Bull. Natl. Mus. Nat. Sci., Ser. A, 49(2), pp. 57–74, May 22, 2023
DOI: 10.50826/bnmnszool.49.2_57

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

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(Received 20 February 2023; accepted 22 March 2023)

Abstract *Nematus yokohamensis* (Konow, 1895) is redescribed. *Pristiphora geniculata* (Hartig, 1840) is recorded from Japan (Hokkaido and Honshu) for the first time. New distribution records within Japan are *Nematus yokohamensis* from Kyushu and *Pristiphora conjugata* (Dahlbom, 1835) from Hokkaido. New host plant records are given for *Abia fasciata* (Linné, 1758), *Athalia yanoi* Takeuchi, 1952, *Macrophya fascipennis* Takeuchi, 1933, *M. katayamai* Shinohara, 2020, *M. timida* Smith, 1874, *Mesoneura shishikuensis* Togashi, 1965, *Nematus japonicus* (Takeuchi, 1921), *N. yokohamensis*, *Perineura okutanii* Takeuchi, 1959, *P. pictipennis* Takeuchi, 1959, *Pristiphora geniculata*, *Profenusa thomsoni* (Konow, 1886) and *Taxonus japonicus* Takeuchi, 1929. Additional information on the larval food plant is given for *Nesoselandria morio* (Fabricius, 1781). The larvae of *Fagineura glabella* Hara, 2022, *Macrophya fascipennis*, *M. katayamai*, *M. timida*, *Mesoneura shishikuensis*, *Nematus yokohamensis*, *Perineura okutanii*, *P. pictipennis* and *Taxonus japonicus* are figured and briefly described for the first time.
Key words: Cimbicidae, Tenthredinidae, redescription, distribution, host plant, life history, larva.

Introduction

In this series of papers on Japanese sawflies and woodwasps, which started with Shinohara and Hara (2015), we publish fragmentary new findings in taxonomy, distribution, host plants and bionomics. This paper deals with 16 species of the Cimbicidae and Tenthredinidae. New distribution records of three species and new host plant records of 13 species are given. *Pristiphora geniculata* (Hartig, 1840), a well-known pest of mountain ash, is recorded from Japan and the host plant of *Macrophya katayamai* Shinohara, 2020 is recorded for the first time.

Materials and Methods

The material used in this study is kept in the National Museum of Nature and Science, Tsukuba, unless otherwise indicated. Morphological examination was undertaken with a Leica MS5 and an Olympus SZ60 stereo binocular microscopes and an Olympus BH-2 light microscope. Photographs were taken with Canon PowerShot SX50 HS, CASIO EX-ZR1000, NIKON E990, Olympus TG-4, Olympus TG-5, Panasonic DMC-FZ30 and RICOH CX3 digital cameras and a Sony DSC-RX100 digital camera with a Leica MS5 and an Olympus BH-2 light microscopes. The digital images were processed and arranged with GIMP 2.10 software. Rearing was done in rooms in Bibai, Hokkaido, and Nak-

agawa, Tochigi Prefecture, Honshu. The temperature and day length were not controlled in the rearing rooms, but hibernating individuals were moved in March to air-conditioned rooms at 10–25°C in Bibai. For the morphological terminology, we generally follow Viitasaari (2002). Notes on the distribution, larva, host plant and life history are given only for the species for which new information is available.

Results and Discussion

Cimbicidae

Abia fasciata (Linné, 1758)
Japanese name: Obi-konbo-habachi

Material examined. HOKKAIDO: 1 ♀, Shikaoi, Yamada-onsen, on *Lonicera alpigena* subsp. *glehnii*, 2. VII. 2007, laid 27 eggs singly in *Lonicera alpigena* subsp. *glehnii*, 2–4. VII. 2007, H. Hara.

Host plants. Caprifoliaceae: *Lonicera alpigena* L. subsp. *glehnii* (F.Schmidt) H.Hara (new record). In Europe, *Lonicera* spp., *Symphoricarpos* spp. and *Linnea borealis* L. (all Caprifoliaceae) have been recorded (for details, see Taeger *et al.*, 1998).

Remarks. Although this host record is not based on the field observation, *Lonicera alpigena* subsp. *glehnii* is undoubtedly a host of the sawfly, because the studied female was collected on this plant, laid eggs on it, and the hatched larvae ate this plant and grew to about 18 mm long.

Tenthredinidae

Athalia yanoi Takeuchi, 1952
Japanese name: Ezonokawajisa-habachi

Material examined. HOKKAIDO: 1 ♂, Bibai, 43°20′N 141°51′E, coll. larva on *Veronica persica*, 11. VII. 2022, mat. 14. VII., em. 10. IX. 2022, H. Hara; 1 ♂, same data but coll. egg in *Veronica persica*, 19. VIII. 2022, larva hatch. 20 VIII., mat. 31. VIII. – 1. IX., em. 23. IX. 2022.

Host plants. Plantaginaceae: *Veronica americana* (Raf.) Schwein. ex Benth. (Abe, 1988), *V. persica* Poir. (new record).

Remarks. The newly recorded host is also known as a host of *Athalia kashmirensis* Benson, 1932 (Abe, 1988). For distinguishing characters of the larvae of these two species, see Abe (1988).

Fagineura glabella Hara, 2022
New Japanese name: Tsuya-aka-nara-habachi

(Fig. 1)

Larva. Middle instar (Fig. 1A–B): Head and thoracic legs black; trunk dorsally dark greenish gray, laterally and ventrally pale greenish gray, laterally with black spots. Final instar larva

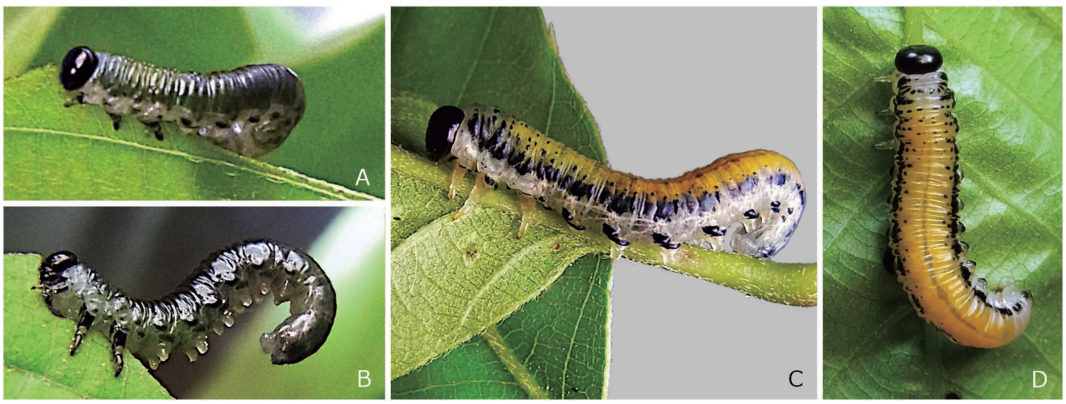

Fig. 1. *Fagineura glabella*. A–B, Middle instar larva, 19. V. 2013; C, final instar larva, 21. V. 2013; D, mature larva, 24 . V. 2013. Photographed by Ibuki.

(Fig. 1C–D): Head black; thoracic legs pale yellow, with claws brown; trunk dorsally reddish yellow, dorsolaterally black, laterally and ventrally pale gray, laterally with black spots.

Material examined. HONSHU: Tochigi Pref.: 1 ♀, Nakagawa, Koisago, coll. larva on *Quercus acutissima* 17. V. 2013, mat. 24. V., em. 35. III. 2014, S. Ibuki (Fig. 1) (cited by Hara and Ibuki, 2022).

Remarks. Hara and Ibuki (2022) recorded the host plant and gave a brief note on the life history. The larva has not been described and figured.

Macrophya fascipennis Takeuchi, 1933
Japanese name: Mon-kuro-habachi

(Fig. 2)

Larva. Probably early instar (Fig. 2A): Head pale olive; trunk creamy white. Middle instar (Fig. 2B–C): Head pale olive; trunk pale greenish, each segment with small black spots dorsolaterally and laterally. Late instar (Fig. 2D): Head olive, with broad blackish band along midline; trunk pale greenish, each segment with small black spots dorsolaterally. Mature larva (Fig. 2E): Head greenish white; trunk vivid pale green, shiny.

Material examined. HONSHU: Tochigi Pref.: 1 ♂ (Fig. 2F), Nakagawa, Koisago, 36°47′N 140°11′E, coll. larva on *Rubus trifidus*, 23. V. 2021, mat. 14. VI., em. 19. IV. 2022, S. Ibuki.

