

Macrophya togashii n. sp. (Hymenoptera, Tenthredinidae) from Japan

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Abstract We describe a new species of tenthredinid sawfly, *Macrophya togashii* Yoshida and Shinohara, from Honshu, Japan. *Macrophya togashii* belongs to the *M. koreana* subgroup of the *M. sanguinolenta* group and resembles *M. koreana* Takeuchi, 1937. *Macrophya togashii* is separated from *M. koreana* by the relative lengths of the antennomeres and the color pattern of the hind leg. *Macrophya togashii* inhabits lower altitudes while *M. koreana* has been found at higher altitudes in Honshu.

Key words: Tenthredinidae, *Macrophya togashii*, *Macrophya koreana*, new species, Japan.

Introduction

The sawfly genus *Macrophya* Dahlbom, 1835, is one of the largest genera of the family Tenthredinidae, containing over 260 species classified into 27 species groups (Li *et al.*, 2014a, b). The *Macrophya sanguinolenta* group is the largest species group containing 44 species, of which 39 occur in China (Li *et al.*, 2014b). Li *et al.* (2014a) proposed to divide the *M. sanguinolenta* group into four subgroups, including the *M. koreana* subgroup, which contains *M. koreana* Takeuchi, 1937, and six other species mainly from China. *Macrophya koreana* was described from Korea (Takeuchi, 1937) and later recorded from China (Takeuchi, 1940), Japan (Inomata, 1989) and the Russian Far East (Zhelochovtsev and Zinovjev, 1996).

Under the names of “*Macrophya* sp.” and “*Macrophya* sp. A”, Yoshida (2002, 2006) and Hayashi (2012) reported on the occurrence of a species of *Macrophya* closely related to *M. koreana* in Honshu, Japan, but they left it undetermined. Our recent study included additional

material and revealed that “*Macrophya* sp. A” of Yoshida (2006) represents an undescribed species belonging to the *M. koreana* subgroup. Here we describe it under the name *M. togashii*, new species.

Materials and methods

The specimens used in this work are housed in the Hoshizaki Institute for Wildlife Protection, Izumo (HIWP), National Museum of Nature and Science, Tsukuba (NSMT), Osaka Museum of Natural History, Osaka (OMNH), and Osaka Prefecture University, Sakai (OPU).

We compared the new species with the following specimens of *M. koreana*. Russia: 1 ♀, Anisimovka, 300 m, Primorskij Kraj, 1. VI. 1994, A. Shinohara (NSMT). North Korea: 1 ♀, Ranam [= Ranam, Hamgyeongbuk-do], 20. VII. 1931, K. Sato (NSMT); 1 ♀, Hakugan [= Paegam, Ryanggang-do], 24. VII. 1935, K. Takeuchi (OPU). South Korea: 2 ♀, Suigen [= Suwon, Gyeonggi-do], 20. V. 1931, K. Sato (NSMT); 1 ♀, Tokchong-kogae, 510 m, east of Chun-

cheon, Gangwon-do, 2. VI. 1997, A. Shinohara (NSMT). Japan: 1 ♀, Minoto, 1750–2000 m, Yatsugatake Mts., Nagano Pref., 18–19. VII. 1981, K. Mizuno (NSMT); 1 ♀, same locality, 29. VII. –3. VIII. 1986, A. Shinohara (NSMT); 1 ♀, same locality, 4–8. VIII. 1987, A. Shinohara (NSMT); 3 ♀, same locality, 23–26. VII. 1996, A. Shinohara (NSMT); 3 ♀, same locality, 1–2. VIII. 1997, A. Shinohara (NSMT); 1 ♀, same locality, 27–28. VII. 2006, A. Shinohara (NSMT).

