

## ORIGINAL ARTICLE

# Two new species of the *Tenthredo grahami* group from China (Hymenoptera: Tenthredinidae), with a revised key to species

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**Abstract** Two new species of the *Tenthredo grahami* group of Tenthredinidae, Hymenoptera, from Sichuan and Tibet of China are described here, namely *T. nigrobullifera* **sp. nov.** and *T. megamaculata* **sp. nov.** A diagnosis and a revised key to species of the *Tenthredo grahami* group are provided. All type specimens of the new species are deposited in the Asian Sawfly Museum, Nanchang, China (ASMN).

**Key words** Symphyta, Tenthredininae, *Tenthredo*, taxonomy, sawflies.

## 1 Introduction

The genus *Tenthredo* Linnaeus is the largest genus of Tenthredinidae, including more than 1000 valid extant species worldwide (Taeger *et al.*, 2010, 2016; Niu *et al.*, 2019). Excluding the species described in this paper, a total of 319 species of the genus have been recorded in China (Niu *et al.*, 2019).

The *Tenthredo grahami* group was firstly defined by Liu & Wei (2013). Eleven species of the *Tenthredo grahami* group have been described from Asia. Among them, nine species are recorded in China, of which seven are endemic to China. In this paper, two additional new species of the group are described from Sichuan and Tibet of China, respectively.

## 2 Material and Methods

The type specimens of the new species are deposited in the Asian Sawfly Museum, Nanchang (ASMN).

Specimen images were taken using a digital camera with a series of images montaged using Helicon Focus (©HeliconSoft).

Terminology of sawfly genitalia follows Ross (1945), and terminology of wing venation follows Niu & Wei (2010).

## 3 Taxonomy

### *Tenthredo grahami* group

**Diagnosis.** The species of the *T. grahami* group can be easily recognized by the combination of following characters: the alive body mainly green with broad black maculae on dorsum of head and thorax, the pterostigma entirely green, and the

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supraantennal tubercles strongly elevated and abruptly cut off from the frontal walls.

General description. Body mainly green in alive but brownish yellow in dried specimens, dorsum of head and of thorax with broad black maculae, mesepisternum usually with narrow black stripe; legs green with black stripe; pterostigma yellowish green; antenna filiform, not longer than length of head and thorax, flagellum entirely black, third antennomere clearly longer than forth antennomere, subapical antennomeres indistinctly dilated; clypeus broader than shortest distance between eyes, anterior margin shallowly incised; malar space not longer than diameter of lateral ocellus; supraantennal tubercles strongly elevated, not shorter than length of frons, dorsum round, posterior end sharply cut off from frontal walls; frontal walls low and obtuse; postocellar area transverse; occipital carina complete and sharp, ventral fold absent; mesoscutellum roundly elevated, without carina; mesepisternum roundly and weakly elevated, without peak, ventral thorn absent; anal cell in hind wing sessile; ovipositor sheath not shorter than length of front tibia; dorsum of head and thorax weakly microsculptured, without distinct puncture, less shiny; lancet long and narrow, distinctly sclerotized; penis valve sclerotized in dorsal half, apical margin more or less produced, sometimes with a long process.

Remarks. Species of the *T. grahami* group occurs only in Eastern Asia. In the Zhelochovtsev (1988) system of *Tenthredo*, species of the *T. grahami* group belongs to subgenus *Olivacedo*.

***Tenthredo nigrobullifera* sp. nov.** (Figs 1A–B, 2)

Diagnosis. This new species is similar to *T. bullifera* Malaise, 1945, but differs from the latter by the body having much more black maculae, the hairs on dorsum of head much longer and apically curved, the pterostigma black, and the male penis valve with a broad triangular apical process.

