

# Taxonomic Notes and New Distribution and Host Plant Records for Sawflies and Woodwasps (Hymenoptera, Symphyta) of Japan II

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**Abstract** Taxonomic and bionomic notes and new distribution and host plant records are given for 16 species of Argidae, Cimbicidae, Diprionidae, Pamphiliidae and Tenthredinidae of Japan. *Orientabia* Malaise, 1934 is synonymized with *Abia* Leach, 1817. Two names, *Abia relativa* Rohwer, 1910 and *Nematus betulae* (Togashi, 1997) are revived, and *Nematus togashii* Hara and Shinohara, 2015 is a new synonym of the latter. *Abia dubiosa* (Gussakovskij, 1947), *Abia ochotica* (Semenov and Gussakovskij, 1937) and *Gilpinia fukudai* (Togashi, 1964) are new combinations. *Arge ustulata* (Linné, 1758) is excluded from the faunal list of Japan. Four species are newly recorded from Hokkaido, one from Honshu and one from Kyushu. New host plant records are given for *Gilpinia hercyniae* (Hartig, 1837), *Onycholyda viriditibialis* (Takeuchi, 1930), *Onycholyda yezoensis* Shinohara, 1987 and *Apareophora japonica* Takeuchi, 1952, and a doubtful host plant record is discussed for *Cephalcia stigma* Takeuchi, 1938. The previously unknown larva of *Onycholyda yezoensis* Shinohara, 1987 is figured. *Apareophora japonica* Takeuchi, 1952 and *A. nebuta* Togashi, 1964 are redescribed and their ovipositors and male genitalia are figured for the first time.

**Key words:** Argidae, Cimbicidae, Diprionidae, Pamphiliidae, Tenthredinidae, revived name, new synonymy, new combination, distribution, host plant.

## Introduction

Japanese fauna of sawflies and woodwasps is fairly well investigated compared with other Asian countries. However, we often come across new findings concerning various aspects of those insects, including taxonomy, distribution, bionomics and host plants. Such new discoveries frequently appear too fragmentary or trivial to be published as separate papers and tend to be left unpublished for years or even forever. The latter cases may result in a serious loss of potentially important data or ideas, which could never be obtained again in the foreseeable future. To avoid such a situation, we decided to publish a collec-

tion of various new findings and ideas under the present title.

In the first paper of the series, Shinohara and Hara (2015) discussed 36 species of three families of Symphyta. In this paper, which is the second report in the series, we treat one species of Argidae, one genus and four species of Cimbicidae, two species of Diprionidae, three species of Pamphiliidae and six species of Tenthredinidae. We discuss their taxonomic positions and give new or additional information on their morphology, distribution, bionomics or host plants.

## Material and methods

Specimens used in this work are kept in the National Museum of Nature and Science, Tsukuba.

Terminology and methodology of morphological examination and photography (Figs. 1, 3–6) are as mentioned in Hara and Shinohara (2016). Photographs in Fig. 2 were taken with a digital camera, Olympus Stylus TG-4 Tough (A, C–E) and Olympus Stylus TG-4 Tough with Olympus SZ60 stereo binocular microscope (B, F). The measurements of the tarsal claws of *Abia* species (Table 1) were made as follows (see Fig. 1I): The length of each tooth is the distance from the bottom of the notch between the teeth to the apex of each tooth, and the width of each tooth is measured at the level of the bottom of the notch between the teeth.

## Results and discussion

### Argidae

#### *Arge ustulata* (Linné, 1758)

*Tenthredo ustulata* Linné, 1758: 556.

*Hylotoma ustulatum* [sic]: Motschulsky, 1866: 182.

*Arge ustulata*: Takeuchi, 1932: 36; Gussakovskij, 1935: 282, 407; Takeuchi, 1939: 407; Benson, 1945: 104; Benson, 1951: 34; Muche, 1977: 51; Lelej, 2012: 64.

**Remarks.** Motschulsky (1866) recorded this species from Japan. This record was questioned by Takeuchi (1932) and Benson (1945), and Gussakovskij (1935) and Takeuchi (1939) excluded Japan from the distribution of *A. ustulata*. However, Benson (1951), Muche (1977) and Lelej (2012) included Japan in the distribution, without showing additional evidence. We have examined numerous Japanese specimens of *Arge* in all major sawfly collections in Japan, but found no specimens of this species. We exclude *A. ustulata* from the faunal list of Japan. See also Hara and Shinohara (2016).

### Cimbicidae

#### *Abia* Leach, 1817

*Abia* Leach, 1817: 102, 113. Type species: *Tenthredo sericea* Linné, 1767 [= *Abia sericea* (Linné, 1767)], by subsequent designation of Curtis (1825).

*Zaraea* Leach, 1817: 102, 113. Type species: *Tenthredo fasciata* Linné, 1758 [= *Abia fasciata* (Linné, 1758)], by monotypy.

*Orientabia* Malaise, 1934: 36; Conde, 1937: 14; Semenov and Gussakovskij, 1937: 1; Benson, 1938: 371; Takeuchi, 1939: 431; Benson, 1946: 101; Gussakovskij, 1947: 76, 202; Okutani, 1967a: 48; Okutani, 1970: 27; Okutani, 1983: 23, 25; Abe and Smith, 1991: 59; Lee and Jung, 1999: 198, 200; Lelej and Taeger, 2007: 945; Taeger *et al.*, 2010: 184; Yan and Wei, 2010: 627; Lelej, 2012: 67; Wei *et al.*, 2012: 440. Type species: *Abia egregia* Kuznetsov-Ugamskij, 1927 by original designation. **Syn. nov.**

For more synonymy, see Taeger *et al.* (2010).

**Remarks.** *Orientabia* has been known as a small East Asian genus consisting of eight species (Yan and Wei, 2010). Only by the size of the subapical tooth of the tarsal claw, Malaise (1934) separated *Orientabia* from *Abia* (except for the members formerly placed in *Zaraea*) (see Taeger, 1998 and Liston *et al.*, 2014 for the synonymy of *Abia* and *Zaraea*). Malaise wrote that “Der Subapicalzahn länger und breiter als der Endzahn” in *Orientabia*, while “Der Endzahn der Klauen länger und breiter als der Subapicalzahn” in *Abia* (and “Klauen einfach” in *Zaraea*). Semenov and Gussakovskij (1937) used the depth of the anterior emargination of the clypeus to separate these genera in addition to the character of the tarsal claw: “la structure de l'épistome, qui est distinctement échancré à son bord antérieur, ce qui laisse à découvert la majeure partie du libre” in *Orientabia*, but “l'épistome tronqué ou à peine échancré à son bord antérieur” in *Abia* (and “l'épistome coupé droitement à son bord antérieur” in *Zaraea*).

