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

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Abstract A key to Japanese species of *Arge* and *Spinarge* (Argidae) is provided. One new combination, *Nematinus cuneiformis* (Togashi, 1990) (Tenthredinidae), and two new synonymies, *Platyxiphydria saitoi* Togashi, 2003 = *Euxiphydria leucopoda* var. *nakanishii* Takeuchi, 1938 (= *Hyperxiphia nakanishii* (Takeuchi, 1938)) and *Euxiphydria amphybolia* Sundukov, in Sundukov and Lelej, 2012 = *Xiphydria annulitibia* Takeuchi, 1936 (Xiphydriidae), are proposed. *Ulmus davidiana* var. *japonica* (Ulmaceae) is recorded as a host plant of *Aproceros mikagei* Togashi, 2003 (Argidae) for the first time. *Alnus firma* (Betulaceae) is newly recorded as a host plant of *Pamphilius confusus* Shinohara, 2005 (Pamphiliidae), whose larvae are briefly described. New distribution records are *Xiphydria kastsheevi* Ermolenko, 1979 (Xiphydriidae) from Japan (Hokkaido, Honshu), *Arge rejecta* (Kirby, 1882) (Argidae), *Aproceros mikagei*, *Ophrynopus tosensis* (Tosawa and Sugihara, 1934) (Orussidae), *Euura ulmicola* (Togashi, 1998), *Nematus yokohamensis* (Konow, 1895), *Tenthredo babai* Takeuchi, 1936, *Tenthredo providens* Smith, 1874 and *Tenthredo rufonotalis* Mallach, 1936 (Tenthredinidae) from Hokkaido, and *Megaxyela togashii* Shinohara, 1992 (Xyelidae) from Nagano Prefecture, Honshu.

Key words: Argidae, Orussidae, Pamphiliidae, Tenthredinidae, Xiphydriidae, Xyelidae, new combination, new synonymy, distribution, host plant.

Introduction

In a series of papers under the present title, we have published new findings or ideas on various aspects of Japanese sawflies and woodwasps (Shinohara and Hara, 2015; Hara and Shinohara, 2017; Hara *et al.*, 2018). This is the fourth paper in the series and deals with six families. For a correct identification of the often closely similar Japanese species of the argid genera *Arge* Schrank, 1802 and *Spinarge* Wei, 1998, we present a new key based on the information accumulated mainly through our own research over the last twelve years. Recent taxonomic studies on the tenthredinid subfamily Nematinae and the family Xiphydriidae have revealed one new combination and two new synonymies. We also report on new host records for two species of Argidae and Pamphiliidae and new distribution records for ten species of Argidae, Orussidae, Tenthredinidae, Xiphydriidae and Xyelidae.

Material and Methods

The material used in this study is kept in the National Museum of Nature and Science, Tsukuba, unless otherwise indicated. Observations of morphology were made with a Leica MS5 and an Olympus SZ60 stereo binocular microscopes and Olympus BH-2 light microscope. Photographs were taken with an Olympus Stylus TG-4 Tough digital camera (Fig. 1A–D, F) and the

same camera attached to the Olympus SZ60 stereo binocular microscope (Fig. 1E, G–I) and with digital cameras, Olympus TG-5 (Fig. 2A, B) and Sony DSC-RX100 (Fig. 2C–I). The digital images were processed and arranged with Adobe Photoshop Elements 8 and 15® software. For the morphological terminology, we generally follow Viitasaari (2002).

Results and discussion

Argidae

Key to Japanese species of *Arge* and *Spinarge*

1 Fifth abdominal tergum simple. *Arge* Schrank, 1802. 2

— Fifth abdominal tergum with dark median line in female, long median process in male (fig. 7 in Hara and Shinohara, 2006). *Spinarge* Wei, 1998. 49

2(1) Abdomen ventrally orange, with or without dark brown to black areas on ninth tergum and ovipositor sheath in female, without dark areas in male. 3

— Abdomen ventrally with more dark areas. 8

3(2) Thorax with orange areas. .....*A. nigronodosa* (Motschulsky, 1860), ♀ ♂ part