Description. Female. Body length 12.0–14.0 mm (Fig. 1A). Head and thorax black, following parts yellowish green in alive: palpi, basal 2/5 of mandible, labrum, clypeus except narrow basal margin, triangular supraclypeal area (Fig. 2A), supraantennal tubercles, narrow inner orbit and connected subtriangular macula on temple, lateral stripes of postocellar area (Fig. 2B), lower 3/5 of hind orbit, lower anterior lobe and lateral corner of pronotum, tegula, a V-shaped stripe on posterior of mesoscutal middle lobe, mesoscutellum except narrow hind margin, mesoscutellar appendage, metascutellum (Fig. 1A), narrow base of metapostnotum, two big maculae on mesepisternum and entire metepisternum (Fig. 2D). Abdomen yellowish green, broad basal band of each segment black (Fig. 1A), upper margin of basal plate black, ovipositor apical sheath brown (Fig. 2E). Leg black, outer stripe on each coxa, anterior side of fore femur largely, narrow dorsal stripe on middle femur and apex of hind femur, middle 3/5 of each tibia, 1st to 4th tarsomeres except apex and 5th tarsomere entirely yellow green. Hairs on head and thorax black brown, pubescence on labrum, margin of clypeus and most of tibia and tarsi light brown. Wings hyaline, apex of vein C and pterostigma black, vein C except apex and R1 pale brown.

Dorsum of head (Fig. 2B) strongly shiny, black part with fine microsculptures, impunctate; mesonotum with fine and dense microsculpture, weakly shiny, margin of mesonotum with small punctures; mesoscutellum largely shining, posterior margin of mesoscutellum and lateral sides of mesoscutellar appendage with fine microsculpture; upper half of mesopleuron weakly microsculptured, lower half finely and densely microsculptured, punctures indistinct; metapleuron largely polished; all abdominal tergites distinctly microsculptured, weakly shiny; lateral of apical sheath weakly microsculptured, weakly shiny.

Length of hairs on dorsum of head, mesonotum, mesoscutellum and mesopleuron about 2, 1, 1.5 and 1.3 times diameter of lateral ocellus, respectively, apex of hairs on dorsum of head distinctly curved. Apex of labrum round; clypeus flat and much broader than distance between eyes below, anterior margin emarginated to a depth of 0.25 times length of clypeus (Fig. 2B); malar space 1.2 times diameter of lateral ocellus; distance between eyes below about 0.8 times longest axis of an eye; supraantennal tubercles strongly elevated, free-standing and parallel to each other, height 0.9 times its width, length about 2 times its height and 1.5 times the length of postocellar area, distance between tubercles 0.9 times its height, posterior end abruptly cut off from frontal ridges, bottom of median fovea with distinct carina; interocellar furrow deep and straight, postocellar furrow shallow; postocellar area flat, without middle carina or middle furrow, width 1.5 times its length; lateral furrows slightly curved, distinctly divergent backwards; temple in dorsal view 0.8 times length of eyes, both sides obtusely convex (Fig. 2B); occipital carina sharp and complete, low part without fold. Antenna as long as head and thorax together, 3rd antennomere 1.65 times length of 4th antennomere, subapical antennomeres not dilated, 8th antennomere twice as long as board (Fig. 2I). Mesoscutellum obtusely elevated, slightly higher than mesonotum, without middle longitudinal and transversal carina; mesoscutellar appendage with low and short middle carina; distance between cenchri 2.7 times longest axis of a cenchrus; middle of mesepisternum weakly and subtriangularly elevated, without sharp peak or carina, ventral thorn absent. Hind tibia 0.85 times as long as tarsus, basitarsus slightly shorter than following three tarsomeres together, inner tibial spur about 0.65 times length of basitarsus, basitarsus slender, tarsal pulvillus developed, distance between basal two pulvilli 2 times length of 1st pulvillus; claw with a small basal lobe, inner tooth shorter than outer tooth. Vein cu-a in fore

wing joining cell 1M at basal 0.33, cell 2Rs longer than 1Rs; hind anal cell sessile. Ovipositor sheath slightly bent ventrally, apical sheath narrow, about 2 times length of basal sheath, apical margin round (Fig. 2E). Setae on sheath mostly straight. Lancet very narrow and long with 15 oblique serrulae, annular suture strongly oblique with indistinct annular spine band, ctenidia weakly developed (Fig. 2C); 5th–7th serrulae as Figure 2H, each with about 14 small outer subbasal teeth, spiculella small but distinct.

Male. Body length 11.0–12.0 mm (Fig. 1B). Body color and structure similar to female, but sometimes mesosternum with a middle triangular green spot, malar space about 0.5 times diameter of lateral ocellus, in dorsal view temple 0.5 times as long as eyes; subgenital plate slightly longer than broad, apex narrowly truncate; gonoforcep as in Figure 2F, harpe longer than broad, apex round; penis valve as in Figure 2G, valviceps with a short and triangular apical lobe.