Host plants. Rosaceae: *Rosa onoei* Makino var. *onoei* (Okutani, 1970; Inomata, 1989). *Rubus trifidus* Thunb. (new record).

Life history. In Nakagawa, Tochigi Prefecture, Ibuki found a middle instar larva feeding on *Rubus trifidus* on May 23, 2021, which matured on June 14 and entered the soil. A male adult emerged on April 19, 2022. The larva was a solitary leaf-feeder and stayed coiled at rest (Fig. 2E). This species is regarded as univoltine.

Remarks. As a host plant of this species, Okutani (1970) first recorded *Rosa* sp. based on

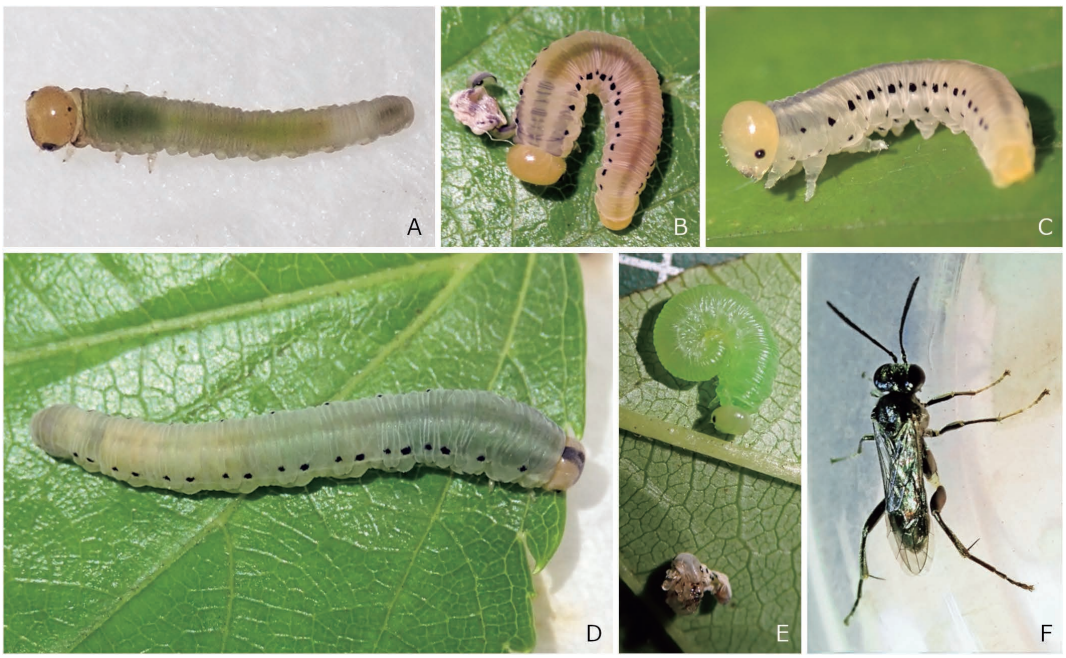

Fig. 2. *Macrophya fascipennis*. A, Probably early instar larva, Koisago, 23. V. 2021; B, same larva, middle instar, with cast skin, just molted, 7. VI.; C, same larva, 7. VI.; D, same larva, last feeding instar, 11. VI.; E, same larva (above), matured, and cast skin (below), 14. VI.; F, male adult, same individual as A–E, emerged, 19. IV. 2022. Photographed by Ibuki.

the rearing result of Ryoichi Inomata, who (Inomata, 1989) himself recorded "Yabuibara, *Rosa Luciae* Franch. et Rochebr." (= *Rosa onoei* var. *onoei*) later. This is an oligophagous species feeding on *Rosa* and *Rubus*. No information about the larva and life history of this species has been published.

Macrophya katayamai Shinohara, 2020
New Japanese name:
Maruba-aodamo-kuro-habachi

(Fig. 3)

Larva. Middle to late instars (Fig. 3A–D): Head pale gray, with obscure dark area laterally; trunk very pale greenish. Mature larva (Fig. 3E): Head greenish white; trunk vivid pale green, shiny.

Material examined. HONSHU: Tochigi Pref.: 1 ♂, Nakagawa, Bato, coll. larva on *Fraxinus sieboldiana*, 28. IX. 2017, mat. 9. X., em. (found dead) 1. V. 2018, S. Ibuki; 1 ♀ (Fig. 3F), Nakagawa, Bato, Sukusukunomori, coll. larva on *Fraxinus sieboldiana*, 10. VII. 2017, mat. 30. X., em. 30. IV. 2018, S. Ibuki.

Host plant. Oleaceae: *Fraxinus sieboldiana* Blume (new record).

Life history. In Nakagawa, Tochigi Prefecture, Ibuki found two larvae of this species feeding on *Fraxinus sieboldiana* in July and September. They both matured and entered the soil in October. The larvae were solitary leaf feeders, coiled at rest. Two adults emerged in spring next year. This species is regarded as univoltine. The larval period of this species was very long. One larva collected on July 10, 2017, reached maturity on October 30 (see above).

Remarks. The host plant and immature stages of this species were unknown. Among the Japanese species of *Macrophya*, the larva of *M. satoi* Shinohara & Li, 2015, is known to feed on *Fraxinus japonica* (Shinohara and Li, 2015; Shinohara, 2020) but the larva of this species is still undescribed. The larvae of the two species cannot be differentiated for now.

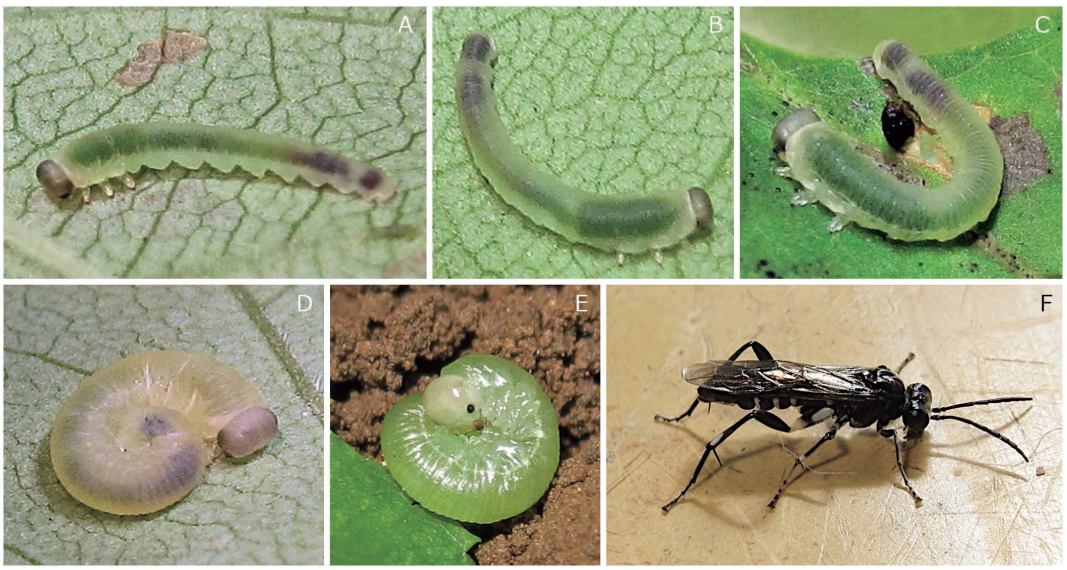

Fig. 3. *Macrophya katayamai*. A, Middle instar larva on *Fraxinus sieboldiana*, Bato, 15. VII. 2017; B, same larva, 20. VII.; C, same larva, 8. VIII.; D, same larva, 13. IX.; E, same larva, matured, 30. X.; F, female adult, same individual as A–E, emerged, 30. IV. 2018. Photographed by Ibuki.

Macrophya timida Smith, 1874
Japanese name: Ko-kuro-habachi

(Fig. 4)

Larva. Late instar (Fig. 4A, C above): Head gray, with obscure dark area dorsally and laterally; trunk whitish, covered with whitish wax powder. Mature larva (Fig. 4C below): Head greenish white; trunk vivid pale green, shiny.

Material examined. HONSHU: Tochigi Pref.: 1 ♂, Nakagawa, Bato, 36°44′N 140°10′E, coll. larva on *Ligustrum lucidum*, 26. V. 2021, mat. 3. VI., em. 3. IV. 2022, S. Ibuki; 2 ♀, same data except mat. 4. VI., em. 4. IV. 2022.