— Thorax entirely dark brown to black. 4

4(3) Legs entirely brown to black. 5

— Legs widely or partly yellow to orange. 7

5(4) Supraclypeal area with median ridge sharply carinate (fig. 1I, J, L in Shinohara and Hara, 2009). Female with ovipositor sheath bluish black. Male with valviceps slightly rounded laterally in dorsal view (figs. 1P, 4A–F in Shinohara and Hara, 2009). [Head and thorax with blue reflection.] .....*A. indicura* Shinohara and Hara, 2009, ♀ ♂

— Supraclypeal area with median ridge rounded or very bluntly carinate as in fig. 2I–K in Shinohara *et al.* (2008). Female with ovipositor sheath orange. Male with valviceps angularly convex laterally in ventral view. 6

6(5) Head and thorax with blue reflection. .....*A. pagana* (Panzer, 1797), ♀ ♂

— Head and thorax with colorless reflection. .....*A. nigronodosa*, ♀ ♂ part

7(4) Fore wing with cells C and Sc dark brown. Supraclypeal area with median ridge distinctly carinate as in fig. 1I, J, L in Shinohara and Hara (2009). Female with ovipositor sheath orange, with narrow medial margin and inner side black. .... *A. nipponensis* Rohwer, 1910, ♀ ♂

— Fore wing with cells C and Sc yellow. Supraclypeal area with median ridge rounded or very bluntly carinate (fig. 2I–K in Shinohara *et al.*, 2008). Female with ovipositor sheath black, basally orange. .....*A. suspicax* Konow, 1908, ♀ ♂

8(2) Thorax with orange areas. 9

— Thorax entirely dark brown to black. 10

9(8) In both wings, margin between veins Rs and Cu glabrous or sparsely ciliate (marginal setae shorter or slightly longer than width of vein M) as in fig. 2S in Shinohara *et al.* (2009). Supraclypeal area roundly swollen with top narrowly flattened or very shallowly and narrowly furrowed at middle (fig. 2J, O in Shinohara *et al.*, 2009). .....*A. captiva* (Smith, 1874), ♀ ♂ part

— In both wings, margin between veins Rs and Cu densely and distinctly ciliate (marginal setae much longer than width of vein M) as in fig. 1M in Shinohara and Hara (2009). Supraclypeal area medially distinctly carinate as in fig. 1I, J, L in Shinohara and Hara (2009). .... *A. rejecta* (Kirby, 1882), ♀ ♂ part

10(8) Mesepisternum with setae brown to black. Hind tibia entirely dark brown to black. Wings distinctly darkened at least on basal two thirds. Flagellum entirely black. 11

— Mesepisternum with setae white, sometimes yellow or pale brown. Hind tibia basally or entirely white, yellow or orange (very rarely entirely darkened). Wings clear, yellowish or slightly brownish, at most distinctly darkened below stigma (rarely mostly darkened in males). Flagellum orange to black. 17

11(10) Dorsum of abdomen densely wrinkled with many transverse wrinkles. In female, each ovipositor sheath c-shaped (or reversed c-shaped) with median lobe very long in posterodorsal view (fig. 9i in Viitasaari, 1990). .....*A. berberidis* Schrank, 1802, ♀♂

— Dorsum of abdomen smooth, weakly rough or sparsely wrinkled; transverse wrinkles absent or not many. In female, each ovipositor sheath nearly quarter circle or triangular with median lobe very short in posterodorsal view (fig. 3B, C in Hara and Shinohara, 2008b). 12

12(11) In both wings, margin between veins Rs and Cu densely ciliate as in fig. 1M in Shinohara and Hara (2009). Supraclypeal area with longitudinal median carina as in fig. 1I, J, L in Shinohara and Hara (2009). 13

— In both wings, margin between veins Rs and Cu glabrous or sparsely ciliate (fig. 3P in Hara and Shinohara, 2008b). Supraclypeal area without median carina, rounded or roundly swollen with nearly flattened top (fig. 3I, J in Hara and Shinohara, 2008b; fig. 2J, O in Shinohara *et al.*, 2009). 15

13(12) Supraclypeal area and clypeus with inconspicuous punctures. In female, each ovipositor sheath longer than wide in posterodorsal view. In male, valviceps with very small dorsal convexity at apex. .....*A. gracilicornis* (Klug, 1814), ♀♂