Material examined. Holotype. ♀, China, Tibet, Motuo County, 24K (29°47'N, 95°42'E; elev. 3663 m), 21 June 2009, Meicai Wei leg. Paratypes. 5♀3♂, Tibet, Motuo County, Lage (29°34'N, 94°59'E; elev. 3740 m), 15 June 2009, Zejian Li leg.; 6♀1♂, Tibet, Motuo County, Hanmi (29°22'N, 95°7'E; elev. 2180 m), 16 June 2009, Zejian Li leg.; 1♀, Tibet, Motuo County, 2K (29°45'N, 95°43'E; elev. 3272 m), 17 June 2009, Gengyun Niu leg.; 2♂, Tibet, Motuo County, 2K (29°45'N, 95°43'E; elev. 3272 m), 17 June 2009, Meicai Wei leg.; 7♀11♂, Tibet, Motuo County, 24K (29°47'N, 95°42'E; elev. 3663 m), 21 June 2009, Meicai Wei leg.; 3♀5♂, Tibet, Motuo County, 24K (29°47'N, 95°42'E; elev. 3663 m), 21 June 2009, Gengyun Niu leg.; 1♀, Tibet, Motuo County, 30K (29°45'N, 95°42'E; elev. 3808 m), 20 June 2009, Gengyun Niu leg.; 1♀, Tibet, Motuo County, 30K (29°45'N, 95°42'E; elev. 3808 m), 20 June 2009, Meicai Wei leg.

Distribution. China (Tibet).

