

# Taxonomic study of the *Nematus maculostigmatus* group with three new species of *Nematus* (Hymenoptera: Tenthredinidae) from China

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**Abstract:** The *Nematus maculostigmatus* group is established, and three species are described as new: *N. brevispuralis* Liu, Li & Wei **sp. nov.**, *N. melanothecatus* Liu, Li & Wei **sp. nov.** and *N. wugangensis* Liu, Li & Wei **sp. nov.** The main identification characteristics of the *N. maculostigmatus* group and a key to all Chinese species of the group are provided.

**Key words:** Tenthredinoidea; Nematinae; sawflies; taxonomy; key

中国突瓣叶蜂属斑痣突瓣叶蜂种团三新种（膜翅目：叶蜂科）

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**摘要:** 建立了突瓣叶蜂属斑痣突瓣叶蜂种团, 并记述 3 新种: 短距突瓣叶蜂 *N. brevispuralis* Liu, Li & Wei **sp. nov.**, 黑鞘突瓣叶蜂 *N. melanothecatus* Liu, Li & Wei **sp. nov.** 和武冈突瓣叶蜂 *N. wugangensis* Liu, Li & Wei **sp. nov.**。文中提供了斑痣突瓣叶蜂种团主要鉴别特征, 并编制了该突瓣叶蜂种团中国已知种类的分种检索表。

**关键词:** 叶蜂总科; 突瓣叶蜂亚科; 叶蜂; 分类; 检索表

## Introduction

*Nematus maculostigmatus* Liu & Wei, 2023 and the three new species in this study are similar in general morphology and form a distinct species group. Therefore the *Nematus maculostigmatus* group is proposed and defined (Liu *et al.* 2023). The three new species, *N. brevispuralis* Liu, Li & Wei **sp. nov.**, *N. melanothecatus* Liu, Li & Wei **sp. nov.** and *N. wugangensis* Liu, Li & Wei **sp. nov.**, are described and illustrated, A key to all of the species of the *Nematus maculostigmatus* group from China is provided.

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## Material and methods

The specimens were examined with a Motic-SMZ-171 stereomicroscope. Images of the imagines were taken with a Nikon D700 digital camera and a Leica Z16APO separately. The genitalia were examined with a Motic BA410E microscope, and images of the genitalia were taken with Motic Moticom Pro 285A. The series of images produced were focus-stacked using Helicon Focus (HeliconSoft, Kharkiv, Ukraine) and further processed with Adobe Photoshop CS 11.0.

The terminology of genitalia follows Ross (1945) and that of general morphology follows Viitasaari (2002). For a few terms, including middle fovea, lateral fovea, and lateral walls, we follow Takeuchi (1952).

Specimens examined in this study are deposited in the Asian Sawfly Museum, Nanchang, China (ASMN), including the holotypes and all paratypes of the three new species.

Abbreviations used in the text and illustrations are as follows: OCL — 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 distance between an eye and a lateral ocellus; POL — the distance between the mesal margins of the 2 lateral ocelli.

## Taxonomy

### *Nematus maculostigmatus* species group

Diagnosis. Medium-sized. The body mainly black; labrum, clypeus, supraclypeal area, facial orbit mostly or entirely, vertex more or less, temple, pronotum and tegula yellowish brown to reddish brown; mesonotum, metanotum and abdomen with yellowish brown or reddish brown patches sometimes; thoracic pleuron with yellowish brown or reddish brown patches more or less; clypeus with broad and moderately deep (0.4–0.5) emargination apically; malar space shorter than diameter of median ocellus obviously; inner margins of eyes slightly convergent downward in frontal view; antenna shorter than thorax and abdomen together; inner apical spur of hind tibia 0.4 times as long as metatarsomere 1; vein cu-a of hindwing straight; apex of cercus protruding beyond valvula 3 in dorsal view; annular suture 1 of lancet oblique and curved, longest setae band about 0.6 times as long as length of annulus; tangium long and narrow, 3.0 times as long as annulus 1 at least, radix 0.4–0.7 times as long as lamnium; valvispina of penis valve long, paravalva with some pores and protuberances.

The diagnostic characters of this *N. maculostigmatus* group are malar space shorter than diameter of median ocellus obviously; antenna shorter than thorax and abdomen together; inner apical spur of hind tibia 0.4 times as long as metatarsomere 1.