Subsequent authors have regarded *Orientabia* as a genus distinct from *Abia* (and *Zaraea*), though some problems have been suggested. Takeuchi (1939) wrote “Clypeus with a rather deep median notch” for “*Abia iridescens*” [= *Abia iridescens* Marlatt, 1898]. The generic



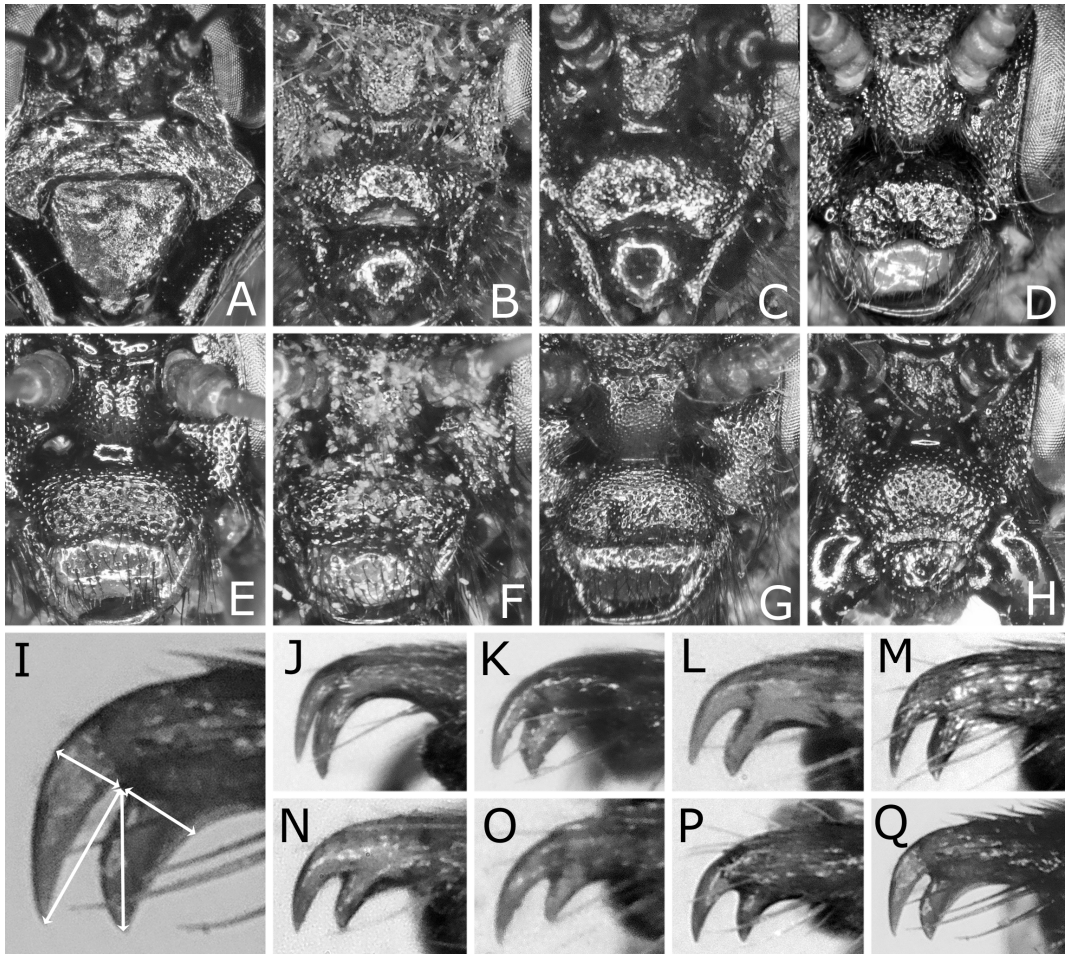


Fig. 1. *Orientabia relativa*, male (A, J), *O. coreana*, female (B, K), *O. sachalinensis* (C, male; L, female), *O. iridescens*, female (D, M), *Abia nitens*, female (E, N), *A. sericea*, male (F, O), *A. formosa*, female (G, P) and *A. imperialis*, female (H, I, Q). A–H, Lower medial part of head, anterior view; I–Q, tarsal claw; I, showing measuring methods (see Material and methods). A, J, Mts. Yatsugatake, Japan; B, K, Mt. Odaesan, Korea; C, Tokachi, Japan; D, M, Kamikochi, Japan; E, N, St. Valentin, Austria; F, O, Attersee, Austria; G, P, Mei-Feng, Taiwan; H, I, Q, Lushan, Taiwan; L, Tokachi, Japan.

position of this species has differed depending on the authors. It was placed in both *Orientabia* and *Abia*, apparently in error, by Semenov and Gussakovskij (1937), in *Abia* by Takeuchi (1939), Gussakovskij (1947), Okutani (1967a, 1983), Abe and Togashi (1989), Shinohara (1990), Naito *et al.* (2004) and Yan and Wei (2010), and in *Orientabia* by Malaise (1945), Wei *et al.* (2006) and Taeger *et al.* (2010). On the other hand, Gussakovskij (1947) did not regard the large subapical tooth of the tarsal claw as the

character of *Orientabia*. He separated *Orientabia* from *Abia* by the deep clypeal emargination, the densely pilose head and thorax and the inconspicuous or slight metallic reflection.

Actually, the depth of the clypeal emargination and the size of the subapical claw tooth both show large interspecific variations in *Orientabia* and *Abia* (Table 1). The relative depth of the clypeal emargination overlaps between some species of *Orientabia* (*O. japonica*, *O. sachalinensis* and *O. iridescens*) (Fig. 1C, D) and some

Table 1. Variations of the depth of the anterior emargination of the clypeus and the size of the subapical tooth of the tarsal claw in *Orientabia* and *Abia*

Species* (names in Taeger <i>et al.</i> , 2010)	sex	n	Clypeus emargination/ clypeus in median length	Tarsal claw: Subapical tooth/apical tooth	
				in length	in width
<i>Orientabia magna</i> Takeuchi, 1939 [= <i>Abia relativa</i> Rohwer, 1910]	♀	6	0.36–0.50	1.1–1.2	1.2–1.4
	♂	3	0.60–0.70	1.1–1.2	1.4–1.5
<i>O. japonica</i> (Cameron, 1887)	♀	6	0.18–0.36	0.9–1.2	1.0–1.4
	♂	6	0.17–0.29	0.9–1.3	1.2–1.5
<i>O. coreana</i> (Takeuchi, 1927)	♀	5	0.25–0.31	0.8–0.9	1.1–1.4
	♂	4	0.20–0.21	1.0–1.1	1.2–1.5
<i>O. sachalinensis</i> (Takeuchi, 1931)	♀	6	0.17–0.20	0.9–1.1	1.0–1.2
	♂	6	0.10–0.23	0.9–1.1	1.1–1.5
<i>Abia nitens</i> (Linné, 1758)	♀	2	0.15–0.19	0.7	1.0–1.1
	♂	2	0.14–0.15	0.6	0.9–1.0
<i>O. iridescens</i> (Marlatt, 1898)	♀	5	0.11–0.16	0.7–0.9	1.0–1.3
	♂	3	0.10–0.16	0.8	1.0
<i>A. berezowskii</i> Semenov, 1896	♀	1	0.06	0.9	1.0
	♂	1	0.14	0.7	1.1
<i>A. sericea</i> (Linné, 1767)	♀	1	0.12	0.8	1.0
	♂	1	0.09	0.6	1.0
<i>A. americana</i> (Cresson, 1880)	♀	2	0.05–0.11	0	0
<i>A. fulgens</i> Zaddach, 1863	♀	3	0–0.10	0.3–0.4	0.8–0.9
<i>A. metallica</i> Mocsáry, 1909	♀	4	0.07–0.09	0	0
	♂	4	0.03–0.10	0	0
<i>A. akebiae</i> (Takeuchi, 1931)	♀	4	0.04–0.08	0	0
	♂	2	0.04–0.05	0	0
<i>A. fasciata</i> (Linné, 1758)	♀	9	0.02–0.08	0	0
	♂	2	0.03–0.07	0	0
<i>A. lewisii</i> Cameron, 1887	♀	3	0.03–0.08	0	0
	♂	1	0.05	0	0
<i>A. niui</i> Wei and Deng, 1999	♀	1	0.08	0.7	1.0
	♂	1	0.03	0.6	1.0
<i>A. vitalisi</i> Turner, 1920	♂	1	0.08	0.9	1.1
<i>A. aurata</i> (Takeuchi, 1931)	♀	1	0.03	0	0
	♂	2	0.03–0.07	0	0
<i>A. formosa</i> Takeuchi, 1927	♀	4	0.05–0.07	0.7–0.9	1.1–1.3
<i>A. loniceræ</i> (Linné, 1758)	♀	1	0.06	0.8	1.0
<i>A. triangularis</i> (Takeuchi, 1931)	♀	3	0.03–0.06	0	0
	♂	3	0.02–0.04	0	0
<i>A. marginata</i> Mocsáry, 1909	♀	2	0.04–0.05	0	0
<i>A. aurulenta</i> Sichel, 1856	♀	2	0–0.04	0	0
	♂	3	0	0	0
<i>A. imperialis</i> Kirby, 1882	♀	1	0.04	0.9	1.2
	♂	2	0.02–0.03	0.8	1.0–1.5
<i>A. aenea</i> Klug, 1820	♀	1	0.03	0.7	1.2
<i>A. hungarica</i> Mocsáry, 1883	♀	2	0.03	0	0
<i>A. mutica</i> Thomson, 1871	♂	1	0	0	0