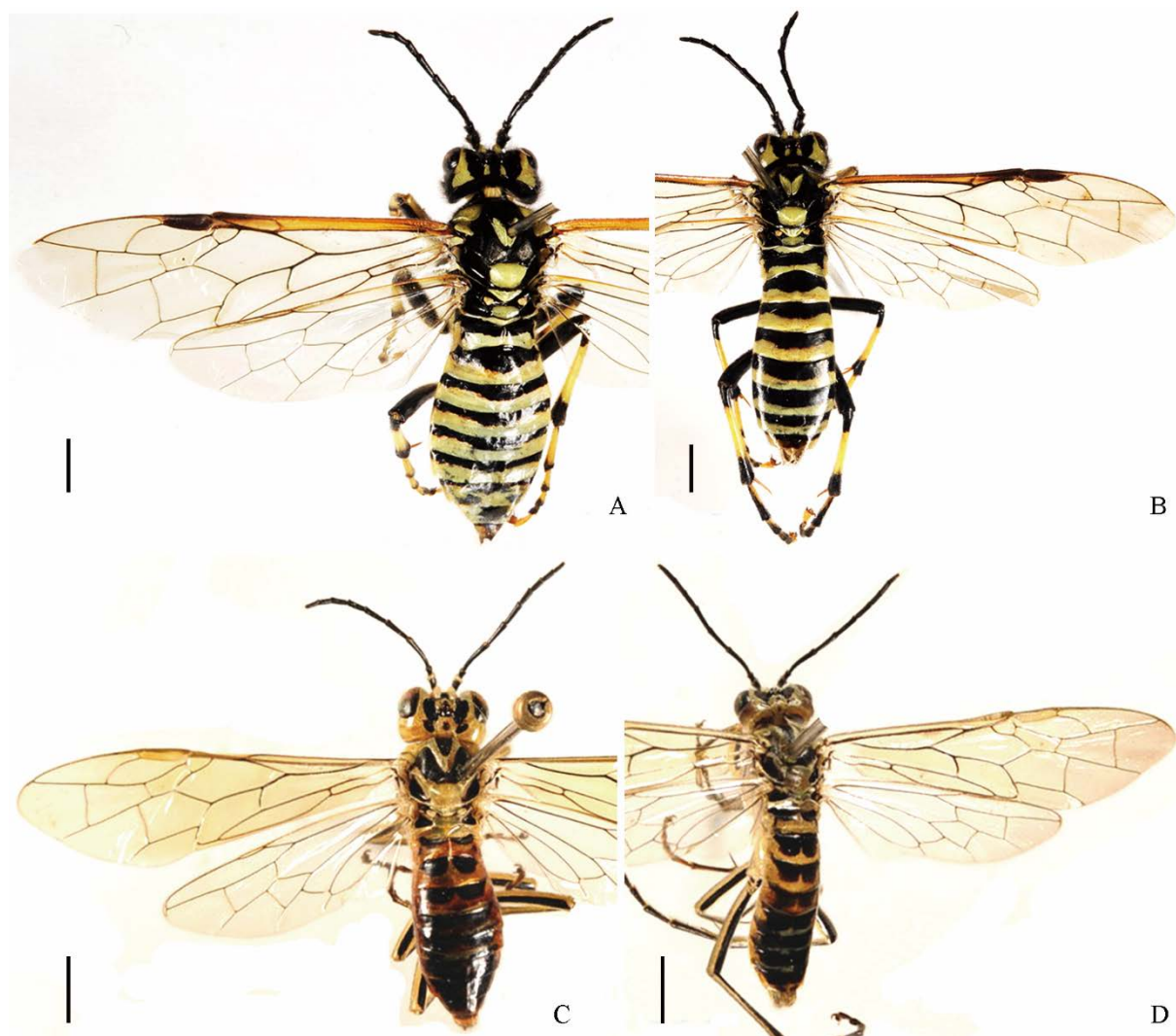


Figure 1. *Tenthredo* spp., adults. A–B. *T. nigrobullifera* sp. nov. C–D. *T. megamaculata*, sp. nov. A, C. Female; B, D. Male. Scale bars = 1.0 mm.

**Etymology.** This new species is named after its body color as it has the richest black spots in the *Tenthredo grahami* group.



Figure 2. *Tenthredo nigrobullifera* **sp. nov.** A. Female head, front view. B. Female head, dorsal view. C. Lancet. D. Mesopleuron and metapleuron, female. E. Apical segments of abdomen and ovipositor, lateral view. F. Gonoforcep. G. Penis valve. H. The 5th–7th serrulae. I. Female antenna.



***Tenthredo megamaculata* sp. nov.** (Figs 1C–D, 3)

**Diagnosis.** This new species is most similar to *T. gulmargi* Singh & Saini, 1987 from North India, but differs from the latter by the black spots on the 2nd to 8th abdominal tergites distinctly longer than half length of abdominal tergites, the 5th cypsella of lancet much shorter than 5th serrula, the male penis valve with narrow and long apical process, and the apex of parapenis almost truncate without inner process, while in *T. gulmargi*, the black spots on abdominal tergites about half length of the abdominal tergite, the 5th cypsella of lancet as long as 5th serrula, the male penis valve simple without apical process, and the apex of parapenis with a distinct inner process).

**Description.** Female. Body length 10.5–11.5 mm (Fig. 1C). Body and legs light green in alive by yellow brown in dried; following parts black: median fovea and connected broad lateral stripes of frons and postocellar area, ocellar basin, a small middle spot on postocellar area (Fig. 3B), antenna except apex of first antennomere, a narrow transverse stripe on bottom of pronotum, a wide middle stripe on mesoscutal middle lobe, dorsum of mesoscutal lateral lobe, bottom of parapsides, basal 1/3 of 1st abdominal tergite, middle strongly constricted basal bands on dorsum of 2nd to 8th abdominal tergites (Fig. 1C), slightly curved vertical narrow stripe on mesepisternum (Fig. 3D), a dorsal narrow stripe on all legs from trochanter to tarsi; most hairs on upper 2/5 of hind orbit and dorsum of head, thorax and abdomen black, setae on sheath brown, most hairs on lateral and ventral side of body silver. Wings hyaline, pterostigma and vein C yellow green, other venation brownish.

Dorsal side of head (Fig. 3B) with fine but clear microsculpture, weakly shiny, microsculpture within black spots more distinct; mesonotum finely but densely sculptured, lateral lobe with sparse and minute punctures; anterior slope of mesoscutellum faintly microsculptured, posterior slope and lateral of appendage shallowly and sparsely punctured; upper half of mesopleuron finely microsculptured, shiny, ventral half sparsely punctured mixed with microsculpture; abdominal tergites finely sculptured, weakly shiny; sides of apical sheath with fine microsculpture, strongly shiny.