— Supraclypeal area and clypeus with distinct punctures. In female, each ovipositor sheath about as long as or shorter than wide in posterodorsal view. In male, valviceps with large dorsal lobe at apex. 14

14(13) Clypeus distinctly convex, usually rough between puncturess, with brassy, bronze or purple reflection. .....*A. rejecta*, ♀♂ part

— Clypeus slightly convex, smooth between punctures, with blue reflection. ....*A. similis* (Snellen van Vollenhoven, 1860), ♀♂

15(14) Fore wing gradually becoming paler apically (fig. 2G–M in Shinohara *et al.*, 2009). In both wings, margin between veins Rs and Cu usually sparsely ciliate as in fig. 2S in Shinohara *et al.* (2009). Supraclypeal area roundly swollen with top narrowly flattened or very shallowly and narrowly furrowed at middle (fig. 2J, O in Shinohara *et al.*, 2009). ....*A. captiva* (Smith, 1874), ♀♂ part

— Fore wing usually abruptly becoming paler beyond stigma (fig. 1A, B, E in Hara and Shinohara, 2008b). In both wings, margin between veins Rs and Cu glabrous (fig. 2P in Hara and Shinohara, 2008b). Supraclypeal area medially rounded (fig. 2I, J in Hara and Shinohara, 2008b). 16

16(15) Fore wing with crossvein 3r-m usually subparallel or weakly converging anteriorly with crossvein 2r-m (fig. IV in Fenili, 1981). In female, subanal area mostly brown to dark brown. Male genitalia with basiparameres widely in contact with each other from base to near apex in ventral view; valviceps with large dorsal lobe near apex (fig. XI in Fenili, 1981). ....*A. enodis* (Linné, 1767), ♀♂

— Fore wing with crossvein 3r-m usually diverging anteriorly with crossvein 2r-m (fig. 1A, B, E in Hara and Shinohara, 2008b). In female, subanal area yellow, rarely narrowly darkened (fig. 1D in Hara and Shinohara, 2008b). Male genitalia with basiparameres narrowly in contact

with each other at base in ventral view; valviceps without dorsal lobe (fig. 5C–F in Hara and Shinohara, 2008b). ..... *A. pullata* (Zaddach, 1859), ♀♂

17(10) Head, thorax and abdomen with coppery reflection. 18

— Head, thorax and abdomen with blue or colorless reflection. 19

18(17) Abdominal terga densely wrinkled (fig. 5E, F in Hara and Shinohara, 2014a). Hind tibia yellowish white, apically dark brown; hind tarsus yellow brown, apically black. .... *A. impolita* Hara and Shinohara, 2014, ♀♂

— Abdominal terga smooth (figs. 1, 2 in Hara and Shinohara, 2008a). Hind tibia and tarsus orange; hind tibia basally pale yellow. ..... *A. aenea* Hara and Shinohara, 2008, ♀♂

19(17) Hind tibia and tarsus entirely pale yellow to orange, sometimes hind tarsus slightly darkened apically. [Head, thorax and abdomen with colorless or very faint blue reflection. Interantennal carinae dorsally separated from each other. Flagellum dark brown to black. Fore wing with veins C and Sc entirely yellow; in both wings, margin between veins Rs and Cu glabrous.] .20

— Hind tibia apically darkened (very rarely entirely darkened), and hind tarsus apically or entirely darkened. 21

20(19) Interantennal carinae dorsally straight or slightly curved medially and widely separated from each other (figs. 2B, H, 3B, E in Hara and Shinohara, 2014b). In male, apex of valviceps with large lateral lobe (fig. 6 in Hara and Shinohara, 2014b). ..... *A. dimidiata* (Fallén, 1808), ♀♂

— Interantennal carinae dorsally distinctly curved medially and narrowly separated from each other (rarely straight in male) (fig. 2B, E in Hara and Shinohara, 2016). In male, apex of valviceps slightly and roundly convex laterally (fig. 6A–C in Hara and Shinohara, 2016). .... *A. solowiyofka* (Matsumura, 1911), ♀♂ part

