Three new species of *Janus* Stephens (Hymenoptera: Cephidae) with a key to Zhejiang species, China

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**Abstract:** Three new species of *Janus* Stephens are described from Zhejiang Province, China: *Janus dianban* Wei sp. nov., *J. infuscimarginatus* Wei sp. nov. and *J. xanthoscutella* Wei sp. nov. A key to four *Janus* species from Zhejiang Province is provided. Type materials are deposited in the Asian Sawfly Museum, Nanchang, China.

**Key words:** Cephomorpha; Hartigiinae; taxonomy; stem sawflies; key

**Introduction**

*Janus* Stephens, 1829 is the third largest genus among the Cephidae now but it is probably the largest one based on the material in our collection. Until the end of 2020, 28 species had been described in the world and 14 of them had been recorded from China (Taeger *et al.* 2021; Liu *et al.* 2017). Wei & Nie (1996) revised 6 Chinese *Janus* species and provided a key for 11 Asian species. In the next year, Wei & Nie (1997) described 4 additional species and provided a species list of *Janus* Stephens from China. Naito *et al.* (1998) described 2 new *Janus* species from Sichuan and Tibet respectively. Liu *et al.* (2017) discussed the diagnosis of *Janus* and described 2 new species from Hunan, Guangxi and Guizhou of China.

During our survey to the Zhejiang sawfly fauna, we found 3 additional new *Janus* species. They are described and illustrated herein.

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Material and methods

The specimens were examined with a Leica S8APO dissection microscope. Adult images were taken with a Nikon D700 digital camera and a series of images montaged using Helicon Focus (©HeliconSoft). Detail images were taken with a Leica Z16 APO/DFC550. All images were further processed using Adobe Photoshop CS 6.0.

The terminology of sawfly genitalia follows Ross (1945) and that of general morphology follows Niu & Wei (2010).

All types of the new species are deposited in the Asian Sawfly Museum, Nanchang, China (ASMN).

Taxonomy

1. Janus dianban Wei sp. nov. (Fig. 1)

Description. Male. Body length 6 mm (Fig. 1A). Body black; mandible except for apex, tegula, a minute dot on posterior corner of pronotum, a dot on dorsal corner of mesepisternum, subgenital plate and genitalia bright yellow; maxillary palp, labial palp and posterior half of abdominal sternite 8 yellowish brown; ventral side of antennomeres pale brown from 5th antennomere, cercus dark brown. Legs yellowish brown, coxa except for apex black; femur, apical 2/5 of hind tibia and hind tarsus orange. Wing hyaline, base of costal vein pale brown, pterostigma and other veins blackish brown. Body hairs silver.

Body smooth and strongly shiny; prescutum, scutum and anterior part of mesoscutellum with shallow sparse punctures; basal 2 antennomeres smooth, antennomere 3 feebly microsculptured, other antennomeres densely microsculptured; sides of abdominal tergite 1 punctured, other tergites with faint punctures and weak microsculptures.

Supraclypeal furrow absent; malar space as long as diameter of median ocellus; inner tooth of left mandible without shoulder and distinctly longer than outer tooth (Fig. 1F); maxillary palptomere 3 slightly more than 2 times as long as broad, about 2.5 times as broad as palpomere 4; lower interocular distance as long as longest axis of eye; occipital carina extending to upper of hind orbit; median fovea not obvious; frons feebly elevated, with a shallow middle furrow, a shallow triangular fovea present in front of median ocellus; POL : OOL = 9 : 13; interocellar and postocellar furrows absent, each ocellus with incomplete cellar furrow; postcetellar area slightly broader than long, middle furrow and lateral furrows absent; in dorsal view head clearly narrowed behind eyes, temple about 0.7 times as long as eye (Fig. 1B). Antenna missing from antennomere 18, antennomere 2 longer than broad, antennomere 3 3.5 times as long as broad, distinctly longer than antennomere 1, slightly longer than antennomere 4 (Fig. 1E), antennomere 17 longer than broad. Pronotum with distinct anterior marginal carina, hind margin shallowly emarginated; mesoscutellum distinctly broader than long, anterior margin approximately triangularly protruding. Fore wing with vein 1r joining pterostigma beyond base, 2r joining pterostigma at middle, 1r complete and parallel with 2r; cell 2R1 about 1.5 times as high as broad; 1Rs about as long as 2Rs, lower part of 1r-m slightly bent inward, 2m-cu joining cell 2Rs at basal 1/5, cell 2M about 2 times as long as height; cell Rs in hind wing open. Middle tibia with 1 preapical spur, hind tibia as long as hind tarsus with 2 preapical spurs, inner tibial spur 1.3 times as long as outer spur;
metabasitarsus as long as following 3 tarsomeres together; claw with a small basal lobe, inner tooth slightly shorter than outer tooth. Abdomen distinctly compressed laterally, second to 8th segments almost equal in height, segment 2 1.8 times as high as long, distinctly shorter than hind coxa; subgenital plate broader than long, apex round, without apical tubercle; harpe about 3 times as long as broad; cercus short, about 2.5 times as long as broad.