Hairs on dorsum of head straight and distinctly inclined forward, 0.8 times as long as diameter of lateral ocellus; length of hairs on mesonotum, mesoscutellum and mesopleuron about 0.5, 0.75 and 1 times diameter of lateral ocellus, respectively. Apex of labrum round; clypeus large and flat, distinctly broader than distance between eyes below, anterior margin narrowly and shallowly incised to a depth about 0.25 times length of clypeus, lateral lobe truncate (Fig. 3A); malar space equal to diameter of lateral ocellus; distance between lower corners of eye 0.9 times longest axis of eye; supraantennal tubercles strongly elevated, free-standing and slightly divergent backwards, height 1.1 times its width, length about 2 times its height and as long as postocellar area, distance between posterior ends of tubercles 1.2 times its breadth, posterior end abruptly cut off from frontal ridges, bottom of median fovea without carina; interocellar furrow deep and straight, postocellar furrow deep; postocellar area hardly elevated, about 1.4 times as broad as long, without middle carina or middle furrow, lateral furrows weakly curved, distinctly divergent backward; in dorsal view length of temple 0.5 times eye length, lateral sides distinctly curved and narrowed backward (Fig. 3B); occipital carina low but complete, lower part without fold. Antenna filiform, not compressed, about as long as head and thorax together, 3rd antennomere 1.5 times as long as 4th antennomere, 8th antennomere 2.5 times as long as broad (Fig. 3I). Mesoscutellum roundly elevated, without longitudinal carina or peak but with faint transversal ridge, mesoscutellar appendage with short longitudinal carina; distance between cenchri 2.2 times longest axis of a cenchrus; mesepisternum weakly elevated at middle, ventral thorn absent (Fig. 3D). Hind tibia 0.8 times as long as tarsus, inner tibial spur 0.55 times as long as basitarsus; basitarsus slender, 0.8 times as long as following 3 tarsomeres together; claw with a short and obtuse basal lobe, inner tooth distinctly shorter than outer tooth. Vein cu-a in forewing joining cell 1M at basal 0.35, cell 2Rs distinctly longer than cell 1Rs; hind anal cell sessile (Fig. 1C). Lancet narrow and long with 17 serrulae (Fig. 3C), serrulae distinctly oblique, middle serrulae each with 1 inner subbasal tooth and 11–13 distal subbasal teeth, annular sutures strongly oblique, annular spines bands very narrow, annular spines very short and sparse; 5<sup>th</sup> to 7<sup>th</sup> serrulae as in Figure 3H.

**Male.** Body length 8.5–9.5 mm (Fig. 1D). Body color and structure similar to female but hind coxa with narrow black dorsal and ventral stripes, malar space 0.5 times diameter of lateral ocellus, distance between eyes below about 0.7 times longest axis of eye, in dorsal view head shorter and distinctly narrowed, basal lobe of claw distinct; subgenital plate 1.2 times as long as broad, apex roundly and narrowly convex; harpe longer than broad, apex of parapenis almost truncate without inner process (Fig. 3F); penis valve broad with a long and narrow apical process (Fig. 3G).

**Material examined.** Holotype. ♀, China, Sichuan Province, Mt. Emei, Leidongping (29°55'N, 103°33'E; elev. 2350m), 7 July 2009, Meicai Wei leg. Paratypes. 1 ♀, Sichuan Province, Mt. Emei, Leidongping (29°55'N, 103°33'E; elev. 2350m), 7 July 2009, Meicai Wei leg.; 2 ♀2 ♂, Sichuan Province, Mt. Emei, Leidongping (29°55'N, 103°33'E; elev. 2350m), 8 July 2009, Meicai Wei leg.; 1 ♀1 ♂, Sichuan Province, Mt. Emei, Leidongping (29°55'N, 103°33'E; elev. 2350m), 8 July 2009, Gengyun Niu leg.; 2 ♀3 ♂, Sichuan Province, Mt. Emei, Leidongping (29°55'N, 103°33'E; elev. 2350m), 7 July 2009, Zejian Li leg.; 1 ♀2 ♂, Sichuan Province, Mt. Emei, Jinding (29°31.37'N, 103°21.22'E; elev. 3073m), 20 July 2011, Junzhe Xue & Hu Ping leg.; 1 ♀, Tibet, Chaya County, G241 (30°42.59'N, 97°19.56'E; elev. 3350m), 24 June 2009, Zejian Li leg.

