



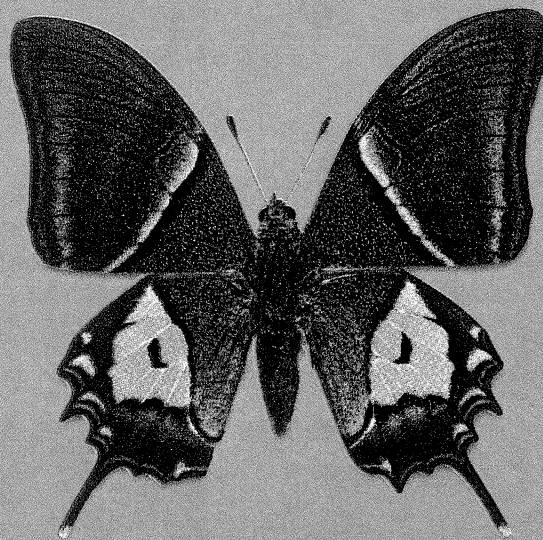
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The genus *Carinostigmus* Tsuneki (Hymenoptera: Crabronidae) with two newly recorded species from China

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Abstract: The genus *Carinostigmus* Tsuneki (Crabronidae: Pemphredoninae: Pemphredonini) from China, including 9 species, is reviewed and a key to the Chinese species is provided. Two species are reported from China for the first time: *Carinostigmus costatus* Krombein, 1984 and *Carinostigmus maior* (Maidl, 1925).

Key words: Hymenoptera; Crabronidae; *Carinostigmus*; new record; China

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中国隆痣短柄泥蜂属研究及二新记录种记述（膜翅目：方头泥蜂科）

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摘要: 记述我国已知的隆痣短柄泥蜂属 *Carinostigmus* Tsuneki 9 种, 其中包括 2 中国新记录种: 脉隆痣短柄泥蜂 *Carinostigmus costatus* Krombein, 1984, 以及弯柄隆痣短柄泥蜂 *Carinostigmus maior* (Maidl, 1925)。编制了中国隆痣短柄泥蜂属已知种类检索表。

关键词: 膜翅目; 方头泥蜂科; 隆痣短柄泥蜂属; 新记录; 中国

Introduction

The genus *Carinostigmus* Tsuneki includes 35 species and 1 subspecies of small- to medium-size predatory solitary wasps worldwide, of which 1 species occurs in the Palearctic, 21 in the Oriental, 12 species with 1 subspecies in the Ethiopian, and 1 in both the Palearctic and Oriental Regions (Maidl 1925; Tsuneki 1954, 1963, 1966, 1967, 1971, 1974, 1976, 1977, 1992; Bohart & Menke 1976; Krombein 1984; Pulawski 2010). 7 species in this genus have been recorded from China (Li & Yang 1995; Li & He 2004). During our study of *Carinostigmus* of China, two new records from China were discovered. A key to the Chinese species of the genus is provided. The new records are reported below.

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Material and methods

The specimens examined during this study were deposited in the following institutions: Yunnan Agricultural University, Kunming, Yunnan, and Zhejiang University, Hangzhou, Zhejiang, China.

The specimens were observed and illustrated with the aid of an Olympus stereomicroscope (SZ Series, Japan) with an ocular micrometer. For the terminology we mainly follow Bohart & Menke (1976).