Female. Unknown.

Figure 1. Janus dianban Wei sp. nov., holotype, ♂. A. Adult; B. Head, dorsal view; C. Head, lateral view; D. Claw; E. Antenna, basal 7 antennomeres; F. Head, frontal view.


Etymology. The specific epithet is a Chinese pronunciation of “spot” referring to the yellow dot on top of mesepisternum.

Remarks. This new species is similar to Janus piri and J. gussakovskii in general appearance, but differs from them by the following characters: the pronotum black without large lateral yellow maculae, the ventral folds of abdominal tergites and sternites 2–8 black; the maxillary palpomere 3 2.2 times as long as broad; cell 2M in fore wing about 2 times as long as broad, vein 1r entire, each coxa largely black and narrow apex black, and the male pterostigma black. In Janus piri and J. gussakovskii, the pronotum black with two large lateral yellow maculae, the ventral folds of abdominal tergites and sternites 2–8 partly yellow in male; the maxillary palpomere 3 more than 3 times as long as broad; cell 2M in fore wing about 1.2–1.3 times as long as broad, vein 1r usually entirely absent; each coxa largely yellow with narrow base black, and the male pterostigma pale brown.

2. Janus infuscimarginatus Wei sp. nov. (Fig. 2)

Description. Male. Body length 7.5 mm (Fig. 2A). Head and thorax yellow white, mandible apex and metascutellum brown, head above antennal sockets and upper margin of hind orbit black, a small spot near dorsal corner of eye yellow; anterior margin and middle stripe of pronotum, prescutum and scutum except for upper margin of parapsis, edge of
Three new species of *Janus* from China

Mesoscutellum, hind margin and both sides of metasternum, mesepimeron and metepimeron black (Fig. 2G); antenna black, scape largely yellowish brown, apex of pedicellum pale brown; abdomen orange brown, tergite 1 largely black, narrow inner margin and outer margin yellow. Legs yellowish white, extreme base of each coxa black, hind trochanter and dorsum of hind femur dark brown, ventral side of hind femur, hind tibia and hind tarsus yellowish brown, meta basitarsus slightly darker. Wing hyaline, outer margin of fore wing and of hind wing gradually infuscate (Fig. 2E), vein C and Sc pale brown, pterostigma and other veins black.

Body smooth and shiny; prescutum, scutum and mesoscutellum with shallow sparse punctures; mesepisternum and metepisternum with setigerous punctures. Basal 2 antennomeres smooth, antennomere 3 feebly microsculptured, other antennomeres densely microsculptured.

**Figure 2. Janus infuscimarginatus Wei sp. nov., holotype, ♂.** A. Adult; B. Head, dorsal view; C. Head, frontal view; D. Claw; E. Right fore wing; F. Antenna, basal 9 antennomeres; G. Mesopleuron, lateral view.