### Key to Chinese species of the *Nematus maculostigmatus* group

1. Female ..... 2
- Male ..... 5
2. Body with reddish brown patches ..... 3
- Body without reddish brown patches ..... 4
3. Metanotum, legs black; apical margins of abdominal terga 1–5, spots of abdominal tergum, terga 7–9 reddish brown; mesonotum shiny, with fine and somewhat dense punctures; POL : OOL : OCL = 1.3 : 1.0 : 1.1; lower part of mesepisternum without bare area; lancet with 22 serrulae, upper side of annulus 1 longer

- than the length of lower side, sutures 3–19 with setae bands; tangium 3.8 times as long as annulus 1, radix 0.4 times as long as lamnium. China (Hunan)..... *N. wugangensis* Liu, Li & Wei **sp. nov.**
- . Patches of metanotum, abdominal terga except black patches of terga 1–4, apical margins of all coxae, all trochanters, base of all tibiae reddish brown; mesonotum smooth and shiny, with shallow and sparse punctures; POL : OOL : OCL = 1.0 : 1.2 : 1.4; lower part of mesepisternum with bare area; lancet with 19 serrulae, upper side of annulus 1 shorter than the length of lower side, sutures 2–15 with setae bands; tangium 3.0 times as long as annulus 1, radix 0.6 times as long as lamnium. China (Hunan) ..... *N. melanothecatus* Liu, Li & Wei **sp. nov.**
4. Mesonotum, mesoscutellum appendage, metanotum entirely black; medial spots of abdominal terga 1–2 yellowish brown; stigma black brown; labrum flat; middle fovea oval, without groove at bottom; postocellar area with very sparse punctures, mesosulcus clear, 1.7 times as wide as long, lateral furrows very broad and shallow, almost parallel; annular suture 2 of lancet straight; setae bands of sutures 2–4 shorter than 1/2 length of the suture; tangium 3.8 times as long as annulus 1, radix 0.6 times as long as lamnium. China (Guangxi)..... *N. brevispuralis* Liu, Li & Wei **sp. nov.**
- . Medial spot of mesonotum, mesoscutellum appendage, metanotum, abdominal tergum 1, mostly tergum 2 yellowish brown; center of stigma yellowish brown; base of labrum elevated; middle fovea triangular, with a groove at bottom; postocellar area with slightly sparse punctures, mesosulcus unclear, 2.1 times as wide as long, lateral furrows punctiform, slightly narrow and deep, convergent backward; annular suture 2 of lancet curved; setae bands of sutures 2–4 longer than 1/2 length of the suture; tangium 3.6 times as long as annulus 1, radix 0.7 times as long as lamnium. China (Beijing, Zhejiang) ... *N. maculostigmatus* Liu & Wei
5. Head, legs entirely black; abdomen except black spots of terga 1–2 and ventral side reddish brown; valvispina of penis valve not oblique. China (Hunan)..... *N. wugangensis* Liu, Li & Wei **sp. nov.**
- . Head, legs with yellowish brown or reddish brown patches; abdomen almost entirely black; valvispina of penis valve oblique ..... 6
6. Mesepisternum with yellowish brown patch; most of all femora yellow; antenna shorter than thorax and abdomen together; the length of apical harpe longer than 1/2 the length of basal; paravalva of penis valve with protuberance. China (Beijing, Zhejiang)..... *N. maculostigmata* Liu & Wei
- . Mesepisternum entirely black; most of fore femur, apical margins of middle and hind femora yellowish brown; antenna as long as thorax and abdomen together; the length of apical harpe shorter than 1/2 of the length of basal; paravalva of penis valve without protuberance. China (Hunan)..... *N. melanothecatus* Liu, Li & Wei **sp. nov.**

1. *Nematus brevispuralis* Liu, Li & Wei **sp. nov.** (Fig. 1)

Female. Body length 11.0 mm.

Coloration. Body black. Labrum, clypeus, supraclypeal area, most of facial orbit, torulus, most of temple, pronotum, tegula, propleuron, epicnemium, posterior margin of katepimeron, lower margin of metepisternum, posterior margin of metepimeron, apical margins of all coxae, all trochanters, posterior margins of all femora, most of all tarsomere 1, cenchrus, spots of ventral side of abdomen, spots of abdominal terga 1–4 yellowish brown; fore and middle tibiae, hind tibia except apical margin yellowish white; apical margin of hind tibia, most of all tarsi black brown. Wings hyaline, without infusate maculae; stigma and most of veins black brown (Fig. 1A).

Head. Inner margins of eyes convergent in frontal view. Base of labrum flat, and apex rounded; base of clypeus slightly elevated, anterior margin of clypeus incised to 2/5 length of clypeus, lateral corners rounded; labrum and clypeus shiny, with faint punctures and microsculpture. Malar space 0.4 times as long as diameter of median ocellus (Fig. 1C).

Middle fovea oval, slightly shallow, without groove at bottom. Frons elevated, shiny, punctures minute and slightly sparse, microsculpture indistinct; anterior wall elevated and curved, lateral wall very low and blunt. Intercellular furrow broad and shallow, postocellar furrow slightly narrow and shallow; POL : OOL : OCL = 1.0 : 1.2 : 1.0. Vertex and postocellar area shiny and smooth, with a few faint setigerous punctures, without microsculpture; postocellar area elevated, mesosulcus clear, 1.7 times wide as long, lateral furrows very broad and shallow, almost subparallel (Fig. 1B). Antenna filamentous, shorter than thorax and abdomen together distinctly, tapered towards apex; antennomere 3 : antennomere 4 : antennomere 5 = 1.0 : 1.1 : 1.0 (Fig. 1D).