Distribution. China (Sichuan, Tibet).

Etymology: The specific epithet is composed of a Latin prefix *mega-* and *maculata*, referring to the abdomen with large black maculae.



Figure 3. *Tenthredo megamaculata* sp. nov. A. Female head, front view. B. Female head, dorsal view. C. Lancet. D. Mesopleuron and metapleuron, female. E. Apical segments of abdomen and ovipositor, lateral view. F. Gonoforcep. G. Penis valve. H. The 5th–7th serrulae. I. Female antenna.

**Key to species of *Tenthredo grahami* group.**

1. Frons including frontal walls entirely black ..... 2  
Frontal wall green ..... 10
2. First antennomere yellow green; penis valve without apical process ..... 3  
First antennomere largely or entirely black; penis valve with or without apical process ..... 4
3. Mesepisternum green without black stripe; interspaces between punctures on mesonotum not smooth; microsculptured; mesepisternum flat; black frontal macula not extending backward along lateral of postocellar area (Distribution. China (Jilin), Northeastern Asia) ..... ***T. pseudolivacea* Malaise, 1931**  
Mesepisternum green with a distinct black stripe; interspaces between punctures on mesonotum smooth, without distinct microsculpture; mesepisternum triangularly elevated at middle; black frontal macula much extending backward along lateral of postocellar area (Distribution. Kashmir, Hymalayas) ..... ***T. nigromaculata* Smith, 1878**
4. Thorax mainly black, mesepisternum with 2 large yellow green maculae; middle and hind femora entirely black, each tibia yellow green with black base and apex; pterostigma black; postocellar area with a black middle macula (Distribution. China (Tibet)) ..... ***T. nigrobullifera* sp. nov.**  
Thorax green, mesepisternum with a narrow black stripe or entirely green; legs green with longitudinal black stripe; pterostigma green or pale brown ..... 5
5. Supraantennal tubercles quite low, clearly broader than height; black frontal macula transverse elliptical, not extending backward, bottom of middle fovea entirely green; postocellar area more than 2 times as long as broad; mesepisternum flat and entirely green; penis valve with a narrow but not very long apical process (Distribution. China (Gansu, Shaanxi, Henan)) ..... ***T. flatopectalina* Wei, 2002**  
Supraantennal tubercles high, not broader than height; black frontal macula not transverse elliptical, distinctly extending backward, bottom of middle fovea partly or entirely black; postocellar area less than 2 times as long as broad; mesepisternum elevated at middle or with a distinct black stripe; penis valve with or without apical process ..... 6
6. Dorsum of head with an  $\Omega$ -like black macula ending with a hook near posterior corner of postocellar area; ratio of length and breadth of supraantennal tubercles not less than 3; penis valve without apical process (Distribution. Widespread in North and Central China, Russia Far East and Japan) ..... ***T. omega* (Takeuchi, 1936)**  
Dorsum of head with a subquadrate black macula and without a hook near posterior corner of postocellar area; ratio of length and breadth of supraantennal tubercles less than 3; penis valve usually with a distinct apical process ..... 7
7. Anterior incision of clypeus round, deeper than 0.3 times clypeus length; a transverse black band present between clypeus and supra-clypeus; each abdominal tergite with a sickle like black band; mesepisternum flat; body length 10 mm. Liaoning ..... ***T. tombi* Mallach, 1936**  
Anterior incision of clypeus shallow, less than 0.25 times clypeus length; a transverse black band absent between clypeus and supra-clypeus; 2nd abdominal tergite with a black band much longer than black bands on other tergites; body length 12.0–13.5 mm ..... 8
8. Bottom of middle fovea black; mesepisternum flat and smooth; basal black band on each of abdominal tergite narrow, black band on 2nd tergite clearly narrower than half length of the tergite; ovipositor sheath very narrow; penis valve with a very long and slender apical process (Distribution. China (Hubei, Sichuan, Tibet)) ..... ***T. bullifera* Malaise, 1945**  
Bottom of middle fovea green; mesepisternum distinctly elevated at middle and with fine microsculptures; basal black band on each of abdominal tergite broad, black band on 2nd tergite longer than half length of the tergite; ovipositor sheath broad; penis valve with a short and stout apical process (Distribution. Widespread in North and Central China) ..... ***T. pseudobullifera* Wei & Liu, 2013**
9. Supraantennal tubercles clearly higher than broad; black bands on abdominal tergites 2–4 large and clearly separated, clearly larger than black bands on tergites 6–8; apical process of penis valve very long and slender (Distribution. China (Henan, Shanxi, Shaanxi and Sichuan)) ..... ***T. pseudograhami* Wei, 2002**  
Supraantennal tubercles as high as broad; black bands on abdominal tergites 2–4 very narrow and indistinct, or quite large and not separated at middle; black bands on tergites 6–7 not smaller than black bands on tergites 3–4, or penis valve without apical process ..... 10
10. Each black band on abdominal tergites not shorter than half length of each tergite ..... 11  
Black bands on tergites 1–4 clearly shorter than half length of tergite ..... 12
11. Black bands on abdominal tergites 2–8 as long as half-length of tergite; penis valve round at apex and without process (Distribution. India) ..... ***T. gulmargi* Singh & Saini, 1987**  
Black bands on abdominal tergites 2–8 longer than 0.7 times the length of tergite; penis valve with a long apical process (Distribution. China (Sichuan, Tibet)) ..... ***T. megamaculata* sp. nov.**
12. Black bands on abdominal tergites 2–8 very narrow and about equal in length; penis valve round at apex, without process (Distribution. China (Shanxi, Henan, Sichuan)) ..... ***T. grahami* Malaise, 1945**  
Black bands on abdominal tergites 6–7 broad, tergites 2–5 almost absent; penis valve with a very long and slender apical process (Distribution. China (Tibet)) ..... ***T. paragrahami* Wei & Liu, 2013**