Supraclypeal furrow absent; malar space as long as diameter of median ocellus; inner tooth of left mandible distinctly shouldered as a right angle; 3rd maxillary palpmere 2 times as broad as 4th palpmere; lower interocular distance 1.2 times as long as longest axis of eye (Fig. 2C); occipital carina extending to upper part of hind orbit; median fovea not obvious; frons feebly elevated with a shallow middle furrow; POL: OOL = 3: 5; interocellar and postocellar furrow absent, each ocellus with an incomplete celllar furrow; postocellar area slightly broader than long, middle and lateral furrows absent; in dorsal view head clearly narrowed behind eyes, temple about 0.8 times as long as eye (Fig. 2D). Left antenna remaining 23 antennomeres, right antenna remaining 8 antennomeres; antennomere 2 as long as broad, antennomere 3 as long as antennomere 1, slightly longer than antennomere 4 (Fig.
Practically, a distinct anterior marginal carina, hind margin deeply emarginated; mesoscutellum much broader than length, anterior margin triangularly protruding. Fore wing with vein 1r joining pterostigma at base, vein 2r joining pterostigma at middle, 1r and 2r parallel; 1r almost entire with basal 1/10 hyaline; cell 2R1 about 2 times as high as broad; cell 1Rs almost as long as 2Rs, lower part of 1-rm strongly bent inward, 2m-cu joining cell 2Rs at basal 1/3, cell 2M 2 times as long as height (Fig. 2E); hind wing with cell Rs closed and 2 times as long as height. Middle tibia with 1 preapical spur; hind tibia as long as hind tarsus and with 2 preapical spurs, inner tibial spur 1.3 times as long as outer spur; metabasitarsus as long as following 3 tarsomeres together; claw with a large basal lobe, inner tooth distinctly longer than outer tooth (Fig. 2D). Abdomen not compressed laterally, subgenital plate broader than long, apex round, without apical tubercle; harpe about 2 times as long as broad; cercus slender, 4 times as long as broad.

Female. Unknown.

Holotype. ♂, China, Zhejiang, Mt. Tianmu, Xianrending, 30.350° N, 119.424° E, alt. 1506 m, 28-V-2017, Zejian LI, Mengmeng LIU & Tingting JI leg.

Etymology. This new species is named for the special wing color.

Remarks. This new species can be easily recognized from its congeners by the apex of wings infuscate and the peculiar body color. No known Janus species is close to this new species.

3. Janus xanthoscutella Wei sp. nov. (Fig. 3)

Description. Female. Body length 10 mm (Fig. 3A). Head black; face and clypeus, malar space, lower half of inner orbit, mouthparts except for mandible apex and tegula bright yellow; hind orbit largely, basal 3 antennomeres, narrow anterior margin and narrow posterior corner of pronotum pale brown; mesoscutellum largely and cenchrus area yellowish brown; abdomen and cercus dark orange brown, tergite 1 entirely black, sheath largely dark brown, dorsum blackish brown (Figs 3D, 3G). Leg yellowish brown, middle and hind trochanter, dorsal side of hind femur darker. Wing hyaline, basal 2/3 of costal vein pale brown, pterostigma and other veins dark brown. Body hairs silver.

Body smooth and shiny; posterior of pronotum with shallow sparse punctures; prescutum, scutum and mesoscutellum with shallow punctures; pleuron, mesepisternum and metepisternum finely microsculptured; both sides of abdominal tergite 1 distinctly punctured, middle and apical tergites with faint punctures and microsculptures, sheath distinctly microsculptured.