Host plants. Oleaceae: *Ligustrum obtusifolium* Sieb. et Zucc., *L. japonicum* Thunb., *Syringa vulgaris* L. (Okutani, 1954). *Ligustrum lucidum* Aiton (new record).

Life history. On May 26, 2021, Ibuki found three larvae of this species feeding on *Ligustrum lucidum* in Nakagawa, Tochigi Prefecture. The larvae were solitary leaf feeders, coiled at rest. They matured on June 3 and 4 and one male and two females emerged on April 3 and 4 next year. This species is regarded as univoltine.

Remarks. Okutani (1954, 1959) recorded host plants of this species and described the larva. Okutani (1954) also gave a key to the "mature larvae" of sawflies feeding on *Ligustrum*, but his "mature larvae" should actually be the larvae of the last feeding instar. The mature larva in our sense (prepupa or eonymph) is after the last molt at the end of the last feeding instar and ready for entering the soil. In this stage, the known larvae of *Macrophya* are almost entirely pale vivid greenish and shiny and show no clear specific differences (e.g., Figs. 2E, 3E, 4C below).

Mesoneura shishikuensis Togashi, 1965
Japanese name: Kimadara-habachi

(Fig. 5)

Larva. Probably final feeding-instar (Fig. 5A–B): 20 mm long, light green; head with black band laterally and small gray spots on frons; mandible brown yellow, apically black; cervical sclerite black; thoracic legs with coxae laterobasally slightly darkened and claws black; abdominal segment 3 with 6 annulets; proleg present on abdominal segment 2–8; proleg on segment 8 much smaller than proleg on segment 7; caudal protuberance absent. Mature larva (probably final instar) (Fig. 5C): As above, but dark markings on head paler.

Material examined. HONSHU: Tochigi Pref.: 1 ♀, Nakagawa, 36°45′N 140°9′E, coll. larva on *Quercus serrata* 15. V. 2019, mat. 17. V., em. 2. IV. 2020, S. Ibuki (Fig. 5).

Host plants. Fagaceae: *Quercus crispula* Blume

Fig. 4. *Macrophya timida*. A, Late instar larva, Bato, 26. V. 2021; B, another larva, molting, 27. V.; C, last feeding instar (above) and mature (below) larvae, 3. VI. Photographed by Ibuki.

(Hara *et al.*, 2018), *Q. serrata* Murray (new record).

Remarks. The larva of this species is similar to the larva of *Mesoneura opaca* (Fabricius, 1775) from Europe, but the former has the head with dark markings while the latter has the head without markings (fig. 69 in Prous *et al.*, 2019; p. 413, fig. 1 left and right in Macek *et al.*, 2020).

Nematus japonicus (Takeuchi, 1921)
Japanese name: Hiraashi-habachi

Material examined. HONSHU: Tochigi Pref.: 3 ♀, Nakagawa, Yamata, coll. larvae on *Alnus sieboldiana* 30. IX. 2018, mat. 2. X., em. 10. IX. 2019, S. Ibuki; 3 ♀, same data but mat. 3. X., em. 14. IX. 2019.

Host plants. Betulaceae: *Alnus firma* Siebold et Zucc., *A. hirsuta* Turcz. var. *hirsuta*, *A. japonica* (Thunb.) Steud., *A. inokumae* Murai et Kusaka, *A. pendula* Matsum. (Okutani, 1967); *A. sieboldiana* Matsum. (new record).

Remarks. We here record *A. sieboldiana* as a new host plant. This sawfly is associated with various species of *Alnus*.

Nematus yokohamensis (Konow, 1895)
Japanese name: Yokohama-higenaga-habachi

(Figs. 6–9)

Holcocneme Yokohamensis[*sic*] Konow, 1895: 54, 56; Konow, 1905: 62; Enslin, 1910: 316.
Holcocneme yokohamensis: Takeuchi, 1936: 162; Oehlke and Wudowenz, 1984: 420.
Nematus yokohamensis: Takeuchi, 1952: 68; Okutani, 1954: 80; Zinovjev, 1978: 627; Zinovjev, 1979: 430; Abe and Togashi, 1989: 552; Naito *et al.*, 2004: 27; Yoshida, 2006: 54; Sundukov, 2017: 69; Hara and Shinohara, 2018: 106; Hara, 2019: 83; Hara, 2020: 345.
Nematus yokohamensis yokohamensis: Vikberg, 1972: 30.
Nematus (*Paranematus*) *yokohamensis*: Taeger *et al.*, 2010: 420; Sundukov and Lelej, 2012: 85.

Redescription, *female*. Length 7.5–10.5 mm (10.5 mm in lectotype). Black (Fig. 6). Labrum mostly brownish white (Fig. 7G) or brown to dark brown with wide lateral and ventral margins pale brown or brownish white (Fig. 7H). Mandible apically dark reddish brown. Pronotum with posterolateral corner often narrowly brownish (Fig. 6C), rarely yellow. Tegula often yellow or brown laterally. Legs white or pale yellow on apices of coxae, part or most of fore and middle trochanters and trochantelli, hind trochanter and trochantellus, most or wide base of fore tibia, basal third to two thirds of middle tibia, basal third of hind tibia and bases of fore and middle tarsi (Fig. 6A, B, D). Wings nearly colorless transparent, with stigma and veins black; vein C of fore wing sometimes mostly dark yellow (Fig. 6A).

Head in dorsal view narrowing behind eye (Fig. 7A). Postocellar area with anterior furrow shallow and dull, and lateral furrow shallow and sharp. OOL : POL : OOCL 0.8–1.1 : 1.0 : 0.8–1.0. Frontal area with lateral ridge low or indistinct and anterior ridge well developed and laterally fused with well-developed transverse ridge above dorsal tentorial pit (Fig. 7C). Frontal pit

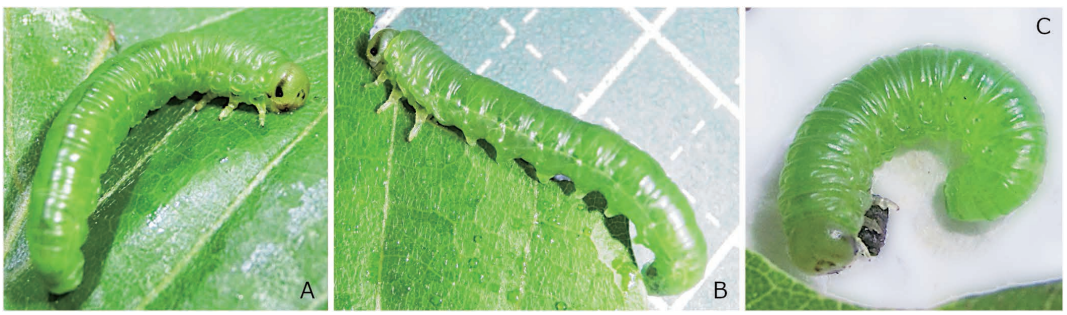

Fig. 5. *Mesoneura shishikuensis*. A–B, Probably final feeding-instar larva, 20 mm long, 15. V. 2019; C, mature (probably final instar) larva, 17. V. 2019. Photographed by Ibuki.

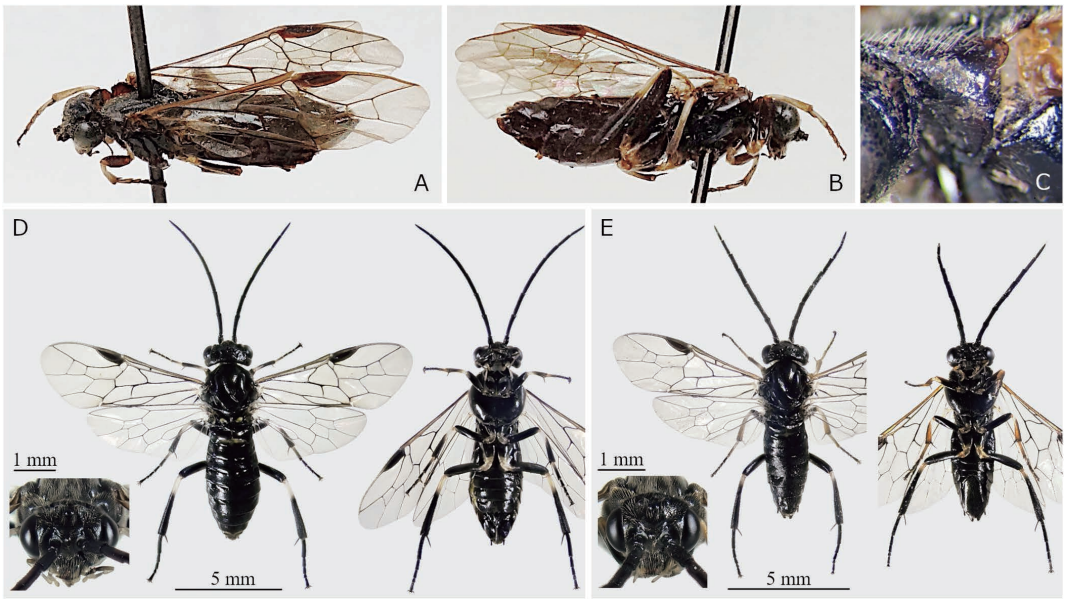

Fig. 6. *Nematus yokohamensis*. A–B, Female in dorsolateral and ventrolateral views (lectotype); C, pronotum in lateral view (lectotype); D, female, head in anterior view, whole in dorsal and ventral views; E, male, head in anterior view, whole in dorsal and ventral views. Photographed by Hara.