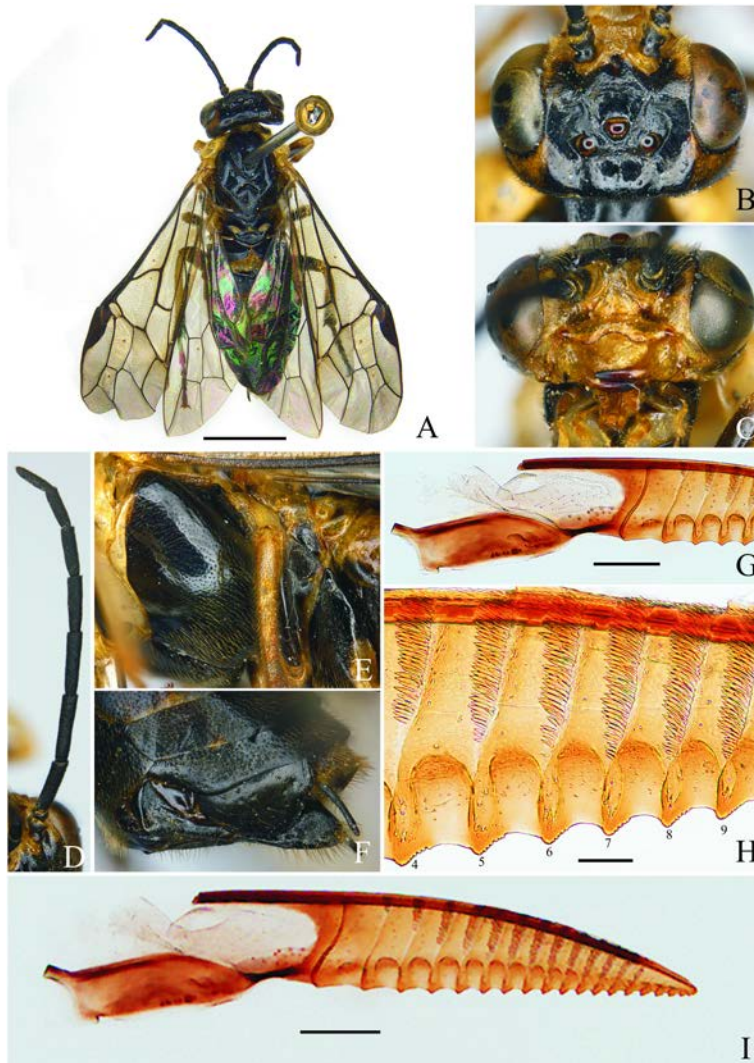


Figure 1. *Nematus brevispurialis* Liu, Li & Wei **sp. nov.**, ♀, holotype. A. Female adult, dorsal view; B. Head, dorsal view; C. Head, anterior view; D. Antenna, lateral view; E. Mesopleuron and metapleuron; F. Ovipositor sheath, lateral view; G. Tangium; H. Middle serrulae; I. Lancet. Scale bars = 2 mm (A); 50  $\mu$ m (H); 200  $\mu$ m (G, I).

Thorax. Mesonotum shiny, with fine and slightly sparse punctures, without microsculpture; median mesoscutal groove fine and deep; mesoscutellum and appendage shiny, punctures small and slightly dense, microsculpture indistinct; mesoscutellum elevated slightly, middle ridge indistinct, 0.9 times as long as wide; mesoscutellum appendage about 1/3 length of scutellum, middle ridge indistinct. Cenchri distance 1.3 times as long as breadth of a cenchrus. Mesepisternum shiny and smooth, setigerous punctures fine and sparse, without microsculpture, lower part without bare area; mesepimeron shiny and smooth, with a few faint punctures, posterior part of katepimeron with distinct microsculpture; metepisternum shiny, punctures faint and sparse, microsculpture indistinct; metepimeron shiny, with a few faint punctures, microsculpture distinct (Fig. 1E). Subbase of vein M in fore wings curved; vein Sc almost interstitial with origin of vein M from R, vein M slightly longer than vein R + M; fore wings with cross-vein cu-a joining cell 1M at basal 1/2, cell 2Rs 1.6 times as long as wide, 2.0 times as long as cell 1R1, vein Rs vestigial; petiole of hind anal cell as long as cu-a, and cu-a straight.