Key to species of the genus *Carinostigmus* Tsuneki from China

1. Scrobal suture of mesopleuron weak to lacking2
 - Scrobal suture of mesopleuron broad, distinctly crenate, short or long6
2. Interantennal tubercle simple, small3
 - Interantennal tubercle conspicuously long and narrow5
3. Upper frons with dense, slender ridges; vertex impunctate*C. filippovi* (Gussakovskij)
 - Upper frons smooth and shiny, with several tiny punctures; vertex with sparse, fine punctures4
4. Basal half of mandible, and scape reddish brown*C. nozakai* Tsuneki
 - Mandible ivory basally, yellowish medially; scape beneath ivory*C. tanoi* Tsuneki
5. Scutum half mat, with fine sparse punctures; admedian line distinct; parapsidal line weakly impressed; mesopleuron with fine, sparse punctures*C. kaihuanaus* Li & Yang
 - Scutum shiny, with large sparse punctures; admedian line inconspicuous; parapsidal line distinct; mesopleuron impunctate*C. saigusai* (Tsuneki)
6. Posterior surface of propodeum with sparse, sturdy, oblique longitudinal rugae anteriorly, remainder reticulate*C. iwatai* (Tsuneki)
 - Posterior surface of propodeum with sturdy, irregular reticulation7
7. Clypeus slightly convex, free margin shallowly emarginated medially; gena rugate ventrally
 -*C. costatus* Krombein
 - Clypeus moderately convex, free margin deeply emarginated medially; gena punctate ventrally8
8. Dorsal surface of petiole with a distinct, median longitudinal carina posteriorly, lateral surface with two distinct lateral carina; pronotal collar with several sturdy, longitudinal rugae laterally; frontal median carina not reaching anterior ocellus*C. maior* (Maidl)
 - Dorsal and lateral surfaces of petiole smooth, without carina; pronotal collar without rugae laterally; frontal median carina reaching anterior ocellus*C. formosanus* (Tsuneki)

1. *Carinostigmus costatus* Krombein, 1984 (Figs. 1–3), new record to China

Carinostigmus costatus Krombein, 1984: 15. Holotype: ♀, Sri Lanka: Western Province: Colombo District: Gampaha Botanical Garden (USNM).

Description. Female. Body length 5.2–5.7 mm. Black; mandible largely reddish brown, black at apex, basal area with narrow ivory band; antennal joints I–IV fulvous; pronotal tubercles ivory; fore and mid tibiae largely and tarsi fulvous to reddish brown, hind leg dark brown to black.

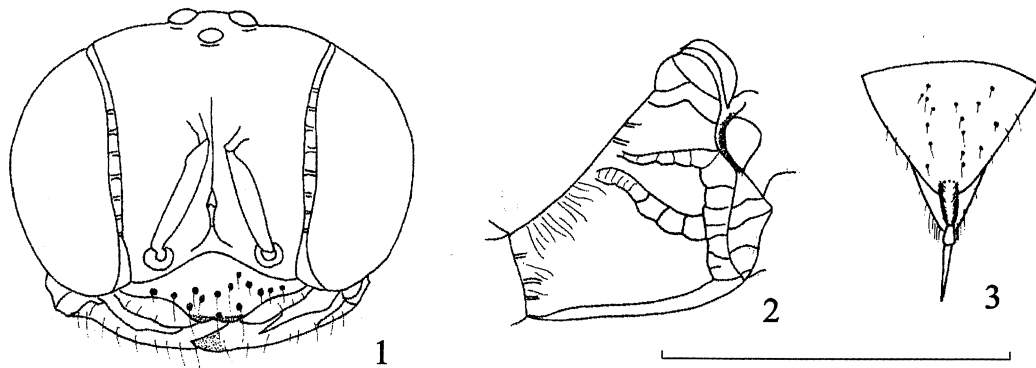
Mandible tridentate apically. Clypeus with sparse, large punctures; free margin with narrow, distinctly turned up prominence, apex slightly emarginate medially (Fig. 1). Lower frons coriaceous, dull, with broad, fairly deep frontal median furrow, which is separated from upper frons distinctly. Inner orbital furrow somewhat broad, finely crenate, inner marginal

carina distinct.

Scutum with large, scattered punctures, posterior area with several strong parallel ridges, longer in middle than laterally. Mesopleuron with slender, sparse longitudinal ridges posteriorly, scrobal suture, omaulus and hypersternaulus much broadened, distinctly crenate (Fig. 2). Propodeal enclosure moderately impressed, triangular, with sturdy longitudinal rugae; posterior surface with broad, shallow median groove, remainder with sturdy reticulation.