21(19) Clypeus marked with pale brown ventrally or ventrolaterally (fig. 1G, H in Shinohara and Hara, 2012). [Flagellum orange. Interantennal carinae dorsally separated from each other. In both wings, margin between veins Rs and Cu glabrous. In female, hind femur basally white.] ..... *A. cerasus* Shinohara and Hara, 2012, ♀♂

— Clypeus entirely black (very rarely slightly brownish ventrolaterally). 22

22(21) Clypeus mostly flattened or nearly so, and black with blue or colorless reflection (rarely ventrolaterally brownish). Labrum dark brown to black with purple or brassy reflection. [Flagellum orange, rarely dark brown. Interantennal carinae dorsally separated from each other. In both wings, margin between veins Rs and Cu glabrous.] ..... *A. hakusana* Togashi, 1997, ♀♂

— Clypeus more or less convex. Coloration of clypeus and labrum not as above. 23

23(22) Female. 24

— Male. 37

24(23) Abdomen with white, yellow or orange areas. 25

— Abdomen without distinct pale areas, at most posterior margins of terga and sterna narrowly yellow. 27

25(24) Abdomen white to yellow on lateral areas of basal terga. .... *A. suzukii* (Matsumura, 1912), ♀ part

— Abdomen yellow to orange on middle segments. 26

26(25) Head, thorax and abdomen with distinct blue reflection. Fore and mid tibiae darkened, sometimes partly whitish. Abdomen orange on middle segments. .... *A. longicornis* Kuznetzov-Ugamskij, 1927, ♀

— Head, thorax and abdomen with nearly colorless reflection. Fore and mid tibiae mostly creamy white. Abdomen pale yellow to creamy white (rarely orange) on middle segments. .... *A. mali* (Uchiyama, 1906), ♀

27(24) Hypopygium with posterior margin strongly convex and medially deeply incised (fig. 2I in Shinohara *et al.*, 2011b). ..... *A. meliosmae* Shinohara and Hara, 2011, ♀

— Hypopygium with posterior margin nearly straight, sometimes medially slightly convex or concave (fig. 1G, H in Shinohara and Hara, 2013). 28

28(27) Fore wing with indistinct small dark marking below stigma (fig. 1A, D in Hara and Shinohara, 2013). [Head, thorax and abdomen with blue reflection. Flagellum black. Wings clear hyaline. Supraclypeal area with median ridge rounded, rarely very bluntly carinate. In both wings, margin between veins Rs and Cu sparsely ciliate.] .... *A. takanebara* Hara and Shinohara, 2013, ♀

— Fore wing with distinct dark marking below stigma. 29

29(28) In both wings, margin between veins Rs and Cu sparsely or densely ciliate, with marginal glabrous area narrower than width of vein M and/or marginal setae longer than width of vein M (fig. 2P in Hara and Shinohara, 2012a; fig. 2M in Hara and Shinohara, 2012b). Supraclypeal area with median ridge distinctly carinate (fig. 2C in Hara and Shinohara, 2012a). 30

— In both wings, margin between veins Rs and Cu glabrous, with marginal glabrous area wider than width of vein M and/or marginal setae shorter than width of vein M (fig. 3M in Hara *et al.*, 2012). Supraclypeal area with median ridge rounded or bluntly carinate (fig. 3F–H in Hara *et al.*, 2012). 33

30(29) Ovipositor sheath in posterodorsal view about as long as or shorter than wide with apex narrowly rounded (fig. 2C, D in Shinohara and Hara, 2008). [Lancet with middle annuli ventrally curved anteriorly, and serrulae convex (figs. 3, 4 in Shinohara and Hara, 2008).] .... *A. suzukii*, ♀ part

— Ovipositor sheath in posterodorsal view longer than wide with apex rounded or pointed. 31

31(30) Ovipositor sheath in posterodorsal view rounded apically (fig. 3A in Hara and Shinohara, 2012b). [Lancet with middle annuli straight; serrulae convex but posterior serrulae slightly convex or nearly flat (fig. 3F–K in Hara and Shinohara, 2012b).] .... *A. aruncus* Hara and Shinohara, 2012, ♀