Observations of the adult morphology were made with an Olympus SZ60 stereo binocular microscope and measurements of each structure were made with an ocular micrometer. Photographs were taken with a Nikon DS-Fi2 microscope camera attached to Leica MZ APO stereo binocular microscope (Fig. 1) and a Dino-Eye AM423X microscope camera attached to a Nikon Eclipse E100 light microscope (Fig. 2). The digital images were processed and arranged with Adobe Photoshop Elements® 9 and 12 software.

For the morphological terminology, we followed Viitasaari (2002).

Results

Macrophya togashii Yoshida and Shinohara n. sp.

[Japanese name: Hitoobi-kuro-habachi]
(Figs. 1–2)

Macrophya sp.: Yoshida, 2002: 64.

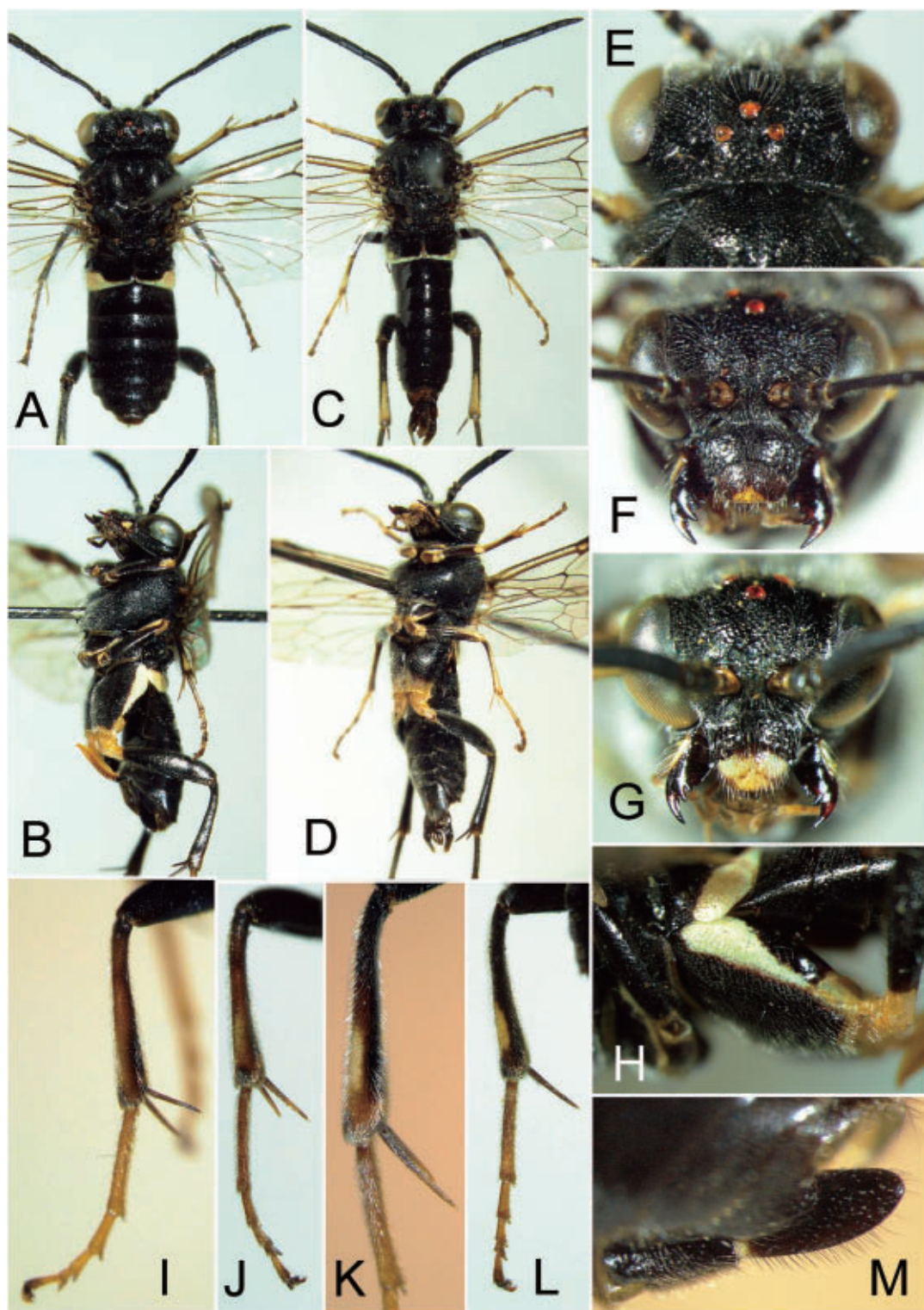
Macrophya sp. A: Yoshida, 2006: 83; Hayashi, 2012: 8.