Dorsal surface of petiole shiny, slightly convex and widened toward apex slightly, with a few weak longitudinal rugae; lateral surface with a few weak carinae. Pygidial area shiny and smooth, elongate ellipsoidal, edged by carina and dense setae (Fig. 3).

Male. Similar to female except as follows: body length 4.8–5.1 mm; mandible largely black, reddish brown apically; scape and flagella black; mandible bidentate apically; inner orbital furrow narrow; flagellum without tyloids; dorsal surface of petiole nearly cylindrical.



Figures 1–3. *Carinostigmus costatus* Krombein, 1984, rec. nov. (♀). 1. Hend, frontal view; 2. Mesopleuron, frontal view; 3. Pygidial area, dorsal view (scale line for Figs. 1–3 = 1 mm)

Specimens examined: 2♀7♂, **China:** Yunnan, Baoshan, Longyang, Lujiang, Pumanshao, 24°55'N 98°47'E, 17 & 21-VII-2006, Li MA, Rui ZHANG, Hesheng WANG; 1♂, Dehong, Yingjiang, Pingyuan Town, Yunyanshan, 24°42'N 97°55'E, 15-VIII-2005, Li MA; 3♀, Hekou, Nanxi, 22°37'N 103°56'E, 21-VII-2003, Qiang LI; 2♀, Mengla, Shangyong, 21°17'N 101°41'E, 19 & 20-V-2005, Peng WANG; 1♀, Mengla, Shangyong, 21°17'N 101°41'E, 21-V-2005, Peng WANG; 1♀, Dali, Nanjian, 25°02'N 100°30'E, 05-V-2005, Li MA; 1♀, Dehong, Lianghe, Zhedao, 24°48'N 98°17'E, 16-VIII-2005, Haiyan ZHANG; 1♀, Simao, Jinggu, Weiyuan, 23°29'N 100°42'E, 04-X-2004, WANG Hesheng; 5♀, Dali, Nanjian, 25°02'N 100°30'E, 04-X-2004, Li MA, Baoxin DONG; 1♀, Nujiang, Fugong, Shangpa, 26°54'N 98°52'E, 24-VIII-2003, Peng WANG; 1♀, Nujiang, Lushui, Shangjiang, Binggong, 25°38'N 98°50'E, 19-VII-2006, Li MA; 1♀, Xishuangbanna, Daluo Forest Park, 21°41'N 100°02'E, 02-X-2004, Haiyan ZHANG; 2♀, Simao, Jingdong, Jingping, 23°11'N 101°27'E, 01-V-2005, Chunju LIU; 1♀, Dehong, Yingjiang, Taipingxiang, 24°40'N 97°51'E, 15-VIII-2005, Chunju LIU; 1♀, Xishuangbanna, Yexianggu, 22°10'N 100°52'E, 23-IV-2006, Hesheng WANG; 1♀, Zhaotong, Yongshan, Huanghua, 27°59'N 103°33'E, 19-VII-2004, Chunju LIU; 1♀, Lincang, Manwan, 24°38'N 100°29'E, 02-V-2005, Baoxin DONG; 1♀, Baoshan, Lujiangba, 24°56'N 98°50'E, 20-VII-2006, Li MA; 1♀, Tengchong, 25°06'N 98°31'E, 27-IV-1981, NO.812185, Junhua HE; 1♂, Mojiang, 23°25'N 101°37'E, 05-IV-1981,

NO.811508, Junhua HE; 1♀, Shaoguan, Chebaling, 24°41'N 113°35'E, 10-VII-2003, Zaifu XU; 1♀, Shaoguan, 24°46'N 113°35'E, 12-V-1992, NO.921115, Yun MA; 1♀, Fengkai, Heishiding, 23°30'N 110°52'E, 15-VIII-2003, NO.200707341, Jujian CHEN; 1♂, **China:** Guangxi, Longsheng, Huaping, 25°47'N 110°00'E, 25 & 26-VI-1982, No. 824550, Junhua HE; 1♂, **China:** Guizhou, Luodian, 25°26'N 106°44'E, 02-VI-1981, Fasheng LI.