Supraclypeal furrow absent; malar space as long as diameter of median ocellus; inner tooth of left mandible distinctly shouldered as a right angle (Fig. 3E). 3rd maxillary palpmere 1.8 times as broad as 4th palpmere; lower interocular distance 1.2 times longest axis of eye; occipital carina extending to upper part of hind orbit; median fovea not obvious; frons feebly elevated with a shallow middle furrow, a shallow triangular fovea present in front of median ocellus; POL : OOL = 10 : 17; intercellar and postcellar furrows absent, each ocellus with incomplete celllar furrow; postcellar area about as long as broad, middle furrow absent, lateral furrows faint; in dorsal view head distinctly narrowed behind eyes, temple about 0.8 times as long as eye (Fig. 3C). Antenna with 29 antennomeres; total length 3.3 times as long as head width, as long as abdomen with sheath, antennomere 2 slightly broader than
long, antennomere 1, 3 and 4 equal in length, antennomere 3 as long as 1/2 longest axis of eye (Fig. 3H). Pronotum with distinct anterior marginal carina, hind margin deeply emarginated; mesoscutellum clearly broader than long, anterior margin approximately triangurally protruding. Fore wing with vein 1r joining pterostigma at base, 2r joining pterostigma at middle, 1r complete and parallel to 2r; cell 2R1 slightly less than 2 times as high as broad, 1Rs as long as 2Rs, lower part of 1r-m strongly bent inward, 2m-cu joining cell 2Rs at basal 2/5, 2M 2 times as long as height; cell Rs in hind wing closed and 1.8 times as long as height. Middle tibia with 1 preapical spur, hind tibia as long as hind tarsus and with 2 preapical spurs, inner tibial spur 1.3 times as long as outer spur; metabasitarsus as long as following 3 tarsomeres together, distinctly shorter than following 4 tarsomeres combined; claw with large basal lobe, inner tooth longer than outer tooth (Fig. 3B). Abdomen feebly compressed laterally, segment 2 distinctly higher than long and shorter than hind coxa, segment 7 distinctly higher than other segments; ovipositor as long as hind tibia, distinctly bent backward in lateral view; apical sheath weakly bent, gradually tapering toward apex (Fig. 3G), distinctly shorter than basal sheath (13 : 17) and metabasitarsus (13: 16); cercus short, length about 1/6 of apical sheath (Fig. 3D).

Male. Unknown.


**Etymology.** The species is named after the color of mesoscutellum.
Remarks. This new species is similar to *J. xanthus* Naito & Smith, 1998 from Sichuan Province, China, but differs from the latter in the following characters: the pronotum and the first abdominal tergum black without distinct yellow macula, antenna about 3.3 times as long as head breadth, the cell Rs in hind wing closed, the second abdominal segment shorter than height in lateral view, cercus short and about 1/6 length of apical sheath. In *J. xanthus*, the pronotum and the first abdominal tergum is black with large yellow maculae, antenna about 4.5 times as long as head breadth, the cell Rs in hind wing open, the second abdominal segment as long as high in lateral view, cercus about 1/3 length of apical sheath.

**Key to the known Janus species from Zhejiang, China**

1. Scape of antenna yellowish brown; abdominal segments 2–10 in both sexes entirely yellowish brown or reddish brown; vein 1r1 in fore wing complete, cell Rs in hind wing closed
   - Scape of antenna black; at least some of abdominal tergites 2–10 in both sexes largely or entirely black; vein 1r1 in fore wing entire or absent, cell Rs in hind wing open

2. Pronotum with large lateral macula; apical margin of wings infuscate; mesepisternum and mesosternum entirely yellow; pedicellum and flagellum entirely black
   - Pronotum black, without large lateral macula, extremely narrow anterior and lateral margins yellowish brown; wings entirely hyaline, apical margin not infuscate; mesepisternum and mesosternum black; basal 3 antennomeres yellowish brown

3. Claw with inner tooth clearly shorter than apical tooth; pronotum black, extremely narrow lateral margin yellow; palpmere 3 of maxillary 2.2 times as long as broad; cell 2M in fore wing about 2 times as long as broad, vein 1r1 entire; ventral fold of abdominal tergites almost entirely black, sternites 2–8 black; each coxa largely black, narrow apex black; male; female unknown
   - Claw with inner tooth clearly longer than apical tooth; pronotum black with broad lateral yellow macula; palpmere 3 of maxillary more than 3 times as long as broad; cell 2M in fore wing about 1.2–1.3 times as long as broad, vein 1r1 usually absent; ventral fold of abdominal tergites partly yellow, hind femur in female with narrow apical black ring; each coxa largely yellow, narrow base black. Male and female

4. Female abdominal segments 2–3 largely reddish brown; male subgenital plate flat, without a distinct apical node
   - Female abdominal segments entirely black; male subgenital plate with a distinct apical node

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