— Ovipositor sheath in posterodorsal view pointed apically. 32

32(31) Ovipositor sheath in lateral view nearly pointed apically (fig. 3D in Hara and Shinohara, 2012a). In both wings, margin between veins Rs and Cu sparsely ciliate, with marginal setae slightly longer than width of vein M (fig. 2P in Hara and Shinohara, 2012a). Lancet not serrate on ventral margin, with middle annuli arched and convex anteriorly (fig. 3H in Hara and Shinohara, 2012a). ..... *A. enkianthus* Hara and Shinohara, 2012, ♀

— Ovipositor sheath in lateral view narrowly rounded apically (fig. 2O, Q in Shinohara and Hara, 2013). In both wings, margin between veins Rs and Cu distinctly ciliate, with marginal setae about 2 × as long as width of vein M (fig. 2M in Shinohara and Hara, 2013). Lancet distinctly serrate on ventral margin, with middle annuli oblique with ventral ends located apical to dorsal ends (fig. 3C in Shinohara and Hara, 2013). .... *A. naokoae* Shinohara and Hara, 2013, ♀

33(29) Smaller species, length 6.5–9.5 mm. Antenna length 1.0–1.2 × head width. Ovipositor sheath in posterodorsal view with basal sunken area large, more than 1/3 as long as ovipositor sheath, and lateral margin gently rounded (fig. 4A–C in Hara *et al.*, 2012). Fore wing with vein C usually darkened on basal anterior margin. Hind femur sometimes basally white. In lancet, middle annuli straight and oblique with ventral ends located posterior to dorsal ends (fig. 5 in Hara *et al.*, 2012). [Head, thorax and abdomen with nearly colorless or faint blue reflection.] ..... *A. obesa* Hara and Shinohara, 2012, ♀

— Larger species, length 8.0–13.0 mm. Antenna length 1.4–1.7× head width. Ovipositor sheath in posterodorsal view with basal sunken area usually small, at most 1/3 as long as ovipositor sheath, if larger, lateral margin straight or slightly concave apically. Fore wing with vein C entirely yellow. Hind femur entirely black. In lancet, middle annuli not as above. 34

34(33) Head, thorax and abdomen with nearly colorless or very faint blue reflection. Ovipositor sheath in posterodorsal view with lateral margin rounded; each sheath shorter than wide (fig. 3B, D in Hara and Shinohara, 2016). [Dorsal surfaces of fifth to seventh abdominal terga almost smooth between punctures. Glabrous area around median ocellus wide, about 1/3 as wide as median ocellus (fig. 2B in Hara and Shinohara, 2016). In lancet, middle annuli nearly straight and slightly oblique with ventral ends located anterior to dorsal ends, sometimes dorsally slightly curved posteriorly (fig. 4 in Hara and Shinohara, 2016).] .... *A. solowiyofka*, ♀ part

— Head, thorax and abdomen with conspicuous blue reflection. Ovipositor sheath in posterodorsal view with lateral margin straight or slightly concave (fig. 6 in Hara and Shinohara, 2014a); if lateral margin rounded apically, each sheath about as long as wide or slightly longer than wide. 35

35(34) Dorsal surfaces of fifth to seventh abdominal terga distinctly and densely wrinkled (fig. 5C in Hara and Shinohara, 2014a). In lancet, middle annuli straight and oblique with ventral ends located anterior to dorsal ends (fig. 8 in Hara and Shinohara, 2014a). [Glabrous area around median ocellus wide, about 1/3 as wide as median ocellus (fig. 3F in Hara and Shinohara, 2014a); frontal area not or slightly raised anterolaterally.] .... *A. aciculata* Hara and Shinohara, 2014, ♀

— Dorsal surfaces of fifth to seventh abdominal terga almost smooth between punctures (fig. 5A in Hara and Shinohara, 2014a). In lancet, middle annuli not straight. 36

36(35) Glabrous area around median ocellus narrow, less than 1/3 as wide as median ocellus (fig. 3B in Hara and Shinohara, 2014a). Frontal area not or slightly raised anterolaterally. In lancet, middle annuli dorsally curved posteriorly and ventrally curved anteriorly or straight (fig. 7 in Hara and Shinohara, 2014a). .....*A. jonasi* (Kirby, 1882), ♀