Distribution. China (Guangdong, Guangxi, Guizhou, Yunnan), Sri Lanka.

2. *Carinostigmus maior* (Maidl, 1925) (Figs. 4–6), new record to China

Stigmus maior Maidl, 1925: 377. Holotype: ♂, Thailand: Muangfang (Sasayama). Tsuneki, 1954: 4 (key; as *major*), 11 (description; as *major*); As *Carinostigmus maior*: Bohart & Menke, 1976: 191 (new combination, listed), 629 (Tsuneki's spelling *major* is an emendation).

Stigmus monstrosus Tsuneki, 1963: 16. Synonymized with *Stigmus maior* by Tsuneki, 1974: 640. As *Carinostigmus monstrosus*: Bohart & Menke, 1976: 191 (new combination, listed), 628 (is a synonym of *Carinostigmus maior*).

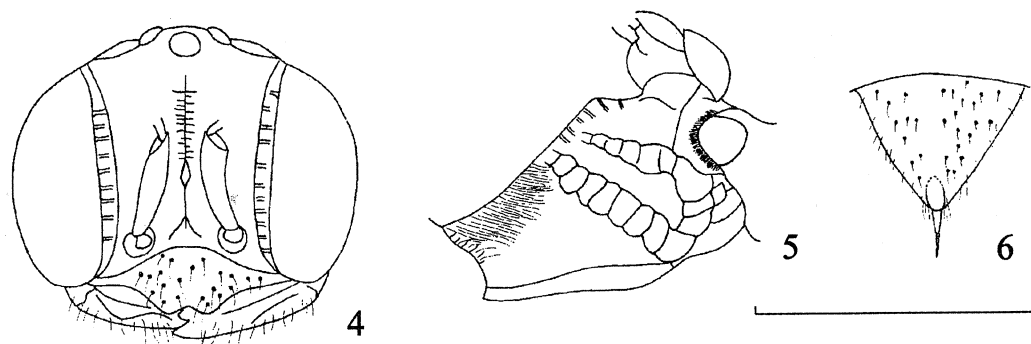
Description. Female. Body length 6.2–6.5 mm. Black; mandible largely reddish brown; antennal joints I–VI fulvous; pronotal tubercles ivory; trochanters, tarsi, fore and mid tibiae, fore femur above, base and apex of mid femur, basal one third of hind tibia fulvous.

Mandible tridentate apically. Clypeus with several large punctures, free margin with two big round teeth medially (Fig. 4). Lower frons irregularly rugate, shiny, with broad, deep frontal median furrow, longitudinal carina not reaching anterior ocellus, inner orbital furrow broad, coarsely crenate, marginal carina distinct.

Scutum with large sparse punctures, anterior area with dense or sparse, sturdy transverse ridges, posterior area with several strong parallel ridges. Mesopleuron with sturdy, dense longitudinal rugae posteriorly, scrobal suture, omaulus and hypersternaulus much broadened, strongly crenate (Fig. 5). Propodeal enclosure shallowly impressed, triangular, with sturdy longitudinal rugae.

Dorsal surface of petiole subquadrate, strongly convex and widened toward apex distinctly, with a distinct median longitudinal carina at posterior half; lateral surface with two distinct lateral carinae. Pygidial area shiny, oval and depressed (Fig. 6).

Male. Similar to female except as follows: body length 5.7–6.0 mm; antennal joints IV–VI dark brown; mandible bidentate apically. Flagellomeres without tyloids.



Figures 4–6. *Carinostigmus maior* (Maidl, 1925), rec. nov. (♀). 4. Head, frontal view; 5. Mesopleuron, frontal view; 6. Pygidial area, dorsal view (scale line for Figs. 4–6 = 1 mm).