Female (holotype, Fig. 1A–B). Length about 10 mm. Black, with following creamy white: lateral obscure spots and anteromedian subtriangular spot on labrum, outer surface of mandible basally, spot at anterior margin of tegula, outer surface of fore coxa, apical part of dorsal surface of fore femur, anterior surface of fore tibia and tarsus (except for apex of each tarsomere), upper outer surface of middle coxa, spot on anterior

surface of apex of middle femur, spot on outer surface of apex of middle tibia, large oblong spot on outer surface of hind coxa extending from dorsobasal corner to apex (Fig. 1H), apex of hind coxa, hind trochanter, hind trochantellus, elongate rather obscure spot on dorsal surface of apical part of hind tibia, and broad posterior margin of abdominal tergum 1. Middle and hind tarsi reddish brown, apex of each tarsomere of middle leg darkened. Wings hyaline, apical 1/3 slightly infuscated, veins and stigma blackish brown to black.

Head in dorsal view distinctly narrowed behind eyes; frons about as high as line connecting anterior margins of eyes; occipital carina entire, sharp all around; postocellar area broad, length about $0.7 \times$ width; anterior margin of clypeus roundly emarginate (depth about $0.3 \times$ clypeal length), lateral lobes subtriangular with narrowly rounded apex; malar space much narrower than diameter of median ocellus; labrum large, trapezoidal in outline with truncate apex. Antenna with length about $1.7 \times$ head width across eyes, rather slender basally and distinctly thickened midapically, thickest at antennomere 6; antennomere lengths ratio about 26:13:62:39:33:27:22:21:22. Frons and postocellar area covered with rather dense, well-separated punctures, interspaces smooth, shiny; facial orbit and postocular area rather smooth and shiny, with irregular indistinct punctures. Mesonotum densely covered with small distinct punctures, interspaces smooth and shiny; mesoscutellum convex in lateral view, mesoscutellar appendage with median longitudinal carina; mesepisternum very densely covered with rather regular, partly confluent punctures with smooth linear interspaces; metepimeral appendage small with rounded apex, without basin, covered with small irregular punctures and hairs with shiny interspaces. Head and thorax densely covered with

Fig. 1. *Macrophya togashii* Yoshida and Shinohara n. sp., holotype female (A–B, E–F, H, L), paratype male, Sakura (C–D, G), and paratype females (I–K, M). — A–D, Entire insect, except for parts of wings and legs; E, head, dorsal view; F–G, head, frontal view; H, hind coxa and surrounding parts, lateral view; I, hind leg, Minoh; J, hind leg, Futatabi-higashi-dani; K, hind leg, Aina; L, hind leg; M, ovipositor sheath, lateral view, Aina.