\* In the order of the relative depths of the anterior clypeal emarginations.

species of *Abia* (*A. nitens*, *A. berezowskii*, *A. sericea*, *A. americana*, *A. fulgens* and *A. metallica*) (Fig. 1E, F). The subapical tooth is not always longer than the apical tooth in *Orientabia* (Table 1). The subapical tooth is 1.0–1.5 times as wide as the apical tooth in *Orientabia* (Fig. 1J–M), and 0.8–1.5 times as wide as the apical tooth in the species of *Abia* with the subapical tooth (Fig. 1N–Q). The development of the pilosity and the presence or absence of the metallic reflection are obscure characters and so variable in *Abia* s. lat. (*Abia* s. str. and *Zaraea* combined) and *Orientabia* (cf. Gussakovskij, 1947). We, therefore, regard *Orientabia* as a synonym of *Abia*, and propose the following new combinations.

- Abia dubiosa* (Gussakovskij, 1947), **comb. nov.**  
= *Orientabia dubiosa* Gussakovskij, 1947: 82, 204.  
*Abia ochotica* (Semenov and Gussakovskij, 1937),  
**comb. nov.**  
= *Orientabia ochotica* Semenov and Gussakovskij,  
1937: 4.

### *Abia metallica* Mocsáry, 1909

*Abia metallica* Mocsáry, 1909: 1; Taeger *et al.*, 2010: 185.  
*Zaraea metallica*: Takeuchi, 1939: 438.

*Material from Kyushu examined.* 1 ♀, “Hayami, Oita-ken, 21.IV.1914, B. Takei”; 1 ♂, “Kumamoto, Jap., 6.IV.1924, K. Sato”; 1 ♀ 1 ♂, “Shimoyabe, Kumamoto, Jap., 15.IV.1926, K. Sato”; 1 ♂, “Aoshima, Miyazaki-ken, 3.IV.1924, Coll. K. Sato”.

*Distribution.* Japan (Hokkaido, Honshu, Shikoku, Kyushu). Korea, northeastern China, Russia (Primorskij Kraj).

*Remarks.* In Japan, this species was known from Hokkaido, Honshu and Shikoku (Takeuchi, 1939) and this is the first record from Kyushu.

### *Abia relativa* Rohwer, 1910, **nom. rev.**

*Abia relativa* Rohwer, 1910: 105; Takeuchi, 1931:21.  
*Orientabia relativa*: Semenov and Gussakovskij, 1937: 1; Gussakovskij, 1947: 83, 205; Takeuchi, 1955: 127; Togashi, 1965b: 253; Okutani, 1967a: 48; Fukuda, 1968: 6; Okutani, 1970: 27; Abe and Togashi, 1989: 544; Togashi, 1998: 40; Hara, 2010: 62; Yoshida,

2010: 25.

*Orientabia japonica*: Takeuchi, 1939: 432 [in part, *A. relativa*]; Lee and Jung, 1999: 203 [in part, *A. relativa*]; Taeger *et al.*, 2010: 186 [in part, *A. relativa*]. [Not Cameron, 1887]

*Orientabia magna* Takeuchi, 1939: 433; Gussakovskij, 1947: 205 [as a junior synonym of *A. relativa*]; Taeger *et al.*, 2010: 186.

*Remarks.* *Abia relativa* Rohwer, 1910, was described from “Japan” based on “One female collected by Mr. Koebele”, though Rohwer also gave a description of the male. Takeuchi (1931) noted a few differences between his specimens of “*A. relativa*” and Rohwer’s original description but concluded that “In spite of this fact, however, it is probable that the specimens before me are correctly identified”. Takeuchi (1939) later changed his interpretation, synonymizing *A. relativa* Rohwer, 1910 with *A. japonica* Cameron, 1887, and described *Orientabia magna* for the species he referred to as *A. relativa* in 1931. Gussakovskij (1947), on the other hand, regarded “*O. relativa*” as a distinct species and synonymized *O. magna* with “*O. relativa*”. Gussakovskij’s (1947) classification has been accepted by subsequent Japanese authors (e.g., Takeuchi, 1955; Togashi, 1965b; Abe and Togashi, 1989; Yoshida, 2010). More recently, Lee and Jung (1999) returned to the old interpretation of Takeuchi (1939) and treated “*O. relativa*” as a junior synonym of “*O. japonica*” without any discussion. Taeger *et al.* (2010) followed this synonymy and revived *O. magna*. Shinohara has examined the holotype of *A. relativa* (see also Gates *et al.*, 2016) and confirmed its synonymy with *O. magna*. *Abia relativa* is distinguished from the related species by the characters given in Takeuchi’s (1939) key (under “*O. magna*”).

## Diprionidae

### *Gilpinia fukudai* (Togashi, 1964), **comb. nov.**

*Diprion fukudai* Togashi, 1964b: 7; Togashi, 1965b: 253; Smith, 1975: 410; Togashi and Sato, 1985: 97 [in part]; Abe and Togashi, 1989: 545; Taeger *et al.*, 2010: 202.

*Material examined.* Paratype: 1 ♀, “Maedake, Nasu, 14. VII. 1962, N. Fukuda” “Paratypus”

“*Diprion fukudai* Togashi, n. sp., det. Togashi, 1964”.

*Remarks.* *Gilpinia* Benson, 1939 and *Diprion* Schrank, 1802 are distinguishable only by the size of a metascutellum (Hara, 2016). The ratio of the length of the metascutellum to the width of a cenchrus is 0.4–0.7 in *Gilpinia*, and 0.8–1.5 in *Diprion*. As shown in fig. 1 in the original description of *Diprion fukudai*, this species has the relatively small metascutellum (its length is  $0.7 \times$  the width of a cenchrus in the paratype examined). This species is regarded as belonging to *Gilpinia*, and structurally quite similar to *Gilpinia hakonensis* (Matsumura, 1912). We will further discuss these species in a separate paper.

Togashi and Sato (1985) described the male of “*Diprion fukudai*”, based on one male with the data “Mt. Shirane, Gumma Pref., 9–10. VI. 1975, M. Kuboki leg”. We examined the male specimen now kept in the National Museum of Nature and Science, and found that it actually belongs to *Diprion nipponicus* Rohwer, 1910.

### *Gilpinia hercyniae* (Hartig, 1837)

*Lophyrus* (*Lophyrus*) *hercyniae* Hartig, 1837: 123.

*Gilpinia hercyniae*: Okutani, 1967a: 49; Smith, 1975: 412; Okutani, 1984: 26; Yoshida, 2010: 28.

*Gilpinia ?hercyninae* [sic]: Abe and Togashi, 1989: 545.