large and deep. Area between dorsal tentorial pit and eye markedly convex (Fig. 7C, E, arrowed). Ridge around torulus dorsolaterally disappearing. Clypeus with width 3.5–4.1 × maximum height; maximum height 0.6–0.8 × torulus height; ventral edge shallowly or moderately emarginate (Fig. 7G–H); depth of emargination 0.3–1.2 × median height of clypeus. Malar space 0.8–1.0 × as long as median ocellus width. Antenna tapering, with length 2.7–2.8 × head width (Fig. 6D); first flagellomere length 1.0–1.1 × major axis of eye, 4.1–4.8 × middle breadth in lateral view (Fig. 7E); second flagellomere 1.0–1.1 × as long as first. Mandibles equal in length, each with one small inner notch (Fig. 7H); left one markedly tapering on basal part, very gradually tapering from middle to apex (Fig. 7I), with distinct apical ridge on anterior surface; right one relatively regularly tapering (Fig. 7J), with distinct apical ridge on posterior surface. Mesoscutellar appendage 1.0–1.7 × as long as minor axis of cenchrus (Fig. 7K). Mesepisternum with groove along anterior edge dorsally extending to anterodorsal corner; epicnemium with maximum breadth shorter than mesothoracic spiracle height; epicnemial groove distinct and sharp. Katepimeron glabrous except for one to several setae on posterior edge. Hind tibia dorsally rounded, in lateral view 0.8 × as broad as hind femur; posterior tibial spur length 1.5–1.8 × apical breadth of tibia in lateral view, 0.6 × first tarsomere length. Hind tarsus 0.7–0.8 × as long as hind tibia (Fig. 6D). Claws with large inner tooth slightly curved inward (Fig. 7L); depth of concavity between teeth longer than distance between teeth. Fore wing with cell Sc 0.4–0.8 × as wide as vein C at middle of base of vein Rs + M. Hind wing with section of vein 1A between cell 1A and crossvein cu-a 1.5–1.8 × as long as crossvein cu-a (Fig. 7D).

Hypopygium with posterior edge moderately concave beside median projection. Cercus posteriorly extending slightly before near or slightly beyond ovipositor sheath (Fig. 7M). Ovipositor sheath 0.5–0.6 × as long as hind tibia. Valvula 3 in dorsal view tapering on apical part, about as wide as cercus (Fig. 7M), in lateral view narrowly rounded apically (Fig. 7N). Lance annu-

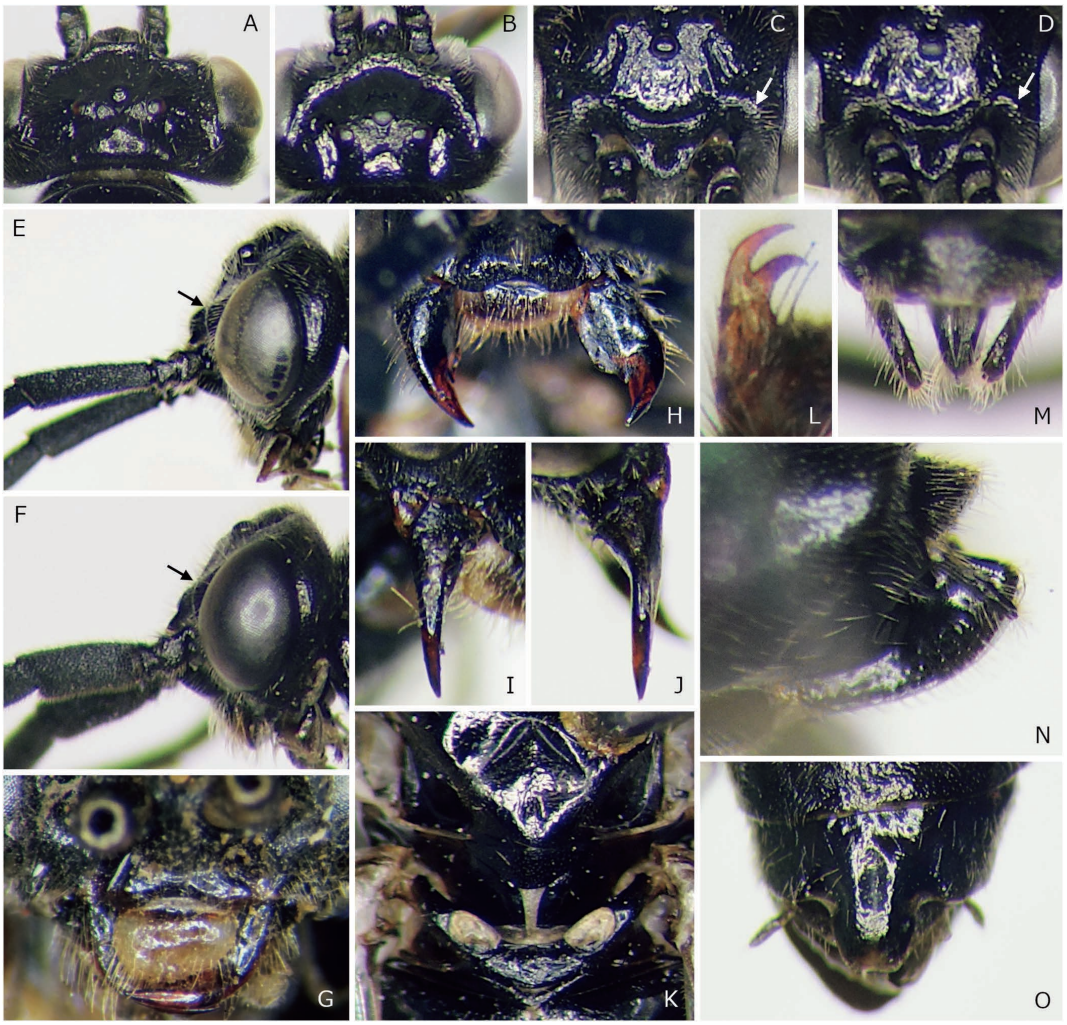

Fig. 7. *Nematus yokohamensis*. A, Head in dorsal view, female, B, ditto, male; C, frons in anterodorsal view, female (convexity arrowed); D, ditto, male; E, head and base of antenna in lateral view, female (convexity arrowed); F, ditto, male; G, ventral part of head in anterior view (lectotype); H, clypeus and mandibles in anterior view, female; I–J, right and left mandibles in outer views, female; K, posterior part of thorax in dorsal view, female; L, claw (lectotype); M, apex of female abdomen in dorsal view; N, apex of female abdomen in lateral view; O, apex of male abdomen in dorsal view. Photographed by Hara.

lated on apical two thirds, with distinct subdorsal carina (Fig. 8A); dorsal edge straight in lateral view. Lancet (Fig. 8B–C) with 20–21 serrulae; sclerite before first annulus wide; basal two annuli without ctenidia; annular sutures sinuate, dorsally curved posteriorly, ventrally slightly curved anteriorly.

Body shiny and smooth, with punctures minute or indistinct. Mesopostnotum medially smooth, laterally slightly microsculptured. Metapostnotum smooth. Basal abdominal terga slightly microsculptured.

Male. As in female except for usual sexual differences. Length 6.0–8.5 mm (Fig. 6E). Legs often pale on apices of fore and middle femora; fore and middle tibiae often entirely pale; fore and middle tarsi often pale except for narrow apices.