— Glabrous area around median ocellus wide, about 1/3 as wide as median ocellus (fig. 2H in Hara and Shinohara, 2016). Frontal area strongly raised anterolaterally. In lancet, middle annuli arched and convex anteriorly (fig. 5 in Hara and Shinohara, 2016). .... *A. kobayashii* Takeuchi, 1931, ♀

37(23) Interantennal carinae sharp throughout, fused with each other dorsally (fig. 2G in Shinohara and Hara, 2013). In both wings, margin between veins Rs and Cu ciliate. Genitalia in ventral view with basiparameres in contact with each other only basally; valviceps with or without setae. 38

— Interantennal carinae blunt at least dorsally, fused with or separated from each other dorsally. In both wings, margin between veins Rs and Cu ciliate or glabrous. Genitalia in ventral view with basiparameres in contact with each other basally or nearly throughout; valviceps without setae. 39

38(37) Fore wing with obscure dark marking below stigma (fig. 1D in Shinohara and Hara, 2013). Flagellum black. Valviceps with setae and small dorsal lobe at apex (fig. 5 in Shinohara and Hara, 2013). .....*A. naokoae*, ♂

— Fore wing with distinct dark marking below stigma (fig. 1C in Shinohara and Hara, 2008). Flagellum orange to black. Valviceps without setae, with long dorsal lobe at apex (fig. 5 in Shinohara and Hara, 2008). .....*A. suzukii*, ♂

39(37) In both wings, margin between veins Rs and Cu sparsely or densely ciliate, with marginal glabrous area narrower than width of vein M and/or marginal setae much longer than width of vein M (fig. 2P in Hara and Shinohara, 2012a; fig. 2M in Hara and Shinohara, 2012b). 40

— In both wings, margin between veins Rs and Cu glabrous, with marginal glabrous area not narrower than width of vein M and/or marginal setae shorter than or slightly longer than width of vein M (fig. 3M in Hara *et al.*, 2012). 45

40(39) Head, thorax and abdomen with vivid blue reflection. Valviceps with very long dorsal lobe arising near apex and curved anteriorly (fig. 5 in Shinohara *et al.*, 2011b). Wings distinctly brownish. [Supraclypeal area with median ridge bluntly carinate. Genitalia in ventral view with basiparameres in contact with each other only basally and each with same width throughout (fig. 5A, B in Shinohara *et al.*, 2011a).].....*A. meliosmae*, ♂

— Head, thorax and abdomen with colorless or blue reflection. Valviceps with dorsal lobe nearly erect or without dorsal lobe. Wings clear hyaline, yellowish, or slightly or distinctly brownish. 41

41(40) Genitalia in ventral view with basiparameres scarcely or very narrowly separated from each other apically (fig. 5B in Hara and Shinohara, 2013). 42

— Genitalia in ventral view with basiparameres widely separated from each other apically (fig. 5B–D in Hara and Shinohara, 2012a). 43

42(41) Head, thorax and abdomen with blue reflection. In genitalia in dorsal view, harpe widest at apical 1/3 and longer than wide, and valviceps with large lateral lobe at apex and apex truncate (fig. 5 in Hara and Shinohara, 2013). .....*A. takanebara*, ♂

— Head, thorax and abdomen with colorless or faint blue reflection. In genitalia in dorsal view, harpe widest near base and about as long as wide, and valviceps gently rounded on lateral margin, without lateral lobe and with apex pointed. .....*A. mali*, ♂

43(41) Genitalia in ventral view with harpe about as long as basiparamere; valviceps apically with long dorsal lobe (fig. 4 in Hara and Shinohara, 2012b). .....*A. aruncus*, ♂

— Genitalia in ventral view with harpe shorter than basiparamere; valviceps without dorsal lobe. 44

44(43) Valviceps in dorsal view very narrow in apical half, wide in basal half (fig. 5 in Hara and Shinohara, 2012a). .....*A. enkianthus*, ♂

— Valviceps in dorsal view distinctly roundly convex laterally in apical half (fig. 5 in Shinohara *et al.*, 2012). .....*A. longicornis*, ♂