*Material examined.* JAPAN: HOKKAIDO: 1 ♀ 1 ♂, Kamishihoro, Horoshika-toge, 23–25. VI. 2005, H. Hara and A. Shinohara; 1 ♂, Higashikawa, Asahidake-onsen, 23–26. VI. 2007, A. Shinohara; 1 ♂, Bibai, 17. V. 1966, K. Kamijo; 1 ♂, Bibai, 30. VI. 1971, S. Momoi; 1 ♀, Yuni, 3. VI. 1988, H. Hara. — HONSHU: Gunma Pref.: 1 ♂, Kusatsu, Mt. Motoshirane-san, 19. VII. 2013, H. Kojima. — Nagano Pref.: 1 ♂, Yamanouchi, Mt. Yokote-yama, coll. larva VIII. 1984, em. 9. IX. 1984, Host: *Picea jezoensis* var. *hondoensis*, H. Kojima; 1 ♂, do. but coll. solitary larva 30. VIII. 2012, coc. 5. IX., em. 19. IX. 2012; 1 ♀, do. but coc. 1. IX., em. 17. IX. 2012; 1 ♀, Chino, Tenshojihara, 30. VII. 1972, A. Shinohara.

*Distribution.* Japan (Hokkaido, Honshu). Korea, Mongolia, Siberia, Europe, North America.

*Remarks.* Takeuchi (1940) recorded “*Gilpinia polytoma* Hartig” (including “*Lophyrus hercyniae* Hartig” as a synonym) from Japan (Hokkaido, Honshu) but the identity of his specimens remains unknown. Okutani (1967a) gave a Japanese name, Nise-shima-tohi-habachi, for *Gilpinia hercyniae* in the paper on “Food plants of Japanese Symphyta”, although he did not clearly state its occurrence in Japan. Smith (1975) included Japan in the distribution of this species without any comments. Okutani (1984) commented on eight species of the genus recorded in Japan, but he did not include *G. hercyniae*, while he called it “Nise-momi-habachi” in Japanese. Yoshida (2010) recorded this species from Hokkaido, Japan, based on the female specimen identified by D. R. Smith in Kobe University. This was the first definite record of *G. hercyniae* from Japan. We examined the Japanese specimens listed above. This is a new record from Honshu.

The host plants were *Picea* spp. in North America, Europe and Siberia (Reeks, 1941; Verzhutskii, 1966; Smith, 1979). In Honshu, Japan, this species feeds on *Picea jezoensis* (Siebold et Zucc.) Carrière var. *hondoensis* (Mayr) Rehder. This is the first host plant record in Japan.

## Pamphiliidae

### *Cephalcia stigma* Takeuchi, 1938

*Cephalcia stigma* Takeuchi, 1938: 212; Takeuchi, 1949: 47; Takeuchi, 1950: 1330; Takeuchi, 1955: 113; Okutani, 1967a: 45.

*Material examined.* Holotype: ♀, “33, VI, 1936, Tokyo-fu, Minamitama-gun, Yokoyama-mura, Takeuchi [upper side of label]/Ikuno Makoto [under side]”, “Oviposited on Hari-momi [= *Picea torano* (Siebold ex K.Koch) Koehne], Doitsu-tohi [= *Picea abies* (L.) Karst.], and Hime-bara-momi [= *Picea maximowiczii* Regel ex Carrière]”.

*Remarks.* In the original description, Takeu-



chi (1938) noted that “According to Mr. M. Ikuno, the larvae of this species injures *Picea* and *Abies* spp.” Takeuchi (1949) also listed “*Abies* and *Picea*” as the hosts of this species. Takeuchi (1950, 1955) mentioned “The larvae [of *C. stigma*] feed on the foliage of Momi-ru [ = *Abies* spp.]” (original in Japanese) and Okutani (1967a) gave only *Abies firma* Sieb. et Zucc. as a host of this species. As noted above, however, the three species of host trees indicated on the label of the holotype all belong to *Picea*, not *Abies*. Okutani (1967a) put two asterisks on his record of *Abies firma*, which indicated that the record was based on his own rearing, but no reared specimens of *C. stigma* were found in Okutani’s collection. The Japanese names of the two host species, Hari-momi and Hime-baromomi may have caused the confusion because the word “Momi” in Japanese usually refers to *Abies* species. The records of *Abies* as the host of *C. stigma* (Takeuchi, 1938, 1949, 1950, 1955; Okutani, 1967a) are probably erroneous and the true hosts are the three species of *Picea* noted on the label of the holotype as mentioned above.

***Onycholyda viriditibialis* (Takeuchi, 1930)**

(Fig. 2A, B)

*Pamphilius viriditibialis* Takeuchi, 1930: 13; Okutani and Fujita, 1956: 3.

*Onycholyda viriditibialis*: Beneš, 1972: 387; Shinohara and Kojima, 2009: 104.

*Material examined.* 3 mature larvae (in ethanol), Kinugawa-koen, 430 m, Fujiwara, Nikko, Tochigi Pref., collected 1. IX. 2016, matured 2–4. IX., fixed 5. IX., host: *Rubus microphyllus*, A. Shinohara.

*Remarks.* On September 1, 2016, Shinohara found several abodes of pamphiliid larvae on *Rubus microphyllus* L.f. near Kinugawa-koen. Most of them were empty but three abodes contained one late-instar, almost mature, larva each. Each abode (Fig. 2A) was made of an irregularly folded portion of the leaf, which had not been consumed by the larvae, and was full of feces. On maturity, the larvae were determined as *Ony-*

*cholyda viriditibialis* because of the entirely black head and the black-marked prothorax and terminal abdominal segment (Fig. 2B) (see also Shinohara and Kojima, 2009). The larva of this species was known to feed on the leaves of *Rubus crataegifolius* Bunge (Okutani and Fujita, 1956; Shinohara and Kojima, 2009) and this is the first host record from *R. microphyllus*.

***Onycholyda yezoensis* Shinohara, 1987**

(Fig. 2C–F)

*Onycholyda yezoensis* Shinohara, 1987: 495.

*Material examined.* 1 ♀, Kimobetsu, Nakayama-toge, 800 m, Hokkaido, 15. VI. 2016, A. Shinohara, and its offspring: 3 middle instar larvae (in ethanol), egg deposited 16. VI. 2016, hatched 22. VI., fixed 1. VII., host: *Rubus parvifolius*; 4 mature larvae (in ethanol), egg deposited 16. VI. 2016, hatched 22. VI., matured 7–8. VII., fixed 15. VII., host: *Rubus parvifolius*.

*Remarks.* *Onycholyda yezoensis* is known to occur in Hokkaido and Sakhalin and its host plant and immature stages have been unknown. It is very close to *O. minomalis* (Takeuchi, 1930) (host: *Rubus parvifolius* L.) and *O. similis* Shinohara, 1987 (host: *Rubus subcrataegifolius* (H. Lév. et Vaniot) H. Lév. and *R. crataegifolius* Bunge) from Japan and *Onycholyda atra* Shinohara and Wei, 2016 (host: *Rubus peltatus* Maxim.) from Zhejiang, China (Shinohara and Ibuki, 2014; Shinohara and Kojima, 2013; Shinohara and Wei, 2016).

On June 15, 2016, Shinohara collected a female of *O. yezoensis* in Nakayama-toge and kept it alive in a plastic bag with twigs of *Rubus parvifolius* L. and *Rubus idaeus* L. subsp. *melanolasius* Focke. These two *Rubus* species are common in the site where the female was collected. The sawfly deposited several eggs only on *R. parvifolius*, each egg singly beside a lateral vein on the underside of a leaf (Fig. 2C, D) on June 16. The eggs hatched on June 22 and four larvae matured on July 7 to 8. The larva solitarily made a leaf-roll on the underside of the leaf. Although