Abdomen. All abdominal terga slightly shiny, with shallow and sparse punctures, microsculptures fine and dense. Ovipositor sheath slightly shiny, punctures on lateral of valvula 3 minute and dense, microsculptures distinct; sheath 2.3 times as long as metatarsomere 1 and 1.3 times as long as front tibia, valvula 3 as long as valvifer 2; in lateral view, sheath apex slightly rounded (Fig. 1F); in dorsal view, apex of cercus protruding beyond valvula 3; angle between most lateral setae of valvula 3 about 70°. Lancet with 19 serrulae (Fig. 1I); each middle serrula with 5–7 distal teeth; annular suture 1 curved, annular suture 2 straight, sutures 2–14 with setae bands, longest setal band about 0.6 times as long as the length of annulus; cypsella slightly long, with shallow or without emargination; tangium long and 3.8 times as long as annulus 1 (Fig. 1G); radix 0.6 times as long as lamnium; middle serrulae from base as in Fig. 1H.

Legs. Protarsomere 1 0.8 times as long as combined length of tarsomeres 2–4; inner apical spur of hind tibia 0.4 times as long as metatarsomere 1, hind tibia 1.3 times as long as hind tarsus, metatarsomere 1 0.7 times as long as combined length of metatarsomeres 2–5; tarsal claw with inner tooth distinctly shorter than outer tooth.

Male. Unknown.

**Holotype.** ♀, **China**, Guangxi, Mt. Daming, Djuanhualang, 108°26.317' E, 23°29.183' N, alt. 1310 m, 26-IV-2012, Zejian LI & Yafei SHANG leg.

Etymology. The specific epithet “*brevispuralis*” refers to the short inner apical spur of the hind tibia.

Remarks. This new species is similar to *N. maculostigmatus* Liu & Wei, 2023, but can be distinguished from the latter by the following combination of characters: mesonotum, mesoscutellum appendage, metanotum entirely black; only medial spots of abdominal terga 1–2 yellowish brown; stigma black brown; labrum flat; middle fovea oval, without groove at bottom; postocellar area with very sparse punctures, mesosulcus clear, 1.7 times as wide as long, lateral furrows very broad and shallow, almost parallel; annular suture 2 of lancet straight; setal bands of sutures 2–4 shorter than 1/2 length of the suture; tangium 3.8 times as long as annulus 1, radix 0.6 times as long as lamnium.

## 2. *Nematus melanothecatus* Liu, Li & Wei sp. nov. (Fig. 2)

Female. Body length 9.0–9.5 mm.

**Coloration.** Body largely black. Labrum, clypeus, supraclypeal area, facial orbit, dorsal side of head except the black spot, protothorax, epicnemium, tegula, spots of mesonotum and metanotum, stripe of mesepisternum, spots of mesepimeron, margins of metepisternum, mesepimeron, apical margins of all coxae, all trochanters, base of all tibiae, abdominal terga except black spots, laterotergites yellowish brown to reddish brown; cenchrus dark; valvifer 2 black brown. Wings hyaline, without infusate maculae; stigma and most of veins black brown (Fig. 2A).

**Head.** Inner margins of eyes subparallel in frontal view. Base of labrum elevated, and apex rounded; base of clypeus hardly elevated, anterior margin of clypeus incised to 2/5 length of clypeus, lateral corners slightly rounded; labrum and clypeus smooth and shiny, with shallow and faint setigerous punctures, without microsculpture. Malar space 0.4 times as long as diameter of median ocellus (Fig. 2C). Middle fovea drop-shape, slightly deep, with a groove at bottom. Frons elevated, shiny, punctures minute and slightly sparse, microsculpture indistinct; anterior wall elevated and curved, lateral wall very low and blunt. Interocellar and postocellar furrow very broad and shallow; POL : OOL : OCL = 1.0 : 1.2 : 1.4. Vertex shiny and smooth, with a few minute setigerous punctures, without microsculpture; ocellar area with distinct wrinkles; postocellar area shiny, setigerous punctures small and sparse, microsculpture indistinct; postocellar area slightly elevated, mesosulcus unclear, 1.7 times as wide as long, lateral furrows narrow and shallow, subparallel backward; in dorsal view, vertex approximately 0.4 times as long as eyes, parallel between lateral margins (Fig. 2B). Antenna filamentous, shorter than thorax and abdomen together, tapered towards apex; antennomere 3 : antennomere 4 : antennomere 5 = 1.0 : 1.3 : 1.2 (Fig. 2D).

**Thorax.** Mesonotum shiny, with minute and slightly dense punctures, without microsculpture; median mesoscutal groove fine and shallow; mesoscutellum shiny and smooth, punctures faint and sparse, without microsculpture, and hardly elevated, middle ridge faint, approximately 0.9 times as long as wide; mesoscutellum appendage slightly shiny, punctures shallow and slightly dense, microsculpture indistinct, 1/3 length of scutellum, middle ridge very low and blunt. Cenchri distance 0.9 times as long as breadth of a cenchrus. Mesepisternum shiny and smooth, setigerous punctures fine and sparse, without microsculpture, lower part with bare area; mesepimeron shiny and smooth, posterior of anepimeron with microsculpture, katepimeron with a few faint punctures, posterior part with distinct microsculpture; metepisternum shiny and smooth, backside with setigerous punctures, microsculpture indistinct; metepimeron smooth and shiny, with a few faint microsculpture and punctures (Fig. 2E). Subbase of vein M in fore wings curved; vein Sc slightly further away from origin of vein M from R, vein M distinctly longer than vein R+M; fore wings with crossvein cu-a joining cell 1M at basal 3/5, cell 2Rs 1.7 times as long as wide, 1.7 times as long as cell 1R<sub>1</sub>, vein Rs vestigial; petiole of hind anal cell as long as cu-a, and cu-a straight.