45(39) Antenna length less than 1.8× head width. Subgenital plate in ventral view with posterior margin apically widely truncate or concave (fig. 6D, N in Hara *et al.*, 2012). Genitalia in ventral view with basiparameres widely separated from each other apically and apex of basiparamere about as wide as base of harpe (fig. 6A–H in Hara *et al.*, 2012). [Head, thorax and abdomen with nearly colorless or faint blue reflection. Valviceps with dorsal lobe near apex (fig. 6 in Hara *et al.*, 2012).] .....*A. obesa*, ♂

— Antenna length usually more than 1.8× head width. Subgenital plate in ventral view with posterior margin apically rounded or narrowly truncate (fig. 6A, E in Hara and Shinohara, 2016) (very rarely concave). Genitalia in ventral view with basiparameres scarcely or very narrowly separated from each other apically and apex of basiparamere wider than base of harpe (fig. 6A, E in Hara and Shinohara, 2016). 46

46(45) Head, thorax and abdomen with nearly colorless or very faint blue reflection. Genitalia in ventral view with harpe pointed apically and much narrower than basiparamere (fig. 6A in Hara and Shinohara, 2016). [Antenna more than twice as long as head width. Glabrous area

around median ocellus more than 1/3 as wide as median ocellus. Valviceps in dorsal view weakly convex laterally at apex (fig. 6A in Hara and Shinohara, 2016).] ....*A. solowiyofka*, ♂ part

— Head, thorax and abdomen with distinct blue reflection. Genitalia in ventral view with harpe rounded or bluntly pointed apically and narrower than or as wide as basiparamere (fig. 10 in Hara and Shinohara, 2014a; fig. 6E in Hara and Shinohara, 2016). 47

47(46) Antenna more than twice as long as head width. In genitalia, harpe widest around middle in ventral view; valviceps with large lateral lobe at apex and apex nearly truncate in dorsal view (fig. 6E in Hara and Shinohara, 2016). [Dorsal surfaces of fifth to seventh abdominal terga smooth between punctures. Glabrous area around median ocellus more than 1/3 as wide as median ocellus. Wings nearly clear hyaline.].....*A. kobayashii*, ♂

— Antenna at most twice as long as head width. In genitalia, harpe widest around basal third or near base in ventral view; valviceps with dorsal extension at apical third and apex pointed in dorsal view (fig. 10 in Hara and Shinohara, 2014a). 48

48(47) Dorsal surfaces of fifth to seventh abdominal terga distinctly and densely wrinkled (fig. 5D in Hara and Shinohara, 2014a). Glabrous area around median ocellus more than 1/3 as wide as median ocellus (fig. 3H in Hara and Shinohara, 2014a). Wings nearly clear hyaline. ....*A. aciculata*, ♂

— Dorsal surfaces of fifth to seventh abdominal terga mostly smooth between punctures (fig. 5B in Hara and Shinohara, 2014a). Glabrous area around median ocellus less than 1/3 as wide as median ocellus (fig. 3D in Hara and Shinohara, 2014a). Wings distinctly brownish or yellowish. .....*A. jonasi*, ♂

49(1) Fore wing with cells C and Sc black. Flagellum black. Legs entirely black. ....*S. nigricornis* Hara and Shinohara, 2006, ♀♂

— Fore wing with cells C and Sc clear or yellowish. Flagellum orange, rarely dark brown. Legs white to yellow at least on basal part of hind tibia. 50

50(49) Interantennal carinae dorsally separated from each other (fig. 4f, h in Hara and Shinohara, 2006). Setae on vein C of forewing yellow. ....*S. flavicostalis* Hara and Shinohara, 2006, ♀♂

— Interantennal carinae dorsally fused with each other (fig. 3 in Hara and Shinohara, 2006) or nearly so, rarely separated from each other. Setae on vein C of fore wing black. 51

51(50) Female. 52

— Male. .....species not distinguishable

52(51) Lancet not serrate on ventral margin (fig. 9D in Hara and Shinohara, 2006). ....*S. pumila* Hara and Shinohara, 2006, ♀

— Lancet distinctly serrate on ventral margin (fig. 9A–C in Hara and Shinohara, 2006). 53

53(52) Lancet with serrulae apically rounded (fig. 9B in Hara and Shinohara, 2006). ....*S. prunivora* Hara and Shinohara, 2006, ♀