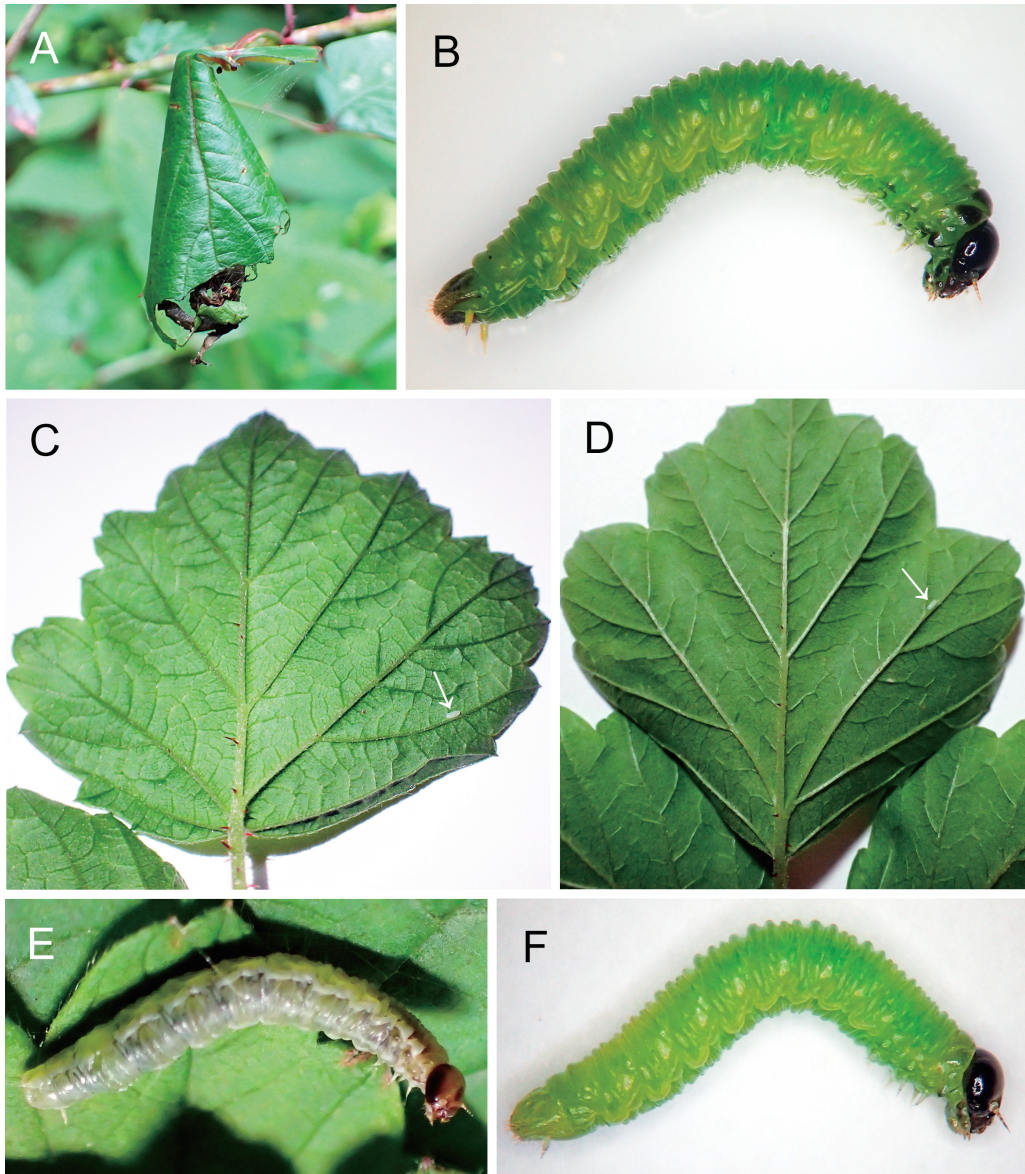


Fig. 2. *Onycholyda viriditibialis* (A, B) and *O. yezoensis* (C–F). A, Larval abode, Kinugawa; B, mature larva; C, D, leaves of *Rubus parvifolius* with deposited eggs (arrows); E, middle instar larva; F, mature larva. Photographed by A. Shinohara.

we have not found any larvae of *O. yezoensis* in the field yet, we believe *R. parvifolius* is the host plant of *O. yezoensis*.

The middle instar and mature larvae (Fig. 2E, F) are similar to those of *O. minomalis* (figs. 4–6 in Shinohara and Ibuki, 2014) and *O. similis* (fig. 11–Q in Shinohara and Kojima, 2013) but may be separated from the latter by the mostly or

entirely black head capsule.

#### Tenthredinidae

##### *Ametastegia (Protemphytus) albovaria* (Takeuchi, 1936)

*Emphytina albovaria* Takeuchi, 1936: 91.

*Protemphytus albovaria*: Takeuchi, 1952: 37.

*Ametastegia (Protemphytus) albovaria*: Taeger *et al.*, 2010: 253.

*Material from Hokkaido examined.* 1 ♂, Kamishihoro, Nukabira-onsen, 6. VII. 1994, A. Shinohara; 1 ♂, Higashikawa, Asahidake-onsen, 27–28. VI. 1997, A. Shinohara; 2 ♂, same locality, 23–26. VI. 1998, A. Shinohara; 1 ♀ 2 ♂, same locality, 14. VII. 1998, A. Shinohara; 1 ♀, same locality, 4. VII. 2010, A. Shinohara; 1 ♂, Kimobetsu, Nakayama-toge, 25–26. VI. 2008, A. Shinohara.

*Distribution.* Japan (Hokkaido, Honshu). Sakhalin.

*Remarks.* This species was described from Japan (Honshu) and Sakhalin (Takeuchi, 1936) and this is the first record from Hokkaido.

#### *Apareophora japonica* Takeuchi, 1952

(Figs. 3, 4A, C, D, 5A, B, 6A–D)

*Apareophora japonica* Takeuchi, 1952: 49; Togashi, 1964a: 403; Okutani, 1967b: 95; Togashi, 1972: 62; Abe and Togashi, 1989: 546; Shinohara, 2000: 299; Naito *et al.*, 2004: 28; Shinohara, 2005: 227; Taeger *et al.*, 2010: 312.

*Diagnosis (female and male).* Length 6.5–8.5 mm in female, 6.0–7.5 mm in male. Black; clypeus sometimes dark brown; mandible apically dark red; palpi apically grayish brown. Legs dark brown to black, yellow brown on apex of fore femur, anterior part of fore tibia and narrow apices of mid and hind femora; middle tibia often anteriorly or anterodorsally yellow brown; tibial spurs and claws yellow to brown. Cercus dark brown to black, rarely brown. Wings distinctly darkened. OOL:POL = 1.2–1.6:1.0; OOL:OCL = 1.0–1.3:1.0. Median ocellus in deep depression (Fig. 4A). Frontal ridge long and distinct. Frontal area and its adjacent areas mat or weakly shiny, usually predominantly without wrinkles. First flagellomere 1.2–1.4 × as long as second; apical flagellomere 1.9–3.0 × as long as broad in lateral view. Posterior slope of mesoscutellum with large punctures and interspaces generally wide and mat. Female ovipositor (Figs. 4C, D, 5A, B): Lance and lancet, respectively,

gradually narrowing apically; lancet with distinctly convex serrulae; most basal annulus with serrula; middle serrulae with four to six (rarely seven) large teeth. Male genitalia (Fig. 6A–D): Valviceps in dorsal view with apex narrowly rounded and lateral spine directed anterolaterally, in lateral view with lateral spine basally not curved.

*Immature stages.* Final feeding instar (semi-final instar) larva (Fig. 3A, B): Length 16–17 mm; head black; trunk and legs greenish yellow; trunk covered with white spines. Final instar larva: Head and trunk yellow. Cocoon: Length 8 mm, width 3.5 mm; dark brown, but covered with dirt; single wall, tough; outside roughly fibrous.

*Material examined.* Paratypes: 1 ♀, “2, VII, 1937 Mt. Akagi Takeuchi” “col. [Sugiyama-shi (in Japanese)]”; 1 ♀, “26, VI, 1951 Sagami-Daisen Takeuchi”. The holotype was not located.