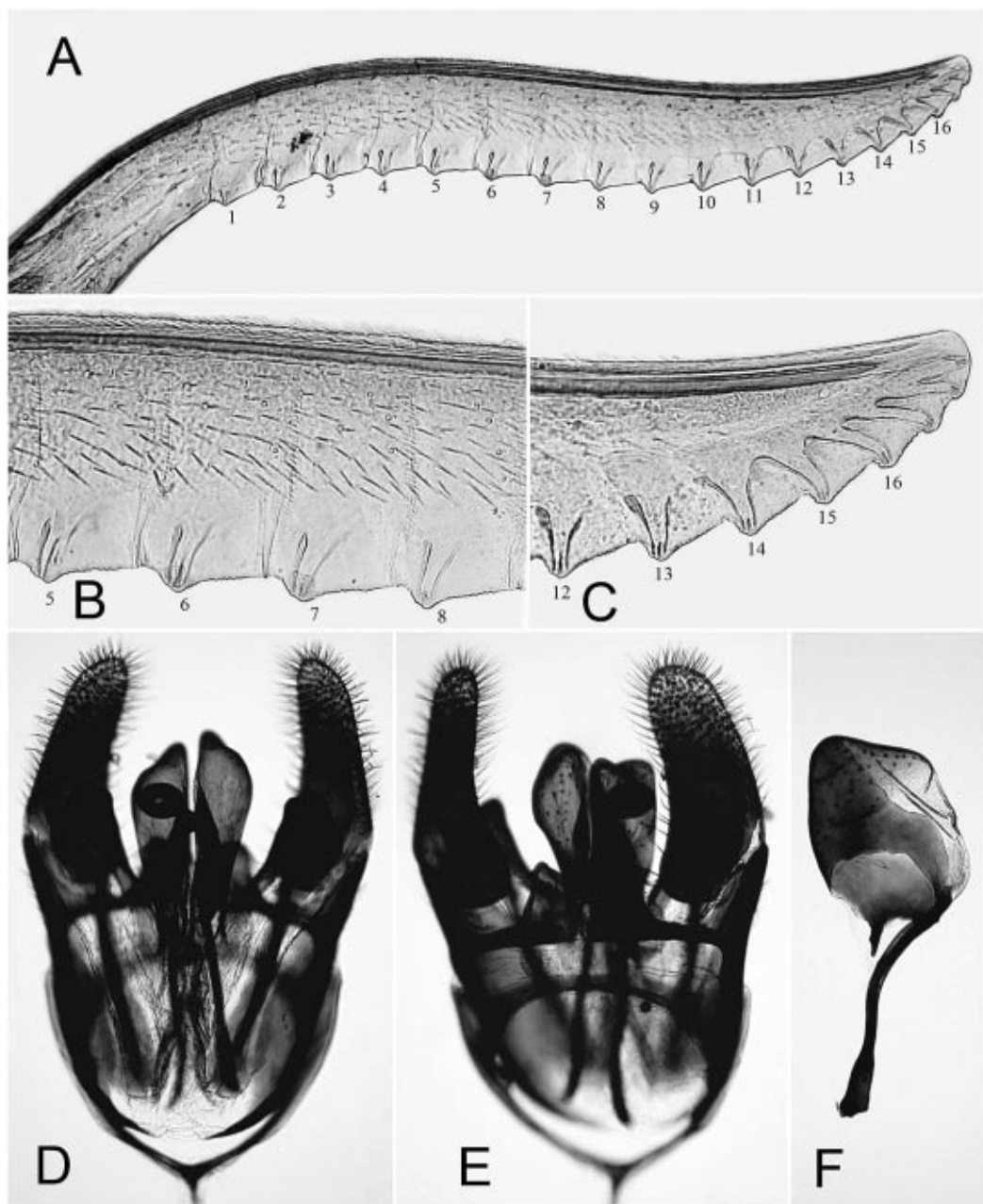


Fig. 2. *Macrophya togashii* Yoshida and Shinohara n. sp., lancet, paratype, Futatabi-higashi-dani (A–C) and male genitalia, paratype, Sakura (D–F). — A, Entire lancet; B, middle part; C, apical part; D, genital capsule, dorsal view; E, same, ventral view; F, penis valve, lateral view (left ventral).

silvery hairs. Forewing with cell A constricted at middle, without crossvein; hindwing with crossvein a joining vein 1A basal to junction of crossvein cu-a with vein 1A, thus anal cell appearing petiolate. Ovipositor sheath as in Fig. 1M. Lancet

(in paratype from Futatabi-higashi-dani) with 19 annuli (Fig. 2A), each serrula subtriangularly raised with rounded top near base of annulus and with very minute and rather indistinct denticles (Fig. 2B–C).