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## References

- Liu, M.M., Wei, M.C. 2013. Two new species of *grahami* group of *Tenthredo* Linnaeus (Hymenoptera, Tenthredinidae) from China. *Acta Zootaxonomica Sinica*, 38(4): 841–848.
- Malaise, R. 1945. Tenthredinoidea of South-Eastern Asia with a general zoogeographical review. *Opuscula Entomologica, Lund Supplementum*, 4: 1–288.
- Niu, G.Y., Wei, M.C. 2010. Revision of the *Siobla annulicornis*, *acutiscutella* and *sheni* groups (Hymenoptera: Tenthredinidae). *Zootaxa*, 2643: 45–65.
- Niu, G.Y., Hu, P., Luo, X., Wei, M.C. 2019. Two new species of the *Tenthredo fortunei* group (Hymenoptera: Tenthredinidae) from China with a key to subgroups and known species of *nigricornis* subgroup. *Entomological Research*, 49: 323–329.
- Ross, H.H. 1945. Sawfly genitalia: terminology and study techniques. *Entomological News*, 61(10): 261–268.
- Singh, D., Saini, M.S. 1987. Six new Species of *Tenthredo* Linn. from Northwestern India (Hymenoptera, Symphyta, Tenthredinidae). *Reichenbachia, Staatliches Museum für Tierkunde Dresden*, 24(29): 189–198.
- Taeger, A., Blank, S.M., Liston, A.D. 2010. World Catalog of Symphyta (Hymenoptera). *Zootaxa*, Monograph, 2580: 1–1064.
- Taeger, A., Wei, M.C., Shinohara, A. 2016. Sibling species in *Tenthredo* Linné (Hymenoptera: Tenthredinidae): the status of some East Asian taxa. *Euroasian Entomological Journal*, 15(1): 156–164.
- Zhelochovtsev, A.N., Zinovjev, A.G. 1988. 27. Order Hymenoptera-Wasps Suborder Symphyta (Chalastogastra)-Sawflies and woodwasps. In: Zhelochovtsev, A.N., Tobias, V.I., Kozlov, M.A. (eds.), *Key to the Insects of the European part of the USSR. Vol. III. Hymenoptera. Sixth part*. Nauka, Leningrad. pp. 7–234.