**Abdomen.** All abdominal terga slightly shiny, with a few shallow and faint punctures, microsculpture fine and dense. Ovipositor sheath slightly shiny, punctures on lateral of valvula 3 minute and slightly dense, microsculptures distinct; sheath 2.2 times as long as metatarsomere 1 and 1.2 times as long as front tibia, valvula 3 0.9 times as long as valvifer 2; in lateral view, sheath apex slightly rounded (Fig. 2F); in dorsal view (Fig. 2G), apex of cercus protruding beyond valvula 3; angle between most lateral setae of valvula 3 about 80°. Lancet with 19 serrulae (Fig. 2I); each middle serrula with 5–6 distal teeth; annular suture 1–2

curved, sutures 2–15 with setae bands, longest setae band about 2/3 length of annulus; cypsella with shallow emargination; tangium 3.0 times as long as annulus 1; radix 0.6 times as long as lamnium; middle serrulae from base as in Fig. 2H.

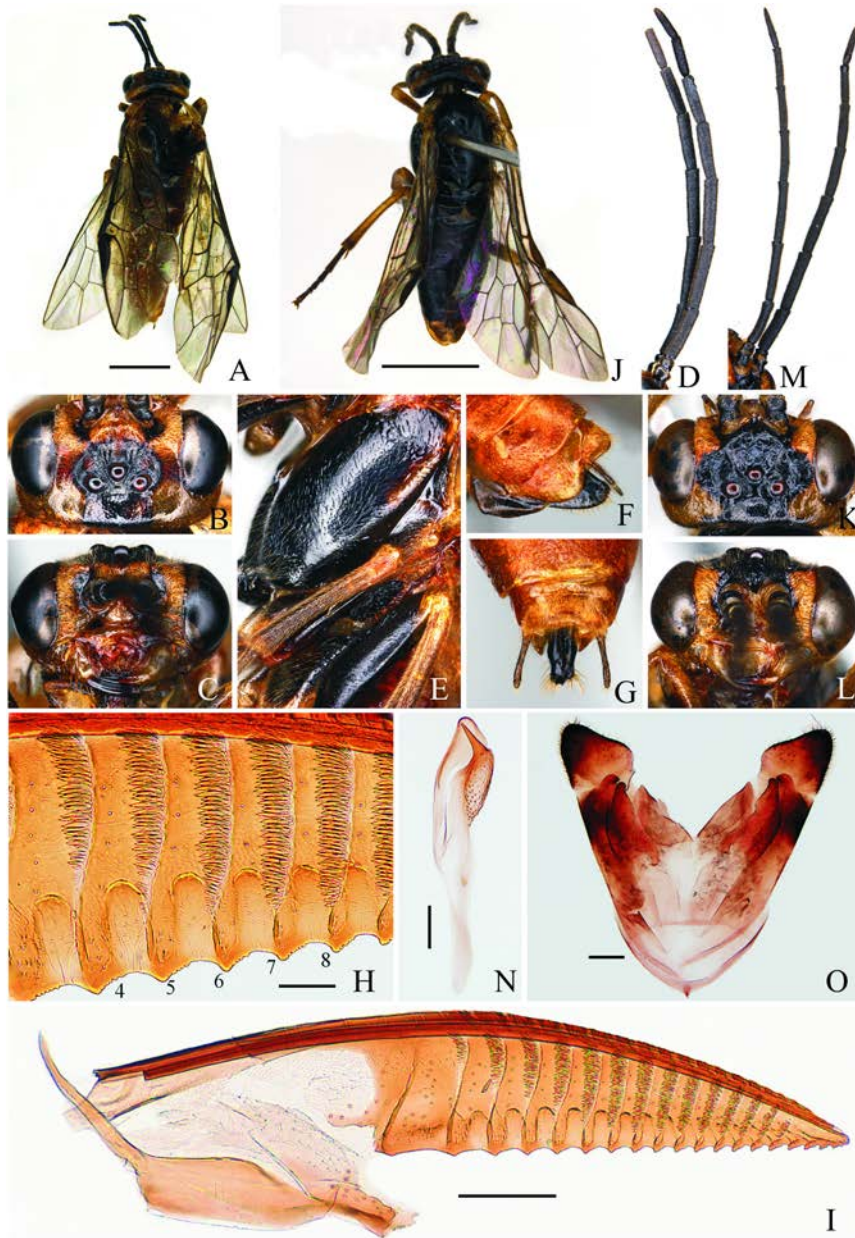


Figure 2. *Nematus melanothecatus* Liu, Li & Wei **sp. nov.**, ♀, holotype, ♂, paratype. A. Female adult, dorsal view; B. Female head, dorsal view; C. Female head, anterior view; D. Female antenna, lateral view; E. Female mesopleuron and metapleuron; F. Ovipositor sheath, lateral view; G. Ovipositor sheath and cercus, dorsal view; H. Middle serrulae; I. Lancet; J. Male adult, dorsal view; K. Male head, dorsal view; L. Male head, anterior view; M. Male antenna, lateral view; N. Penis valve; O. Gonoforceps. Scale bars = 2 mm (A, J); 50 µm (H); 200 µm (I, N, O).