Male (paratype, Fig. 1C–D). Length 7.5 mm. Black, with following creamy white: most of labrum, outer surface of mandible basally, spot at anterior margin of tegula, outer surfaces of fore and middle coxae, femora (except for bases), tibiae, and tarsi, large spot in dorsobasal part of outer surface of hind coxa, apex of hind coxa, hind trochanter, hind trochantellus and oblong spot on upper surface of apical half of hind tibia. Middle tarsus very slightly brownish. Narrow apex of hind tibia, bases of hind tarsomeres 1–4 and entire tarsomere 5 reddish brown. Wings as in female.

Similar to female in structure. Postocellar area length $0.6 \times$ width. Antenna length about $1.9 \times$ head width across eyes, not distinctly thickened midapically; antennomere length ratio about 18:8:50:31:27:28:18:15:18. Abdominal sternum 9 narrowed to weakly concave apex. Genitalia as in Fig. 2D–F.

Variability. Female: Length 9.5–12 mm. The pale lateral spots on the labrum are obscure in the holotype but are distinct in all the paratypes. The large pale spot on the lateral surface of the hind coxa does not reach the posterior margin of the coxa in a specimen from Niigata. In all the female paratypes, the dorsal surface of the hind tibia is marked with reddish brown, though this coloration is almost missing in the holotype. The extent of the reddish brown area is variable, ranging from almost entire dorsal and lateral surfaces of the tibia (Fig. 1I) to a rather small area (Fig. 1L) surrounding the creamy white spot, which is always present (though sometimes fading and inconspicuous) in the posterior part of the dorsal surface of the tibia.

Type series. Holotype: ♀, Sakura City, Sakurajyoshi, Chiba Pref., Honshu, Japan, 30. IV. 1991, H. Suda, NSMT-I-Hym 71018 (NSMT). Paratypes: Chiba Pref.: 1 ♂, same data as for holotype, NSMT-I-Hym 71019 (NSMT). Niigata Pref.: 1 ♀, Yunodaira, Shibata City, 25. VI. 1993, H. Itami, NSMT-I-Hym 71020 (NSMT). Fukui Pref.: 1 ♀, Haeboshi Riv., Oono-shi, 11. VI. 1982, Y. Haneda, NSMT-I-Hym 36102 (NSMT). Nara Pref.: 1 ♀, Kongozan, alt. 1120 m, 12. VI.

1993, Y. Nishimoto, NSMT-I-Hym 71021 (NSMT). Osaka Pref.: 1 ♀, Minoh City, Minoh Riv. Dam, N34°51' E135°28', alt. 350 m, 4. V. 2001, H. Yoshida (OMNH). Hyogo Pref.: 1 ♀, Kobe City, Kita-ku, Yamada-cho, Aina, N34°44' E135°07', alt. 250 m, 4. V. 1997, H. Yoshida, NSMT-I-Hym 71022 (NSMT); 1 ♀, same locality, 19. V. 2001, H. Yoshida, NSMT-I-Hym 71023 (NSMT); 1 ♀, Kobe City, Chuo-ku, Kobeko-Jikata, Futatabi-higashi-dani, N34°43' E135°11', alt., 350 m, 22. V. 1999, H. Yoshida, NSMT-I-Hym 71024 (NSMT). Prefecture unknown: 1 ♀, "Goshiki, 2620 [= 1960]. 7. 14" "J. Yoshioka Collection" "NSMT-I-Hym 9813" (NSMT).

Other specimen examined. Shimane Pref.: 1 ♀, Shakunouchi-koen, Un'n-an-shi, 23. IV.–8. V. 2008, Malaise Trap (HIWP).