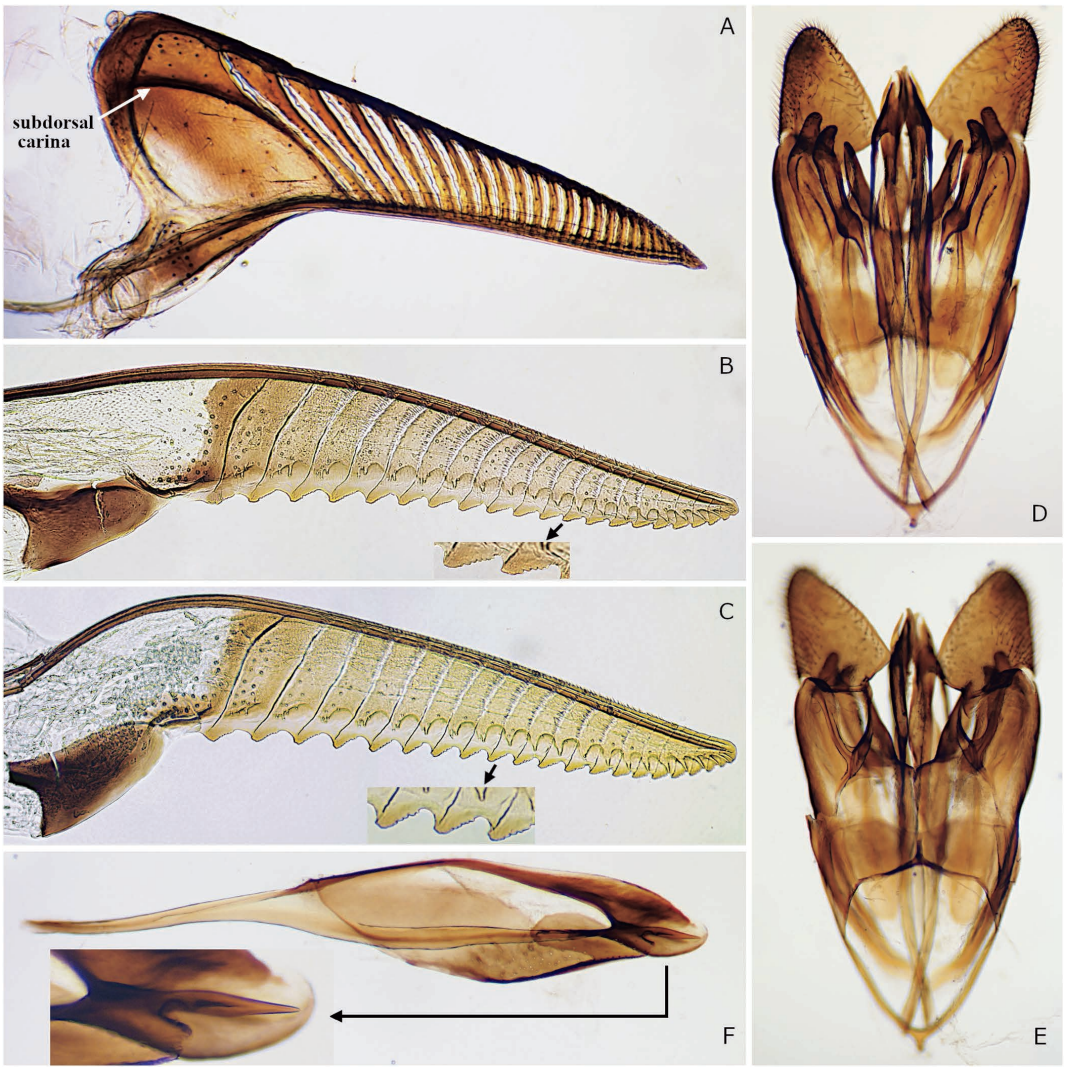

Fig. 8. *Nematus yokohamensis*. A, Lance; B–C, lancet; D–E, male genitalia in dorsal and ventral views; F, penis valve. Photographed by Hara.

Head in dorsal view markedly narrowing behind eye (Fig. 7B). Malar space 0.5–0.7 × as long as median ocellus width. Antenna length 2.9–3.1 × head width (Fig. 6D); flagellum basally compressed laterally; first flagellomere length 0.8–0.9 × major axis of eye and 2.7–2.9 × middle breadth in lateral view (Fig. 7F); second flagellomere 1.1–1.2 × as long as first.

Procidentia very large, basally slightly constricted, with apical edge truncate or widely rounded in dorsal view (Fig. 7O); tergal hollow laterally ridged. Genitalia (Fig. 8D–E) with paranepennis acute apically; harpe with inner edge convex at basal fourth; penis valve (Fig. 8F) with valvispina thorn like, sometimes basally slightly constricted.

Larva. First instar (Fig. 9C): Head and caudal protuberance black; trunk and thoracic legs dark gray. Early instar (Fig. 9D): Black, slightly purplish. Middle instar (Fig. 9E): Head black; trunk dorsally purplish black, laterally and ventrally pale grayish green; thoracic legs with lateral parts of coxae and claws black; surpedal and subspiracular lobes greenish gray. Final instar

Fig. 9. *Nematus yokohamensis*. A–B, Egg marks (arrowed) and first instar larvae, 2. VI. 2020; C, ditto, 1. V. 2021; D, early instar larva, 4. VI. 2020; E, middle instar larva, 6. VI. 2020; F, final instar larva, 13. V. 2021; G, mature larva, 10. VI. 2020 (about 20 mm long); H, exuvia in cocoon, labrum; I, ditto, antenna, above dorsal; J–K, cocoon. A–G, Photographed by Ibuki; H–K, photographed by Hara.

(Fig. 9F–I): Length about 25 mm; color as in middle instar, but dark markings on lateral region reduced; prolegs on abdominal segments 2–7 and 10; caudal protuberances close to each other; clypeus with two pairs of setae; labrum ventrally deeply incised, medially convex with median furrow, with two pairs of setae (Fig. 9H); antenna flattened, slightly convex apically, with four antennomeres (Fig. 9I); mandible with one or two setae; stipes with one seta; palpifer with one seta.

Cocoon. Length 9.5 mm; blackish brown, double walled (Fig. 9J–K); outer wall netted.

Material examined. Lectotype: ♀, "Yokohama" "Coll. Konow" "Holcocneme Yokohamensis Knw. Japonia" "Nematus wahlbergi Th. f. geogr. yokohamensis Knw. O. Conde det, 1939 Type." "HOLOTYPUS Nematus y. yokohamensis det. V. Vikberg, 1971 (Konow)" "PR. 308(W)" "Dtsch. Ent. Inst. Eberswalde" "GBIF-GISHym 3869" (Fig. 6A–C, 7G, L), deposited in the Senckenberg Deutsches Entomologisches Institut, Müncheberg. Konow (1895) did not designate the holotype. It is not clear whether the specimen he had was only one or more than one. Vikberg (1972) referred to the above specimen as "the holotype". We regard this as fixation of the lectotype. Oehlke and Wudowenz (1984) listed this specimen as the holotype.

Other material examined: JAPAN: HOKKAIDO: 1 ♀, Tokachi, Shikaoi, Lake Shikaribetsu-ko, 25. VII. 1939, K. Takeuchi (Fig. 8B). —HONSHU: Tochigi Pref.: 2 ♀1 ♂, 1 cocoon of ♀ and larval exuvia in it, Nakagawa, Oyamada, coll. larvae on *Lonicera japonica*, 2. VI. 2020, mat. 12, 14. VI., em. 24, 29. IV. 2021, S. Ibuki (Figs. 6E, 7H–J, 9A–B, D–E, G–K); 1 ♀, Nakagawa, Wami, 36°46′N 140°10′E, coll. larva