Legs. Protarsomere 1 0.9 times as long as following three tarsomeres together; inner apical spur of hind tibia 0.4 times as long as metatarsomere 1, hind tibia 1.4 times as long as hind tarsus, metatarsomere 1 0.7 times as long as following four tarsomeres together; tarsal claw with inner tooth slightly shorter than outer tooth.

Male. Body length 7.0 mm (Fig. 2J); body color and structure similar to female, but frons, mesonotum, metanotum, epicnemium, mesopleuron, metapleuron, abdominal terga 1–8 entirely black; most of fore femur, apical margin of middle and hind femora, most of all tibiae, center of stigma yellowish brown; most of fore and middle tarsi, abdominal terga 9–10 black brown. Postocellar area 2.0 times as wide as long (Fig. 2K), antenna about as long as thorax and abdomen together, antennomere 3 compressed (Fig. 2M), head in anterior view as shown in Fig. 2L. Gonoforceps as shown in Fig. 2O, the length of harpe as long as the width, and the base significantly wider than apex; penis valve as shown in Fig. 2N, valvispina oblique, paravalva without protuberance.

**Holotype.** ♀, **China**, Hunan, Shaoyang City, Wugang County, Mt. Yun, Yunfengge, 110°37.169' E, 26°38.983' N, alt. 1170 m, 15-IV-2013, Zejian LI leg. **Paratypes.** 1♀, **China**, Hunan, Shaoyang City, Wugang City, Mt. Yun, Yunfengge, 110°37.225' E, 26°38.981' N, alt. 1170 m, 10-IV-2010, Yanxia LIU leg; 1♂, **China**, Hunan, Shaoyang City, Wugang City, Mt. Yun, Dianshita, 110°37.299' E, 26°38.630' N, alt. 1380 m, 11-IV-2012, Zejian LI & Zaiyang PAN leg.

Variation. Between the females, the sizes of reddish brown spots of mesoscutellum and metanotum are different; the color of labrum, clypeus, supraclypeal area, protothorax and tegula are different in depth; cenchri distance 0.9–1.0 times as long as breadth of a cenchrus.

Etymology. The specific epithet “*melanothecatus*” refers to the black ovipositor sheath.

Remarks. This new species is similar to *Nematus wugangensis* Liu, Li & Wei **sp. nov.**, but can be distinguished from the latter by the following combination of characters: patches of metanotum, abdominal terga except black patches of 1–4 terga, apical margins of all coxae, all trochanters, base of all tibiae reddish brown; mesonotum smooth and shiny, with shallow and sparse punctures; POL : OOL : OCL = 1.0 : 1.2 : 1.4; lower part of mesepisternum with bare area; lancet with 19 serrulae, upper side of annulus 1 shorter than the length of lower side, sutures 2–15 with setae bands; tangium 3.0 times as long as annulus 1, radix 0.6 times as long as lamnium; the length of apical harpe shorter than 1/2 of the length of basal; valvispina of penis valve oblique, paravalva without protuberance.

### 3. *Nematus wugangensis* Liu, Li & Wei **sp. nov.** (Fig. 3)

Female. Body length 11.0 mm.

Coloration. Body largely black. Most of labrum, most of clypeus, supraclypeal area, torulus, most of facial orbit, dorsal side of head except the black spots, protothorax, epicnemium, tegula, spots of mesonotum, upper part of mesepisternum, katepimeron, most of metapleuron, apical margins of abdominal terga 1–5, spots of tergum 6, terga 7–9, all sterna, most of valvifer 2 yellowish white to reddish brown; cenchrus dark. Wings hyaline, without infusate maculae; center of stigma brown, around stigma and most of veins black brown (Fig. 3A).