Distribution. Japan (Honshu).

Etymology. This new species is named in honor of I. Togashi, Hakusan, who has greatly contributed to the taxonomy of East Asian sawflies. A paratype from Fukui Prefecture bears Togashi's hand-written label, "*Macrophya flavozona* n. sp.", suggesting that he has recognized it as an undescribed species.

Host plant. Unknown.

Remarks. In the female, *Macrophya togashii* Yoshida and Shinohara n. sp. is characterized by the entirely black head and thorax, usually partly reddish brown hind tibia and tarsus, broad creamy white posterior margin of the abdominal tergum 1, and the midapically thickened antenna. In sharing these characters, it resembles *M. koreana* Takeuchi, 1937. In Takeuchi's (1937) key to the Northeast Asian species, *M. togashii* runs to *M. kongosana* Takeuchi, 1937, or *M. koreana*, depending on the interpretation of the punctuation of the head (couplet 8). *Macrophya kongosana* is a larger species with many more whitish markings (see Takeuchi, 1937, for details). In the key to the species of the *M. koreana* subgroup by Li *et al.* (2014b), this new species would run to *M. koreana*, though it does not agree with the descriptions in couplets 1 and 3. *Macrophya koreana* has the labrum "entirely black" (couplet

1) and the “antennomere 3 longer than apical antennomeres 7–9 combined” (couplet 3).

In *M. togashii*, the labrum has a pair of pale maculae in addition to a pale subtriangular spot at the anterior margin, the antennomere 3 is slightly shorter than the three apical antennomeres together, the creamy white spot on the outer surface of the hind coxa usually extends from the dorsobasal margin to the apex of the coxa, the ventral surface and often much of the dorsal surface of the hind tibia are black, and the hind tibia always has a creamy white dorsal macula in the apical half, though it may become inconspicuous in old specimens. In *M. koreana*, the labrum is entirely black except for a pale subtriangular spot at the anterior margin, antennomere 3 is slightly longer than the three apical antennomeres together, the creamy white spot on the outer surface of the hind coxa is situated in the dorsobasal part, not extending posteriorly to the coxal apical margin, and the hind tibia is entirely reddish brown except for the extreme base and apex.

In the male, *M. togashii* is distinguished from the other Japanese species by the entirely black clypeus, pronotum and abdomen (except for the broad posterior margin of the tergum 1) and the creamy whitish labrum, posterior margin of the abdominal tergum 1, and hind trochanter and trochantellus. The male of *M. koreana* is undescribed.

Yoshida (2006) compared *M. togashii* (his “*Macrophya* sp. A”) with *M. koreana* and gave differences in the shape of the whitish spot on the outer surface of the hind coxa, the shape of the anterior emargination of the clypeus and the shape of the median fovea. An examination of the additional material has shown that the differences in the latter two characters are not useful for separating these species, because they are not stable and their ranges of variability overlap.

On the other hand, Yoshida (2006) correctly pointed out that *M. togashii* occurs at lower altitudes and *M. koreana* at higher altitudes in Honshu. Most of the specimens of *M. togashii* were collected on lower mountains (ca. 250–350 m

alt.) in the Kansai region, though the lowest locality is Sakura (ca. 20–30 m alt.), Chiba Prefecture, and the highest locality is Mt. Kongozan (1120 m alt.), Nara Prefecture. All the Japanese specimens of *M. koreana* available were obtained in lower subalpine areas in Minoto (1750–2000 m alt.), Yatsugatake Mts., and on Mt. Senjodake (Inomata, 1989), both in Nagano Prefecture, central Honshu. However, *M. koreana* may occur also in lower regions, because its host plant, *Isodon effusus* (Maxim.) H. Hara (Inomata, 1989), is distributed also at lower altitudes. We need more information to understand the actual distribution patterns of these two apparently related and possibly allopatric species of sawflies.

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