Other material: JAPAN: HOKKAIDO: 12 ♀, Tokachi, Shimizu, Shimizu, 18. VI. 2016, H. Hara; 21 ♀, do. but A. Shinohara; 4 ♀, Bibai, Koshunai, on *Spiraea betulifolia*, 7. VI. 2006, H. Hara; 2 ♀ (HH070707A), Sapporo, Hokkaido University Botanical garden, coll. larvae on *Spiraea japonica* 7. VII. 2007, matured 8–11. VII., em. 3–4. IV. 2008, H. Hara; 1 ♀, Shikotsu-ko, 19. VI. 2003, A. Shinohara. — HONSHU: Gunma Pref.: 1 ♂, Mt. Komochi-yama, 18. VI. 1987, S. Izumiyama; 3 ♀ 5 ♂, Mt. Haruna-san, 7. VI. 2001, A. Shinohara. — Saitama Pref.: 1 ♀, Hidaka, Koma, 11. V. 1996, A. Shinohara. — Kanagawa Pref.: 1 ♀, Yokohama, Shinohara, 21. IV. 1957, K. Sato. — Yamanashi Pref.: 1 ♀, Mt. Minobu-san, 12. VI. 1928, K. Sato, NSMT-HYM 70180. — Nagano Pref.: 11 ♀ 4 ♂, Karuizawa, 28. VI. 1934, K. Sato, NSMT-HYM 70149–70163. — Shizuoka Pref.: 1 ♀, Mt. Fuji-san, Tenshokyo, 24. V. 1989, H. Ishikawa; 1 ♀, Mt. Fuji-san, Awakura, 1. VI. 1998, H. Ishikawa. — KYUSHU: Oita Pref.: 2 ♀, Kuju, 14. V. 1932, H. Sugiura, NSMT-HYM 70164, 70165; 2 ♀, do. but 20. V. 1932, NSMT-HYM 70166, 70167.

*Distribution.* Japan: Hokkaido (new record), Honshu (Takeuchi, 1952) and Kyushu (Togashi,



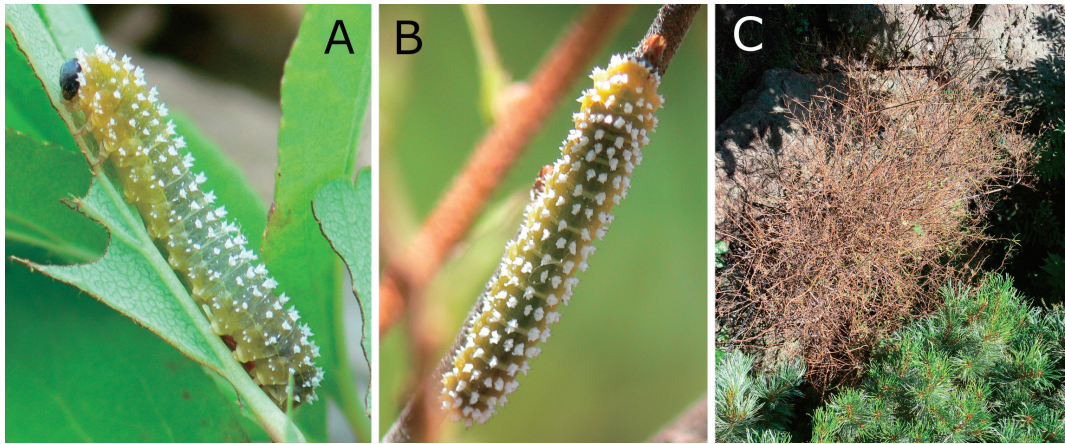


Fig. 3. *Apareophora japonica*. A, B, Final feeding instar larvae (rearing code HH070707A); C, severe defoliation of *Spiraea japonica* by larval infestation in Sapporo. Photographed by H. Hara.

1972).

*Host plants.* Rosaceae: *Spiraea japonica* L. (Takeuchi, 1952), *S. betulifolia* Pall. (new record; the oviposition was observed in the field).

*Life history.* Adults were collected in early and middle June in Hokkaido, from late April to early July in Honshu, and from middle May to early June in Kyushu (see also Takeuchi, 1952; Togashi, 1972; Shinohara, 2000; Naito *et al.*, 2004). In Hokkaido, late instar larvae were found in early July, and they sometimes severely defoliated *Spiraea japonica* (Fig. 3C). In the rearing condition, larvae matured in early and middle

July, and became adults in the following year. This sawfly has one generation a year and overwinters in a cocoon in the soil.

*Remarks.* The male is recorded here for the first time. It is generally similar to the female except for the thicker flagellum and the usual sexual differences.

This species is very similar to another Japanese congener, *A. nebuta*, in having the almost entirely black head and body, the mostly black legs and the dark wings. Their main differences are as follows.

1. Length 6.5–8.5 mm in female, 6.0–7.5 mm in male. Frontal area with lateral ridge long and distinct (Fig. 4A); clypeus dark brown to black; in female, cercus brown to black; middle serrulae of lancet strongly convex with four to seven teeth (Figs. 4C, 5A, B); valviceps in dorsal view with apex narrowly rounded and lateral spine directed anterolaterally (Fig. 6A). ..... *A. japonica*, ♀ ♂
- Length 5.3–6.3 mm in female, 5.0–6.0 mm in male. Frontal area with lateral ridge usually short or indistinct (Fig. 4B); clypeus light brown to dark brown; in female, cercus yellow to dark brown; middle serrulae of lancet weakly convex with seven to ten teeth (Figs. 4E, 5C, D); valviceps in dorsal view with apex widely rounded and lateral spine directed anteriorly (Fig. 6E). ..... *A. nebuta*, ♀ ♂

*Apareophora stenotheca* Wei, 1997 from China is also an almost entirely black species with dark legs and wings (see also Wei *et al.*, 2007), but it differs from *A. japonica* and *A. nebuta* in having the nearly flat serrulae of the lancet with sparse small teeth (fig. 28a in Wei, 1997). Three species known from Korea (Lee and Ryu,

1998) have different, paler color patterns.

#### *Apareophora nebuta* Togashi, 1964

(Figs. 4B, E, F, 5C, D, 6E–H)

*Apareophora nebuta* Togashi, 1964a: 403; Abe and Togashi, 1989: 546; Taeger *et al.*, 2010: 312.