Head. Inner margins of eyes slightly convergent in frontal view. Base of labrum elevated, and apex rounded; base of clypeus slightly elevated, anterior margin of clypeus incised to 2/5



length of clypeus, lateral corners slightly rounded; labrum and clypeus smooth and shiny, with a few setigerous punctures, without microsculpture. Malar space 0.4 times as long as diameter of median ocellus (Fig. 3C). Middle fovea oval, slightly deep, with a groove at bottom. Frons elevated, slightly shiny, punctures small and slightly dense, with some wrinkles; anterior wall elevated and curved, lateral wall very low and blunt. Interocellar and postocellar furrow broad and shallow; POL : OOL : OCL = 1.3 : 1.0 : 1.1. Vertex shiny, with a few minute setigerous punctures, without microsculpture; ocellar area with wrinkles; postocellar area shiny, setigerous punctures small and sparse, microsculpture indistinct; postocellar area slightly elevated, mesosulcus faint, 1.8 times as wide as long, lateral furrows narrow and shallow, slightly divergent backward; in dorsal view, vertex approximately 0.3 times as long as eyes, convergent between lateral margins (Fig. 3B). Antenna filamentous, shorter than thorax and abdomen together, tapered towards apex; antennomere 3 : antennomere 4 : antennomere 5 = 0.9 : 1.0 : 1.0 (Fig. 3D).

Thorax. Mesonotum shiny, with minute and slightly dense punctures, without microsculpture; median mesoscutal groove fine and shallow; mesoscutellum elevated feebly, middle ridge faint, about 0.8 times as long as wide; mesoscutellum appendage slightly shiny, punctures small and dense, microsculpture indistinct, 1/3 length of scutellum, middle ridge low and blunt. Cenchri distance as long as breadth of a cenchrus. Mesepisternum shiny, without microsculpture, upper part with sparse setigerous punctures, lower part setigerous punctures slightly dense, without bare area; mesepimeron shiny and smooth, posterior of anepimeron with microsculpture, katepimeron with a few faint punctures, posterior part with wrinkle; metepisternum shiny, punctures small and slightly dense, microsculpture indistinct; metepimeron shiny, with a few shallow microsculpture and punctures (Fig. 3E). Subbase of vein M in fore wings curved; vein Sc approach to origin of vein M from R, vein M distinctly longer than vein R+M; fore wings with crossvein cu-a joining cell 1M at basal 3/5, cell 2Rs 1.8 times as long as wide, 1.8 times as long as cell 1R<sub>1</sub>, vein Rs vestigial; petiole of hind anal cell 1.1 times as long as cu-a, and cu-a straight.

Abdomen. All abdominal terga slightly shiny, punctures faint and sparse, microsculpture fine and dense. Ovipositor sheath shiny, lateral of valvula 3 with a few punctures, microsculpture thin; sheath 2.6 times as long as metatarsomere 1 and 1.3 times as long as front tibia, valvula 3 as long as valvifer 2; in lateral view, sheath apex slightly rounded (Fig. 3F); in dorsal view (Fig. 3G), apex of cercus protruding beyond valvula 3; angle between most lateral setae of valvula 3 about 70°. Lancet with 22 serrulae (Fig. 3J); each middle serrula with 4–6 distal teeth; annular suture 1–2 curved, sutures 3–19 with setal bands, longest setal band approximately 3/5 length of annulus; cypsella with shallow emarginate; tangium 3.8 times as long as annulus 1 (Fig. 3H); radix 0.4 times as long as lamnium; middle serrulae from base as in Fig. 3I.

Legs. Protarsomere 1 0.8 times as long as following three tarsomeres together; inner apical spur of hind tibia 0.4 times as long as metatarsomere 1, hind tibia 1.4 times as long as hind tarsus, metatarsomere 1 0.6 times as long as following four tarsomeres together; tarsal claw with inner tooth shorter than outer tooth.

Male. Body length 7.5–8.0 mm (Fig. 3K); body color and structure similar to female, but following parts: head, mesonotum except spots of median mesoscutal lobe, mesepimeron and metapleuron entirely black; stigma black brown; abdomen except black spots of terga 1–2 and

ventral plate reddish brown. Mesoscutellum shiny and smooth, punctures faint and sparse; mesepisternum shiny and smooth, setigerous punctures sparse; middle fovea very shallow, anterior wall and lateral wall of frons elevated feebly; postocellar area 2.0 times as wide as long, mesosulcus slightly clear, lateral furrows subparallel backward (Fig. 3L); antennomere 3 compressed (Fig. 3N), head in anterior view as shown in Fig. 3M; middle ridge of mesoscutellum appendage indistinct. Gonoforceps as shown in Fig. 3O, the length of harpe slightly longer than the width, the base slightly wider than apex; penis valve as shown in Fig. 3P, valvispina not oblique, paravalva with protuberance distinctly.