on *Lonicera japonica*, 6. VI. 2020, mat. 10. VI., em. 19. IV. 2021, S. Ibuki (Figs. 6D, 7A, C, E, K, M–N); 1 ♀, ditto but mat. 12. VI., em. 21. IV. 2021 (Fig. 8C), and its progeny, 5 ♂, eggs laid 22–23. IV. 2021, larvae hatch. 30. IV., mat. 15. V., em. 22, 24. IV. 2022 (Figs. 7B, D, F, O, 8D–F, 9C, F). — Tokyo Met.: 1 ♀, Nerima, Doshida, 18. V. 1954, Yamamoto; 1 ♀, Setagaya, Kinuta, 6. V. 1933; 1 ♂, Meguro, 5. V. 1928, K. Sato. — Kanagawa Pref.: 1 ♀, Yokohama, 5. V. 1930, K. Sato; 1 ♀, ditto but 1. V. 1960; 1 ♂, Yokohama, Shinohara, 3. V. 1953, K. Sato; 2 ♀, Yokohama, Nishiterao, 5. V. 1955, K. Sato; 2 ♂, ditto but 3. V. 1957; 1 ♂, Yokohama, Baba, 5. V. 1954, K. Sato; 1 ♀1 ♂, ditto but 22. IV. 1955; 1 ♀, Sagamihara, Kobotoke-pass, 18. V. 1957, K. Sato (Fig. 8A). — Toyama Pref: 1 ♀, Toyama, Omi, 4. VI. 1955, S. Takagi. — Kyoto Pref.: 1 ♀, Kibune, 6. VI. 1950, Takeuchi; 1 ♀, Kyoto, 1. V. 1933, Takeuchi. — Osaka Pref: 1 ♀, Mt. Inunaki-san, 22. V. 1932, Takeuchi (cited by Yoshida, 2006). — Hyogo Pref.: 1 ♀, Tanba-Sasayama, *Lonicera japonica*, 10. IV. 1963, T. Okutani. — KYUSHU: Fukuoka Pref.: 1 ♂, Mt. Hiko-san, 18. V. 1963, A. Nakanishi; 1 ♂, Mt. Kora-san, 17. IV. 1962, A. Nakanishi. — Kagoshima Pref.: 1 ♂, Cape Sata, 2. V. 1962, A. Nakanishi. — Locality unknown: 1 ♀, "[Chikusho-tani]"(in Japanese), 25. VII. 1932; 1 ♀, "[?Kibe]"(in Japanese), 19. V. 1953, J. Yoshioka. — KOREA: 1 ♀, "Tonai" (= Tonae, Ryanggang-do, North Korea), 23. VII. 1935, Takeuchi.

Distribution. Japan: Hokkaido (Hara and Shinohara, 2018), Honshu (Konow, 1895), Sadogashima Is. (Takeuchi, 1936), Kyushu (new record). Korea (Sundukov and Lelej, 2012; Sundukov, 2017; this study); Russia (Sakhalin, Russian Far East, Siberia), China (Sundukov and Lelej, 2012; Sundukov, 2017).

Although Sundukov and Lelej (2012) and Sundukov (2017) listed Korea in the distribution of this species, the reason or original source is unknown. Lee *et al.* (2019) did not include this species in the Korean fauna. We examined one female of this species from North Korea (see material examined). The records from China may need confirmation, because Wei *et al.* (2006) regarded the record from China (Kang, 1992) as being based on misidentification. Sundukov and Lelej (2012) included Finland in the distribution and it was followed by Hara and Shinohara (2018). However, Sundukov (2017) excluded Finland from the distribution. Sundukov and Lelej's distribution list seems to include the distributions of *N. wahlbergi tavastiensis* Vikberg, 1972, described from Finland and *N. tulunensis* Vikberg, 1972, described from Siberia, both originally regarded as the subspecies of *N. yokohamensis*. There is no record of *N. yokohamensis* from Finland.

Host plants. Caprifoliaceae: *Lonicera japonica* Thunb. (new record), *L.* spp. (Sundukov, 2017).

Life history. In the lowlands of Honshu, adults were collected from late April to early June and larvae in early June. The larvae collected in early June matured in middle June and became adults in the following spring under rearing conditions. This sawfly has one generation per year. Under rearing conditions, a female inserted her eggs singly into leaves beside or at the main or lateral veins (Fig. 9A–C). Larvae solitarily fed on leaves. No extra molt was observed when the larvae reached maturity. Cocoons were made between papers or in the soil in captivity.

Remarks. The original description of this species by Konow (1895), containing only the female, is very simple. Takeuchi (1936) briefly described the male as "Undescribed male agrees very well with the female except the most of four anterior tibiae and their tarsi white. Length of male 7 mm.", based on one male. Vikberg (1972) gave the key characters with an excellent figure of the lancet of the "holotype", but he examined only the "holotype". We here redescribe this species based on a good series of specimens listed above, considering the variation and the characters previously not mentioned.

This species is distinguished from other Japanese nematines in having the frons with an anterior ridge well developed and laterally extending into a facial orbit (Fig. 7C–D) and this part of a

facial orbit markedly convex (Fig. 7C–F, arrowed). In the key to the species of the *Nematus lonicerae* and *N. wahlbergi* groups by Vikberg (1972), part of our female specimens of *N. yokohamensis* do not fit "*N. yokohamensis yokohamensis*" (= *N. yokohamensis*) but they may go to "*N. yokohamensis tavastiensis*" (= *N. wahlbergi tavastiensis* Vikberg, 1972), because key characters for *N. yokohamensis*, the color of pronotum and fore-wing vein C and the narrowness of stigma, are variable in our material. However, our female specimens of *N. yokohamensis* have the fore and middle tarsi always strongly infuscate (Fig. 6D) (not infuscate in *N. wahlbergi tavastiensis*; Vikberg, 1972) and the second annulus of the lancet without ctenidial teeth (Fig. 8B–C; fig. 13 in Vikberg, 1972) (with well-developed ctenidial teeth in *N. wahlbergi tavastiensis*; fig. 15 in Vikberg, 1972). In the key to species of *Nematus* (*Paranematus*) Zinovjev, 1978 (= the *N. wahlbergi* group) by Zinovjev (1978, 1979), *N. yokohamensis* goes to the couplet 2–3 consisting of *N. tulunensis* Vikberg, 1972 and "*N. wahlbergi* Thomson, 1871" (= *N. wahlbergi wahlbergi*), but differs from *N. tulunensis* in having the pronotum with the posterolateral corner not pale or narrowly brown or yellow (very broadly yellow in *N. tulunensis*; Vikberg, 1972), the median fovea rounded (Fig. 7C) (oblong, appearing as a deep groove in *N. tulunensis*) and the lancet slightly upturned apically and its second annulus without ctenidial teeth (Fig. 8B–C) (distinctly upturned and its second annulus with well-developed ctenidial teeth in *N. tulunensis*; fig. 14 in Vikberg, 1972 and figs. 7, 17 in Zinovjev, 1978). *Nematus yokohamensis* differs from *N. wahlbergi wahlbergi* in having the legs mostly black (Fig. 6B, D) (mostly yellow to reddish yellow in *N. wahlbergi wahlbergi*; fig. 43 in Prous *et al.*, 2019), the flagellomere 1 slightly curved with the length 4.1–4.8 × the middle breadth in lateral view (Fig. 7E) (straight with the length 3.2–4.0 × the middle width in *N. wahlbergi wahlbergi*; fig. 2 in Zinovjev, 1978, 1979) and the second annulus of the lancet without ctenidial teeth (Fig. 8B–C; fig. 13, lectotype, in Vikberg, 1972) (with well-developed ctenidial teeth in *N. wahlbergi wahlbergi*; fig. 16 in Vikberg, 1972 and fig. 10 in Zinovjev, 1978). Males are known only for *N. yokohamensis* and *N. wahlbergi wahlbergi* in the *N. wahlbergi* group. They are easily distinguished by the color of legs: Mostly black in *N. yokohamensis* (Fig. 6D); mostly yellow to reddish yellow in *N. wahlbergi wahlbergi* (Enslin, 1915; Prous *et al.*, 2019). However, their penis valves are not distinctly different (compare Fig. 8F with fig. 50 in Prous *et al.*, 2019).

Nesoselandria morio (Fabricius, 1781)
Japanese name: Morio-ko-habachi

Material examined. HOKKAIDO: 1 ♀ (HH220626C), Hidaka, Nissho-toge, 42°58′N 142°45′E, 26. VI. 2022, H. Hara, and its progeny, 13 ♂, eggs laid on *Calliergonella lindbergii*, 26–28. VI. 2022, hatch. 2–4. VII., reared on *C. lindbergii* and *Climacium dendroides*, mat. 21–23. VII., em. 15. VIII. – 1. IX. 2022, H. Hara.

Host plants. "[Koke no 1 shu]" (in Japanese; meaning a species of moss), Bryophyta, indeterminate class, ord., fam., gen. et sp. (Naito, 1988). "[Haigoke]" (in Japanese; meaning Bryopsida: Hypnales: Hypnaceae: *Hypnum plumaeforme* Wilson) (Naito, 2020) (this record needs verification; see remarks below). *Food plant under rearing conditions*. Bryopsida: Hypnales: Hypnaceae: *Calliergonella lindbergii* (Mitt.) Hedenás (new record); Isobryales: Climaciaceae: *Climacium dendroides* (Hedw.) F.Weber et D.Mohr (new record). In Finland, Vikberg and Nuorteva (1997) reported the larval feeding on the following mosses under rearing conditions: Bryopsida: Bryales: Mniaceae: *Plagiomnium cuspidatum* (Hedw.) T.J.Kop.; Dicranales: Ditrichaceae: *Ceratodon purpureus* (Hedw.) Brid.; Hedwigiales: Hedwigiaceae: *Hedwigia ciliata* (Hedw.) P. Beauv.; Hypnales: Symphyodontaceae: *Plagiothecium denticulatum* (Hedw.) Bruch et Schimp.; Polytrichales: Polytrichaceae: *Polytrichum commune* L. ex Hedw.