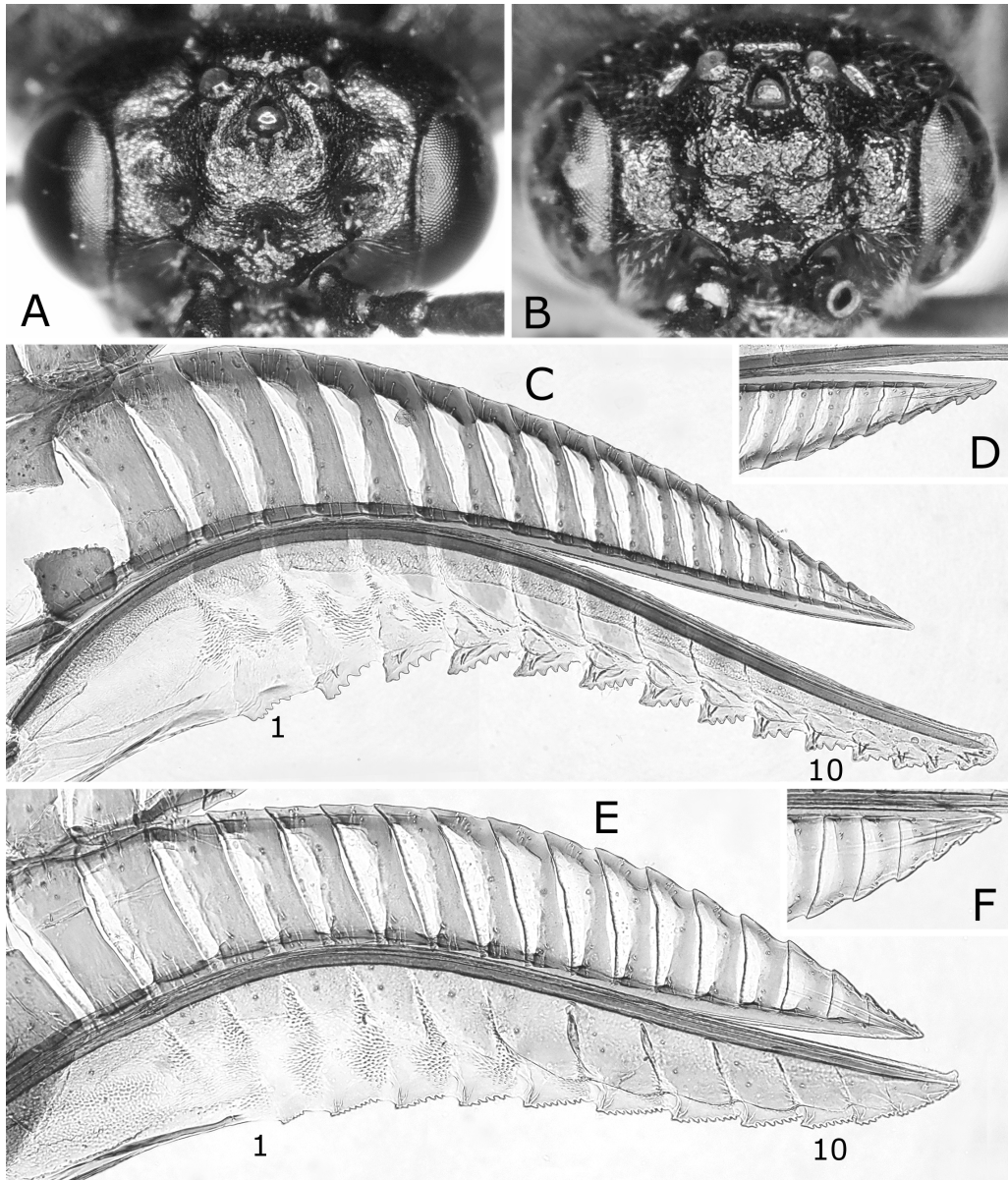


Fig. 4. *Apareophora japonica* (A, C, D) and *A. nebuta* (B, E, F). A, B, Head, female, anterodorsal view; C, E, left lance and lancet; D, F, apex of right lance. 1, First (most basal) annulus; 10, tenth annulus. A, Mt. Harunasan; B, Mt. Kiyosumi-yama; C, D, Karuizawa; E, F, Sugita.

**Diagnosis (female and male).** Length 5.3–6.3 mm in female, 5.0–6.0 mm in male. Black; clypeus very often light brown; mandible apically red brown; palpi apically grayish brown. Legs dark brown to black, yellow brown on apex of fore femur, anterior part of fore tibia and narrow apices of mid and hind femora; middle tibia

anteriorly or anterodorsally brown yellow to dark brown; tibial spurs and claws yellow to brown. Cercus yellow, sometimes brown to dark brown. Ovipositor sheath usually brown at apex narrowly. Wings distinctly darkened. OOL:POL = 1.1–1.3:1.0; OOL:OCL = 1.1–1.3:1.0. Median ocellus in shallow depression (Fig. 4B). Frontal



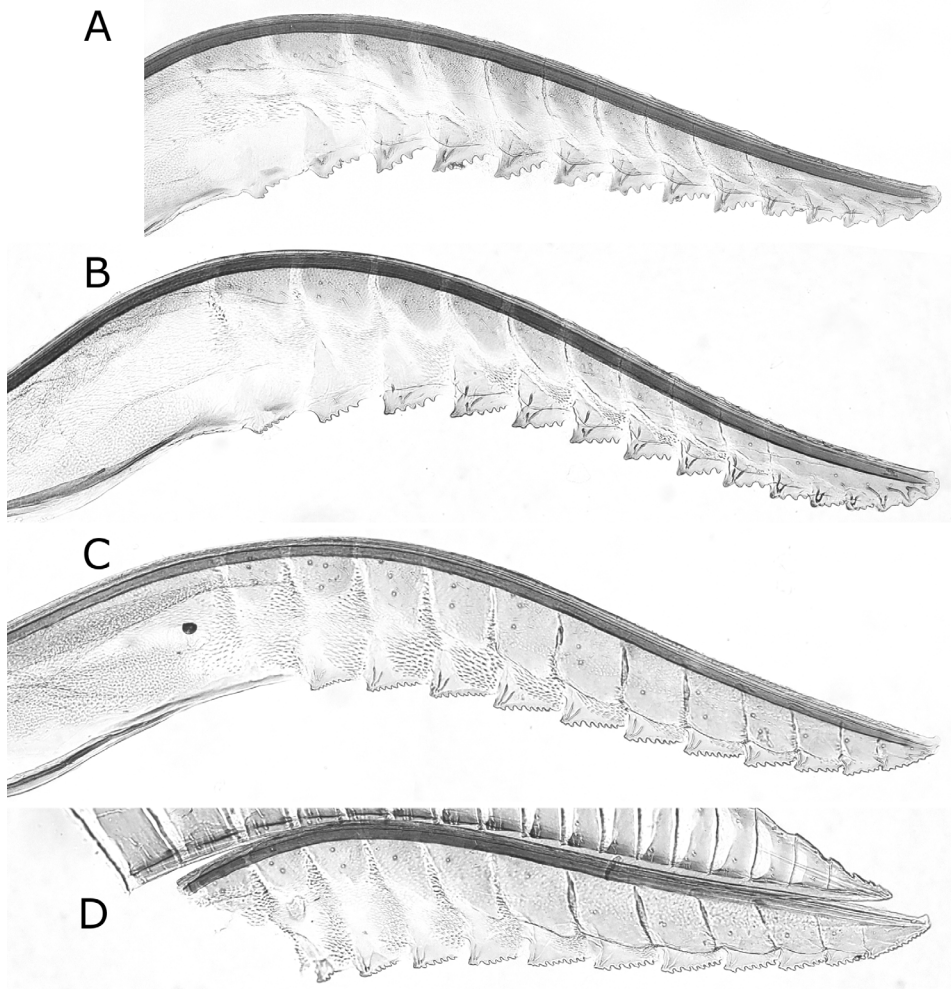


Fig. 5. Lancelet of *Apareophora japonica* (A, B) and *A. nebuta* (C, D). A, Mt. Akagi, paratype; B, Shimizu; C, Mt. Akagi-san; D, Mt. Kiyosumi-yama.

area and its adjacent areas weakly shiny, predominantly covered with irregular wrinkles. Frontal ridge usually indistinct or short, rarely long. First flagellomere  $1.2\text{--}1.4\times$  as long as second; apical flagellomere  $1.5\text{--}2.3\times$  as long as broad in lateral view. Posterior slope of mesoscutellum with large and small punctures densely, rarely only large and sparse punctures as in *A. japonica*. Female ovipositor (Figs. 4E, F, 5C, D; see also fig. 9 in Togashi, 1964a): Lance and lancet, respectively, relatively abruptly narrowing apically; lancet with weakly convex serrulae; most basal annulus of lancet without serrula; middle serrulae with seven to ten small teeth. Male geni-

talia (Fig. 6E–H): Valviceps in dorsal view with apex widely rounded and lateral spine directed anteriorly, in lateral view with lateral spine basally curved.