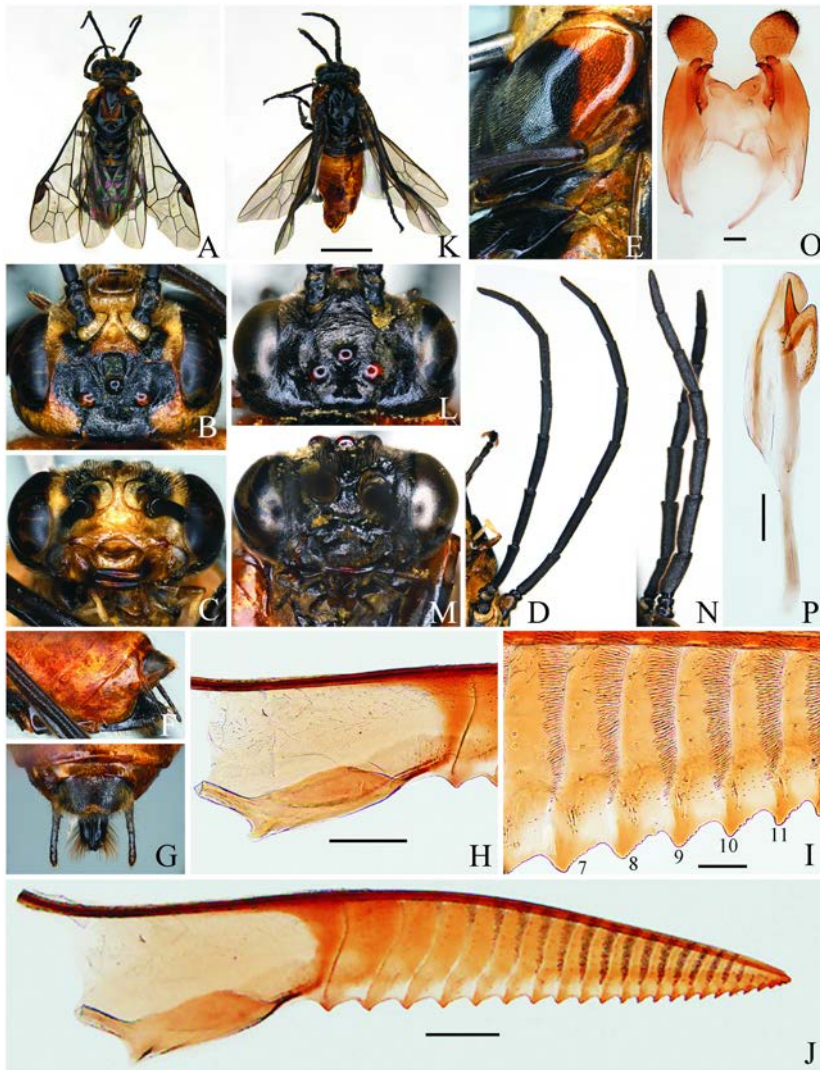


Figure 3. *Nematus wugangensis* Liu, Li & Wei **sp. nov.**, ♀, holotype, ♂, paratype. A. Female adult, dorsal view; B. Female head, dorsal view; C. Female head, anterior view; D. Female antenna, lateral view; E. Female mesopleuron and metapleuron; F. Ovipositor sheath, lateral view; G. Ovipositor sheath and cercus, dorsal view; H. Tangium; I. Middle serrulae; J. Lancet; K. Male adult, dorsal view; L. Male head, dorsal view; M. Male head, anterior view; N. Male antenna, lateral view; O. Gonoforceps. P. Penis valve; Scale bars = 2 mm (A, K); 50  $\mu$ m (I); 200  $\mu$ m (H, J, O, P).

**Holotype.** ♀, **China**, Hunan, Shaoyang City, Wugang City, Mt. Yun, Dianshita, 110°37.299' E, 26°38.630' N, alt. 1380 m, 11-IV-2012, Zejian LI & Zaiyang PAN leg.

**Paratypes.** 4♂, **China**, Hunan, Shaoyang City, Wugang City, Mt. Yun, Dianshita, 110°37.299' E, 26°38.630' N, alt. 1380 m, 11-IV-2012, Zejian LI & Zaiyang PAN leg.

Variation. Among the male, metapleuron with reddish brown spot sometimes; the size of reddish brown spot of abdominal tergum 2 is different; laterotergite without black spot sometimes; katepimeron with brown spot sometimes; cenchri distance 0.7–0.9 times as long as breadth of a cenchrus; fore wings with crossvein cu-a joining cell 1M at basal 2/5–3/5; petiole of hind anal cell 1.1–1.4 times as long as cu-a.

Etymology. The specific epithet “*wugangensis*” refers to the locality of the holotype.

Remarks. This new species is similar to *Nematus melanothecatus* Liu, Li & Wei **sp. nov.**, but can be distinguished from the latter by the following combination of characters: metanotum, legs black; apical margins of terga 1–5, spots of tergum, terga 7–9 reddish brown; mesonotum shiny, with fine and somewhat dense punctures; POL : OOL : OCL = 1.3 : 1.0 : 1.1; lower part of mesepisternum without bare area; lancet with 22 serrulae, upper side of annulus 1 longer than the length of lower side, sutures 3–19 with setal bands; tangium 3.8 times as long as annulus 1, radix 0.4 times as long as lamnium; the length of apical harpe slightly shorter than the length of basal; valvispina of penis valve not oblique, paravalva with distinct protuberance.

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