Remarks. *Nesoselandria morio* is the only

sawfly known to feed on moss (Naito, 1988; Vikberg and Nuorteva, 1997). Naito (1988) simply stated the larva fed on a species of moss. Vikberg and Nuorteva (1997) confirmed that the larva ate various species of Bryopsida, using the larvae reared from the eggs laid by females indoors. The host species, namely the larval food species under natural conditions, remains unknown. Although Naito (2020) stated that the host plant was *Hypnum plumaeforme*, his statement was not accompanied by the observational data or the sources. It requires verification. We here add two species of Bryopsida as the food plants under rearing conditions. One of them, *Calliergonella lindbergii*, was found near the point where the studied female was collected. The moss is probably the host plant of the sawfly.

Perineura okutanii Takeuchi, 1959
Japanese name: Ajisai-habachi

(Fig. 10)

Larva. Late instar (Fig. 10A–B): Head pale olive, with large black spot around stemmatum; trunk pale greenish, with sparse minute whitish tubercles dorsally.

Material examined. HONSHU: Tochigi Pref.: 2 ♀ (Fig. 10C), Nakagawa, Oyamada, coll. larvae on *Hydrangea macrophylla* f. *macrophylla*, 31. V. 2016, mat. 5. VI., em. 11. IV. 2017, S. Ibuki.

Host plants. Hydrangeaceae: *Hydrangea hortensia* (= *Hydrangea macrophylla* (Thunb.) Ser. f. *hortensia* (Lam.) Rehder) (Takeuchi, 1949); *Hydrangea macrophylla* Seringe (= *Hydrangea macrophylla* (Thunb.) Ser. f. *normalis* (E.H.Wilson) H.Hara) (Okutani, 1967); *Hydrangea macrophylla* (Thunb.) Ser. f. *macrophylla* (new record). Takeuchi (1959) noted "Larva feeds on *Hydrangea* spp.".

Life history. Ibuki found two late instar larvae solitarily feeding on *Hydrangea macrophylla* f. *macrophylla* on May 31, 2016, in Nakagawa, Tochigi Prefecture. The larvae were not coiled at rest. They matured on June 5 and entered the soil. Two female adults emerged on April 11, 2017. This species is regarded as univoltine.

Remarks. As suggested by Takeuchi (1959), this species is thought to be the sawfly long known in Japan as "Ajisai-habachi" (= hydrangea sawfly) (Sasaki, 1923), a pest of hydrangea. Sasaki (1923) gave concise notes on the morphology, life history and damage of this species. His description of the late-instar ("mature") larva differs from the larva shown in Fig. 10A–B in the head coloration. According to Sasaki (1923), the head of the larva is black, whereas the head is pale olive in our material. We need more information to confirm if this difference is within a variation range of the species.

Fig. 10. *Perineura okutanii*. A–B, Late instar larva on *Hydrangea macrophylla* f. *macrophylla*, Oyamada, 31. V. 2016; C, two females, emerged, 11. IV. 2017. Photographed by Ibuki.

Perineura pictipennis Takeuchi, 1959
Japanese name: Iwagarami-habachi

(Fig. 11)

Larva. Middle instar (Fig. 11A): Head very pale olive, with large black spot around stemmatum; trunk greenish creamy white. Late instar (Fig. 11B): Head pale olive, with large black spot around stemmatum; trunk pale greenish white, with very sparse minute whitish tubercles dorsally. Mature larva (Fig. 11C): Entirely vivid pale green, shiny.

Material examined. HONSHU: Tochigi Pref.: 1 ♀, Sakura, coll. larva on *Hydrangea hydrangeoides*, 16. V. 2019, mat. 3. VI., em. 3. V. 2020, S. Ibuki; 1 ♀, Nakagawa, Wami, 36°46′N 140°10′E, coll. larva on *Hydrangea serrata* var. *serrata*, 30. V. 2020, mat. 22. VI., em. 29. III. 2021, S. Ibuki; 1 ♀ (Fig. 11D), Nakagawa, Wami, 36°46′N 140°10′E, coll. larva on *Hydrangea serrata* var. *serrata*, 30. V. 2020, mat. 10. VI., em. 30. III. 2021, S. Ibuki.

Host plants. Hydrangeaceae: *Hydrangea hydrangeoides* (Siebold et Zucc.) B.Schulz (Okutani, 1967); *Hydrangea serrata* (Thunb.) Ser. var. *serrata* (new record).

Life history. As shown in the label data above, the larvae were found feeding on the host leaves in May to June in Sakura and Nakagawa, Tochigi Prefecture. They matured in June and went into the soil. The larvae were solitary leaf feeders, not coiled at rest. The adults emerged in spring next year. This is regarded as a univoltine species.

Remarks. Okutani (1967) recorded *Hydrangea hydrangeoides* as the host of this species, but nothing has been published about the larva and life history of the species.

Pristiphora conjugata (Dahlbom, 1835)
Japanese name: Yamanarashi-habachi

Material examined. HOKKAIDO: 1 ♀, Sapporo, Hokkaido University, coll. larva on *Populus nigra*, 23. IX. 2005, coc. 24. IX., em. 12. III. 2006, H. Hara.

Distribution. Japan: Hokkaido (new record); Honshu (Okutani, 1970). Palaearctic (Prous *et al.*, 2017; Sundukov, 2017, for details).

Host plants. Salicaceae: *Populus nigra* L. (this study), *P. nigra* L. var. *italica* (Duroi) Koehne (Okutani, 1970), *P. tremula* L. var. *sieboldii* (Miq.) Kudô (Okutani, 1970) in Japan. For more information, see Prous *et al.* (2017).

Remarks. This species is recorded from Hokkaido for the first time. The Hokkaido female examined runs to *Pristiphora conjugata* in the key to North-Western Palaearctic species of the genus by Prous *et al.* (2017).

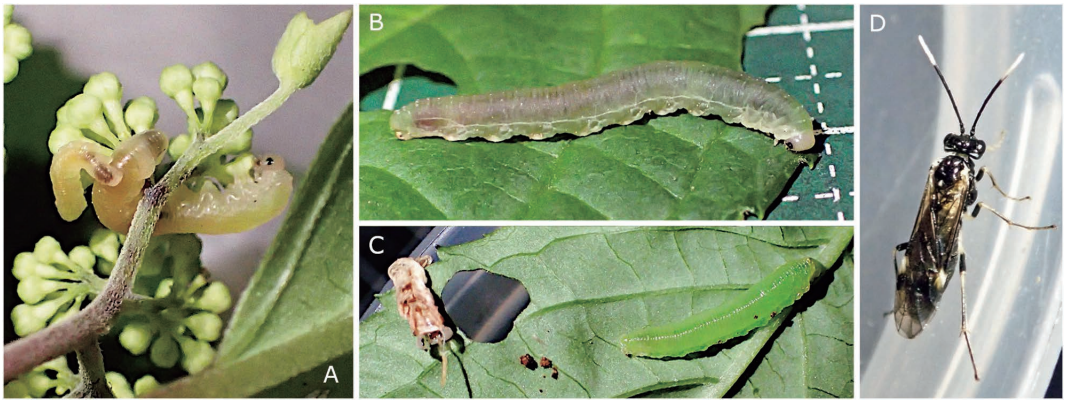

Fig. 11. *Perineura pictipennis*. A, Two larvae on *Hydrangea serrata* var. *serrata*, Wami, 30. V. 2020; B, larger larva in A, late instar, 7. VI. 2020; C, another smaller larva in A, matured, and cast skin, 23. VI. 2020; D, female adult, same individual as B, emerged, 30. III. 2021. Photographed by Ibuki.