*Material examined.* JAPAN: HONSHU: Gunma Pref.: 1 ♂, Mt. Akagi-san, Minowa, 17–20. V. 2001, A. Shinohara: 1 ♀, Matsuida, Kirizumi, 22. V. 1987, T. Matsumoto. — Chiba Pref.: 1 ♀, Mt. Kiyosumi-yama, 16. IV. 1931, K. Sato, NSMT-HYM 70179. — Tokyo Met.: 1 ♀, Kinuta, 3. IV. 1959, Y. Kurosawa, NSMT-HYM 70168. — Kanagawa Pref.: 1 ♀, Yokohama, IV. 1923, C. Teranishi, NSMT-HYM 70178; 1 ♀, “Sugita”, 7. IV. 1928, K. Sato, NSMT-HYM



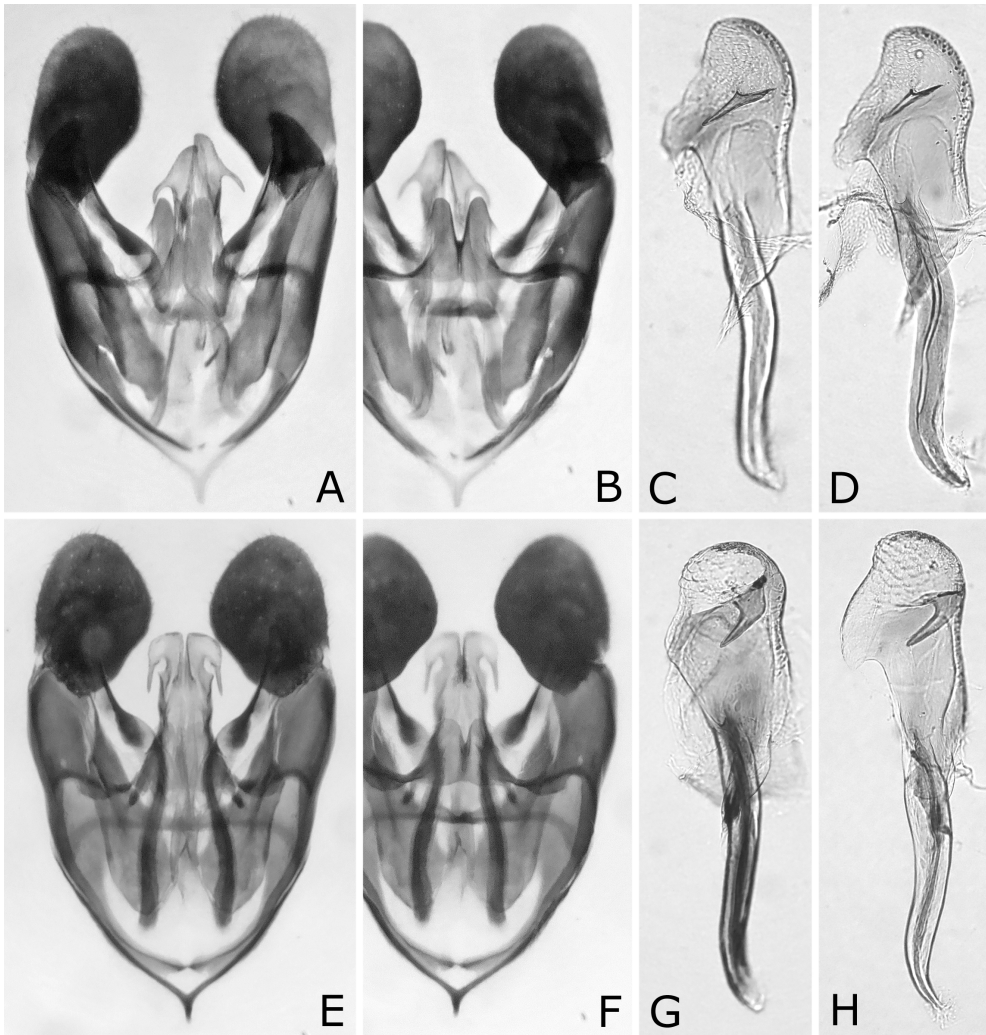


Fig. 6. *Apareophora japonica* (A–D) and *A. nebuta* (E–H). A, E, Male genitalia, dorsal view; B, F, do., ventral view; C, D, G, H, penis valve, lateral view, left dorsal. A–C, Karuizawa; D, Karuizawa; E–G, Matsuida; H, Sugita.

70170; 4 ♂, do. but 6. IV. 1930, NSMT-HYM 70172–70174, 70177. — Tottori Pref.: 1 ♀ 1 ♂, Mt. Daisen, Yokotemichi, 20–25. V. 2000, A. Shinohara.

*Distribution.* Japan: Honshu.

*Remarks.* The previously unknown male is generally similar to the female except for the thicker flagellum and the usual sexual differences.

This species is very similar to *A. japonica* from Japan and *A. stenotheca* from China in having the almost entirely black head and body and

the dark legs and wings, but the three species are distinguished by the characters given in the remarks for *A. japonica*.

Togashi (1964a) used the ratios of OOL:POL and OOL:OCL, the ratio of length to breadth of the apical flagellomere and the punctation of the mesoscutellum to separate *A. nebuta* from *A. japonica*. However, the ratios of OOL:POL and OOL:OCL both overlap between these two species: OOL:POL = 1.1–1.3:1.0 in *A. nebuta*, 1.2–1.6:1.0 in *A. japonica*; OOL:OCL = 1.1–1.3:1.0 in *A. nebuta*, 1.0–1.3:1.0 in *A. japonica*. The

ratio of length to breadth of the apical flagellomere is 1.5–2.3 in *A. nebuta* and 1.9–3.0 in *A. japonica* in our material, and therefore this feature alone is inadequate for separation of these two species. The punctation on the posterior slope of the mesoscutellum usually differs between these two (compare the diagnoses of these two species).

***Armitarsus semirufus* Takeuchi, 1936**

*Armitarsus semirufus* Takeuchi, 1936: 86; Togashi, 1998: 257.

*Material from Hokkaido examined.* 1 ♂, Mt. Piyashiriyama, 26. VI. 2009, A. Shinohara; 1 ♂, Mt. Yokotsudake, 18–19. VI. 2008, A. Shinohara.

*Distribution.* Japan (Hokkaido, Honshu). Sakhalin.

*Remarks.* This species was described from Sakhalin (Takeuchi, 1936) and later recorded from Honshu (Togashi, 1998). This is the first record from Hokkaido.

***Mesoneura shishikuensis* Togashi, 1965**

*Mesoneura shishikuensis* Togashi, 1965a: 1; Togashi, 1965c: 233; Ermolenko, 1967: 86; Togashi, 1972: 63; Abe and Togashi, 1989: 551; Togashi, 1996: 241; Taeger *et al.*, 2010: 412; Wei *et al.*, 2013: 235, 236.

*Material from Hokkaido examined.* 1 ♀, Tokachi, Shintoku, 24. V. 1993, H. Hara; 6 ♀, Mikasa, Kayano, 7. V. 2016, H. Hara.

*Distribution.* Japan (Hokkaido, Honshu, Kyushu).

*Remarks.* This species was known from Honshu (Togashi, 1965a) and Kyushu (Togashi, 1972). Hara collected the above females on trees of *Quercus crispula* Blume whose buds just opened in early spring. This is the first record of *M. shishikuensis* from Hokkaido.

***Nematus betulae* (Togashi, 1997), *nom. rev.***

*Craesus betulae* Togashi, 1997: 67; Taeger *et al.*, 2010: 398.

*Nematus togashii* Hara and Shinohara in Shinohara and Hara, 2015: 179. *Syn. nov.*

*Remarks.* When we moved this species from *Craesus* to *Nematus* (Shinohara and Hara, 2015), we regarded that the name combination *Nematus betulae* (Togashi, 1997) was a junior secondary homonym of *Nematus betulae* Hartig, 1837 [= *Pristiphora testacea* (Jurine, 1807)] and proposed the replacement name, *Nematus togashii* Hara and Shinohara, 2015. However, *Nematus betulae* (Togashi, 1997) is not a junior secondary homonym of *Nematus betulae* Hartig, 1837, because these two taxa are not considered congeneric (ICZN, 1999, Art. 59.2).

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