis sp. nov. (Figs. 3)

. Body length 4. 3 mm. Black with tegula brown; each tibia and basitarsus of four posterior legs yellowish, other joints of hind tarsus brown. Wing infuscate in basal half and hyaline towards apex, vein C brown, stigma blackish brown. Body impunctate. Head strongly narrowing behind eyes; postocellar area 3x broader than long, lateral furrows deep and straight, postocellar furrow absent; median fovea shallow. Clypeus shallowly and roundly incised; malar space equal to distance between antennal sockets. Antennal segments 3 to 6 pectinate, 7th joint with a short distal process (Fig. 3a). CD= 0. 8. Basitarsus of front leg distinctly longer than following 3 segments together; inner spur of hind tibia longer than apical breadth of hind tibia and almost half as long as hind basitarsus; claw with inner tooth quite short (Fig. 3b). Genitalia as shown in Fig. 2c– e, harpe long and slender.

. Body length 4. 5 mm. Similar to female except for: tegula black, vein C vein blackish brown, hind trochanters pale, apex of hind tibia brown, hind tarsus blackish, wing darker, malar space short. Basal 4 antennal joints as in Fig. 3f, 3rd and 4th segments each with a minute process at upper apex. Apex of sheath truncate and almost straight ventrally in lateral view; sheath in dorsal view as in Fig. 3g, cerci about half as long as sheath. Lancet rather slender (Fig. 3h), total length of serrulae about 3. 5x longer than width of 2nd annulus, 1st annulus oblique forward, with 2 large teeth below, tangium very large.

Distribution. China: Henan, Zhejiang, Hubei, Hunan.

Holotype:　, Chusan Islands, Zhejiang, June 30, 1931, O. Piel (IZAS). Paratypes:　, Tianmushan Mt.,

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Zhejiang, May 27, 1936, T. C. Ma (IZAS). 1 , abdomen and left wing lost, data same as the holotype (IZAS); 1 , Xingyang, Henan, 1985; 1 , Luanchuan, Henan, VII. 12. 1996, M. Wei; 1 , Zhuzhou, Hunan, V. 18. 1995, M. Wei, H. Nie; 1 , Guadun, Fujian, June 23, 1980, Qi Shichen (CSFU).

Remarks. This new species is closely allied to C. *difformis*, but differs from it in the form of male antenna, the characters of female lancet and male genitalia as shown in figures and key. The short cerci can distinguish the new species from known species of the genus. 2. 3 **New combinations for *Cladius cornicularius* Zhelochovtsev** 1952**, *C. corniger* Zhelochovtsev** 1952 **and *C. nubilis* Konow** 1897

Zhelochovtsev[5] and Konow[28] placed these three species in Cladius, when they recognised only one genus in the tribe *Cladiini*. However, based on the original descriptions and the notes given by Zhelochovtsev[5] they should be transferred to the genus *Priophorus* as three genera have been recognised in the tribe. Therefore, three new combinations should be proposed: *Priophorus cornicularius* (Zhelochovtsev 1952) comb. nov., *P. corniger* (Zhelochovtsev 1952) comb. nov. and *P. nubilis* (Konow 1897) comb. nov. These three species will be further discussed in the revision of the genus *Priophorus* of China.

3 Genus *Driocampus* Zhang

Driocampus Zhang, 1990: 29.

Type species: *Driocampus shanwanganus* Zhang 1990, original designation.

This is a fossil genus containing 1 species from East China. Zhang[29] suggested that *Driocampus* be nearly identical with *Eohemichroa* Zhelochovtsev et Rasnitsyn by the figure. However, the figures 9 and 10 in the paper of Zhelochovtsev and Rasnitsyn[30] were reversed and should be read Fig. 10 and 9. It is easy to judge the error according to the original figures and descriptions in Cockerell[31] and Brues[32]. *Driocampus*, therefore, is somewhat allied to *Mesoneura* and remote from *Eohemichroa*, the latter belonging to Mesoneurini. *Driocampus* has the vein M and Cu1 in hind wing isolated in basal parts, a character only found in Xyelidae. This character seems no doubt a pleisiomorphy. However, its bearing on the phylogeny of Tenthredinidae remains to be studied.

***Driocampus shanwanganus* Zhang**

Driocampus shanwanganus Zhang, 1990: 30.

Type number: K0057, preserved in Shandong Geological Museum.

Distribution. China: Shandong.

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中国枝角叶蜂族(膜翅目: 叶蜂亚目: 突瓣叶蜂科) (I)

枝角叶蜂族和丛林叶蜂属简记以及栉角叶蜂属厘订

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摘　要: 简要评述了中国枝角叶蜂族以及丛林叶蜂属 *Driocampus* Zhang, 厘订了枝角叶蜂属已知种, 描述了 1 个新种: 短尾枝角叶蜂 *Cladius similis* sp. nov.. 原放在枝角叶蜂属内的 *Cladius cornicularius* Zhelochovtsev 1952, *C. corniger* Zhelochovtsev 1952 and C. *nubilis* Konow 1897 等 3 个种被移入拟栉叶蜂属内, 建立了 3 个新组合: *Priophorus cornicularius*(Zhelochovtsev 1952), *P. corniger* (Zhel. 1952), *P. nubilis* (Zhel. 1952). 三突枝角叶蜂 *Cladius difformis* (Panzer) 为中国新纪录种. 编制了枝角叶蜂族已知属及枝角叶蜂属已知种检索表.

关键词: 膜翅目; 突瓣叶蜂科; 枝角叶蜂族; 枝角叶蜂属; 丛林叶蜂属
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