Pristiphora geniculata (Hartig, 1840)
New Japanese name:
Nanakamado-higenaga-habachi

(Fig. 12)

Material examined. HOKKAIDO: 25 ♀2 ♂, Engaru, coll. larvae on *Sorbus commixta*, 22. VII. 1993, coc. 24–26. VII., em. 9–12. VIII. 1993, H. Hara, and progeny of one of those ♀, 1 ♂, egg laid 10. VIII. 1993, em. 16. IX. 1993, H. Hara; 9 ♀, Tokachigawa-onsen, coll. gregarious larvae on *Sorbus commixta*, 8. VII. 2008, mat. 9–11. VII., em. 23–25. VII. 2008, H. Hara (Fig. 12A–B); 13 ♀6 ♂, Yakumo, coll. 140 early-instar gregarious larvae on *Sorbus commixta*, 20. VI. 2008, coc. 29. VI. – 1. VII., em. 11–23. VII. 2008, H. Hara (Fig. 12C–G). — HONSHU: Gunma Pref.: 12 ♀1 ♂, Manza-onsen, 36°38′N 130°30′E, coll. larvae on *Sorbus commixta*, 16. VIII. 2022, mat. 16–18. VIII., em. 5–6. IX. 2022, H. Kojima.

Distribution. Japan (new record): Hokkaido, Honshu. Palaearctic (see Sundukov, 2017, for details), N. America (introduced; Forbes and Daviault, 1964).

Host plants. Rosaceae: *Sorbus commixta* Hedl. (new record). This species is associated with various species of *Sorbus*. For the host plants outside Japan, see Prous *et al.* (2017). This sawfly is well known as a pest in North America (Forbes and Daviault, 1964; Looney *et al.*, 2016).

Remarks. This Palaearctic species is here recorded from Japan for the first time. The Japanese females and males go to *Pristiphora geniculata* in the key to North-Western Palaearctic species of *Pristiphora* by Prous *et al.* (2017). Their

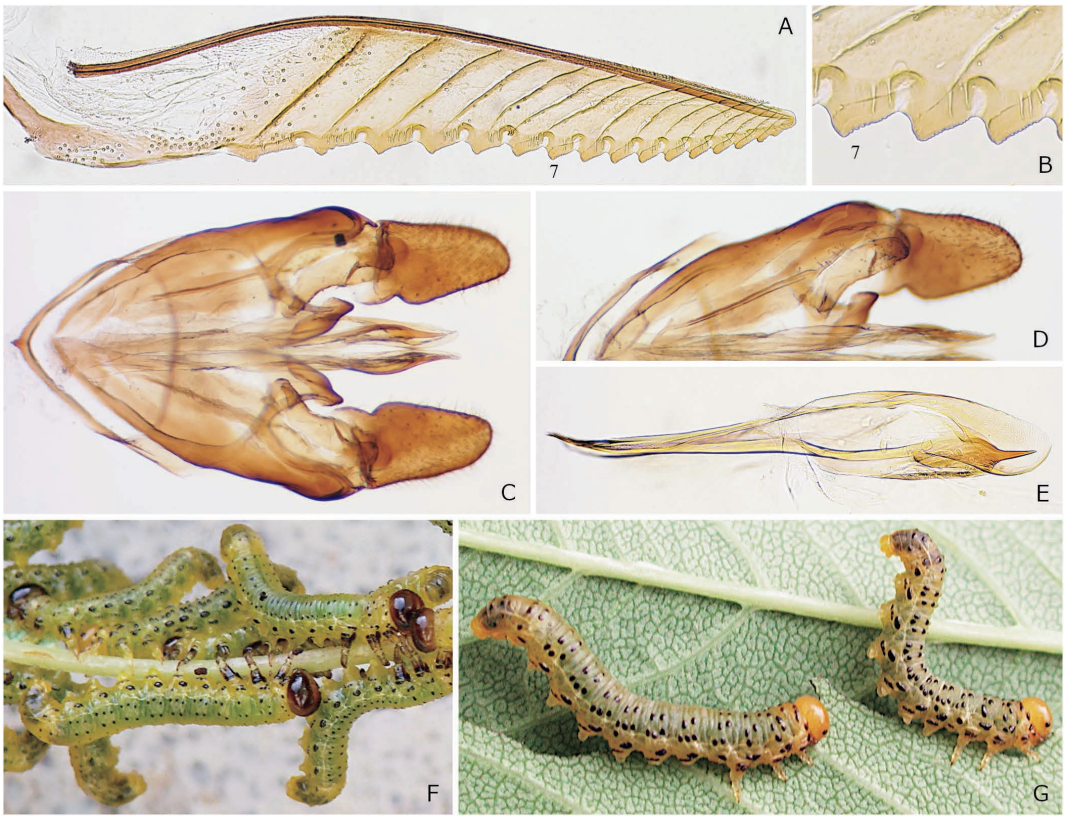

Fig. 12. *Pristiphora geniculata*. A–B, Lancet, C–D, male genitalia in ventral and dorsal views; E, penis valve; F, semifinal instar larvae, 25. VI. 2008; G, final instar larvae (left larva 13 mm long), late VI. 2008. Photographed by Hara.

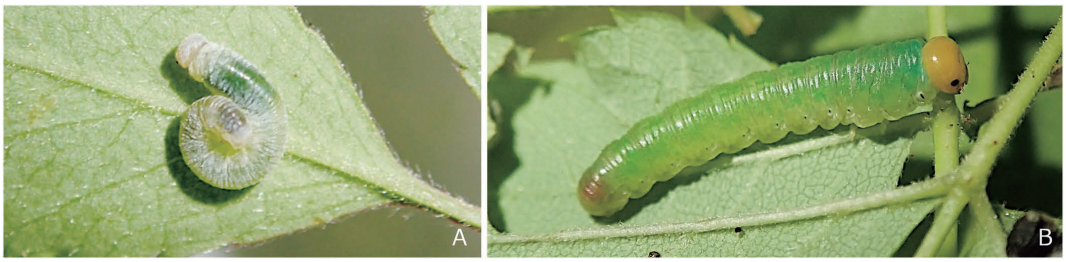

Fig. 13. *Taxonus japonicus*. A, Early or middle instar larva, 31. V. 2021; B, mature larva, 20. VI. 2021. Photographed by Ibuki.

lancets and penis valves are identical with those of European specimens respectively (compare Fig. 12A, E with figs. 150, 229 in Prous *et al.*, 2017). The final instar larva of Japan (Fig. 12G) is also almost the same as the European larva figured by Macek *et al.* (2020, p. 537, fig. 4).

Profenusa thomsoni (Konow, 1886)
Japanese name: Tomuson-hamuguri-habachi

Material examined. HOKKAIDO: 1♀, Iwamizawa, Kurisawa, Mt. Sankaku-yama, 43°05′N 141°58′E, 1. VII. 2022, oviposited in *Betula ermanii* in captivity, H. Hara; 1♀ (HH220801B), same data but coll. larva mining leaf of *Betula ermanii*, 1. VII. 2022, mat. 6. VIII., em. 29. VIII. 2022.

Host plants. Betulaceae: *Betula ermanii* Cham. (new record), *Betula platyphylla* Sukaczev var. *japonica* (Miq.) H.Hara (Shinohara and Hara, 2015) in Japan. For the host plants outside Japan, see Taeger *et al.* (1998).

Remarks. This sawfly is associated with various species of *Betula*.

Taxonus japonicus Takeuchi, 1929
Japanese name: Bara-kuro-habachi

(Fig. 13)

Larva. Early or middle instar (Fig. 13A): Thinly covered with white bloom; head pale yellow; trunk pale green yellow. Mature larva (probably after extra molt) (Fig. 13B): Head yellow; trunk green yellow, with spiracles black; thoracic legs pale greenish gray.

Material examined. HONSHU: Tochigi Pref.: 1♀, Nakagawa, Wami, 36°47′N 140°10′E, coll. larva on *Rosa multiflora*, 31. V. 2021, mat. 20. VI., em. 12. IV. 2022, S. Ibuki (Fig. 13).

Host plants. Rosaceae: *Rosa multiflora* Thunb. (new record), *R. onoei* Makino var. *onoei* (Okutani, 1967).

Remarks. The larva of this species presumably has an extra molt, because the mature larva does not have white bloom. *Taxonus minomensis* (Takeuchi, 1929) is also known to be associated with *Rosa* (Okutani, 1967). Its larva has not been described.

Acknowledgements

We are indebted to Yuya Inoue (National Museum of Nature and Science, Tsukuba) for the identification of mosses. Our thanks are also due to Tatsuya Ide (National Museum of Nature and Science, Tsukuba), Haruyoshi Kojima (Nagano) and Andreas Taeger (Senckenberg Deutsches Entomologisches Institut, Müncheberg) for the loan or gift of the material and David R. Smith (United States Department of Agriculture, Washington, D.C.) for his careful review of the manuscript.

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