Specimens examined: 4♀, **China:** Yunnan, Mengla, Wangtianshu, 21°30'N 101°34'E, 01-VI-2006, Hesheng WANG; 18♀5♂, Mengla, Wangtianshu, 21°30'N 101°34'E, 02-04-V-2005, Peng WANG; 10♀, Xishuangbanna, Daluo Forest Park, 21°41'N 100°02'E, 02-X-2004, Chunju LIU, Kai WU, Baoxin DONG, Haiyan ZHANG.

Distribution. China (Yunnan), Indonesia, Thailand, Malaysia, Laos.

3. *Carinostigmus filippovi* (Gussakovskij, 1934)

Stigmus filippovi Gussakovskij, 1934: 83. Holotype: ♀, Japan: Honshu: Takao-san 60 km of Tokyo (ZIL). Tsuneki, 1954: 4 (key), 12 (description); As *Carinostigmus filippovi*: Bohart and Menke, 1976: 191 (new combination, listed).

Distribution. China (Sichuan: Emeishan Mount), Japan, Russia.

4. *Carinostigmus formosanus* (Tsuneki, 1954)

Stigmus formosanus Tsuneki, 1954. Holotype: ♀, Taiwan: Nantou Prefecture: Raisha, now Sungkang (Hokkaido Univ.). Tsuneki, 1971: 5 (Taiwan). As *Carinostigmus formosanus*: Bohart and Menke, 1976: 191 (new combination, listed).

Stigmus taiwanensis Tsuneki, 1966: 15, 1967: 9. Synonymized with *Stigmus formosanus* by Tsuneki, 1971: 5.

Distribution. China (Taiwan).

5. *Carinostigmus iwatai* (Tsuneki, 1954)

Stigmus iwatai Tsuneki, 1954: 15. Holotype: ♀, China: Hainan Island: Tonfan-sun (originally K. Tsuneki coll., now Hyogo Mus.). Tsuneki, 1967: 9 (Taiwan). As *Carinostigmus iwatai*: Bohart and Menke, 1976: 191 (new combination, listed).

Stigmus thailandinus Tsuneki, 1963: 17. Synonymized with *Stigmus iwatai* by Tsuneki, 1974: 641; As *Carinostigmus thailandinus*: R. Bohart and Menke, 1976: 191 (new combination, listed), 628 (is a synonym of *Carinostigmus iwatai*).

Distribution. China (Shaanxi, Guangdong, Guangxi, Zhejiang, Fujian, Yunnan, Guizhou, Hainan, Taiwan), Malaysia, Thailand.

6. *Carinostigmus kaihuanaus* Li and Yang, 1995

Carinostigmus kaihuanaus Li and Yang, 1995: 272. Holotype: ♀, China: Zhejiang Province: Kaihua County: Mt. Gutian at 29°03'N 118°02' (Beijing Agricult. Univ.). Li and He, 2004: 1106 (in hymenopterous fauna of Zhejiang Province, China).

Distribution. China (Shaanxi, Henan, Hunan, Fujian, Zhejiang, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan, Hainan).

7. *Carinostigmus nozakai* Tsuneki, 1977

Carinostigmus nozakai Tsuneki, 1977: 14. Holotype: ♂, Taiwan: Nantou Prefecture: Pempuchi (originally K. Tsuneki coll., now Hyogo Mus.).

Distribution. China (Taiwan).

8. *Carinostigmus saigusai* (Tsuneki, 1966)

Stigmus saigusai Tsuneki, 1966: 17. Holotype: ♀, Taiwan: Chiayi Hsien: Chihsinliao (Kyushu Univ.). Tsuneki, 1967: 9 (Taiwan). As *Carinostigmus saigusai*: Bohart and Menke, 1976: 191 (new combination, listed).

Distribution. China (Yunnan, Taiwan).

9. *Carinostigmus tanoi* Tsuneki, 1977

Carinostigmus tanoi Tsuneki, 1977: 15. Holotype: ♂, Taiwan: Nantou Prefecture: Pempuchi (originally K. Tsuneki coll., now Hyogo Mus.)

Distribution. China (Shaanxi, Guangdong, Zhejiang, Fujian, Sichuan, Guizhou, Yunnan, Taiwan).

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