— Lancet with serrulae apically angulated (fig. 9A, C in Hara and Shinohara, 2006). 54

54(53) Lancet with aulax (dark line along dorsal margin) straight at middle and apical parts, sometimes slightly curved down apically. Serrulae relatively low (fig. 9C in Hara and Shinohara, 2006; fig. 4 in Shinohara and Hara, 2010). .....*S. affinis* Hara and Shinohara, 2006, ♀

— Lancet with aulax slightly arched and convex dorsally at middle and apical parts. Serrulae relatively high (fig. 9A in Hara and Shinohara, 2006; fig. 5 in Shinohara and Hara, 2010). ....*S. fulvicornis* (Mocsáry, 1909), ♀

Remarks. The above key contains all the species of *Arge* (30 species) and *Spinarge* (six spe-

cies) which we have recognized in Japan through our revisionary works since 2006. It does not include two species of *Arge* recorded from southern Kuril Islands by Sundukov (2015), *A. fuscipes fuscipes* (Fallén, 1808) from Shikotan and *A. ustulata* Linné, 1758 from Kunashiri (for the record of the latter species from Japan, see also Hara and Shinohara, 2017). In the above key, *A. fuscipes fuscipes* runs to the couplet 33 in the female and to *A. kobayashii* in the male, but the female of *A. fuscipes fuscipes* is distinguished from the females of the other species contained in the couplets 33–36 by the combination of the distinct blue reflection on the head, thorax and abdomen, the antenna with the length 1.4–1.7 × the head width, the clear wings with a conspicuous dark spot below the stigma, the black vein C of the fore wing, and the small basal sunken area of the ovipositor sheath, and the male of *A. fuscipes fuscipes* is distinguished from the male of *A. kobayashii* by the black vein C of the fore wing. *Arge fuscipes fuscipes* is quite similar to *A. kobayashii* and they are separated only by the color of the vein C (see also Hara and Shinohara, 2016). *Arge ustulata* goes to the couplet 19 but does not perfectly agree with both halves. *Arge ustulata* has the hind tibia yellow and apically orange and the hind tarsus yellow and apically orange to black, and the head, thorax and abdomen with distinct blue reflection. It is also characterized by the yellow stigma with its basal fourth to three fourths brown and the yellow to brown wing veins.

As discussed by Shinohara and Hara (2007), *A. simillima* (Smith, 1874) is very closely similar to *A. berberidis* Schrank, 1802. We are not able to separate the two species clearly and *A. simillima* is not included in the key above.

We consider that the following three species described from Japan are invalid: *A. compar* Konow, 1900, *A. disparilis* (Kirby, 1882) and *A. imitator* Takeuchi, 1939.

Arge compar Konow, 1900 was described from Japan ("Yokohama") and China. Konow (1900) stated for this species that "Der *A. similis* Vollenh. sehr ähnlich und bisher offenbar damit verwechselt". Takeuchi (1932, 1939) regarded it as a junior synonym of *A. similis* without seeing the type material. On the other hand, Gussakovskij (1935), Wei *et al.* (2006) and Taeger *et al.* (2010) treated *A. compar* as a valid species. We here follow Takeuchi's synonymy, because the specific characters of *A. compar* stated by Konow (1900) and Gussakovskij (1935) fall under the intraspecific variations of *A. similis*. A detailed study on the type material, however, will be needed to verify the synonymy.

Arge disparilis (Kirby, 1882) is a replacement name for *Hylotoma humeralis* Smith, 1874, described from "Hiogo, Japan". Takeuchi (1932, 1939) synonymized this species with *A. nigronodosa* (Motschulsky, 1860) described from Russian Far East. On the other hand, Gussakovskij (1935), Lelej and Taeger (2007), Taeger *et al.* (2010) and Sundukov and Lelej (2012) treated it as a valid species. Shinohara and Hara (2007) examined the lectotype of *H. humeralis*, and accepted the synonymy of these two species. *Arge nigronodosa* shows a very wide intraspecific variation in the coloration of thorax as stated by Takeuchi (1932, 1939). Naito (1983) studied the genetic basis for this large color variation.

Wei *et al.* (1998), Wei *et al.* (2006) and Taeger *et al.* (2010) regarded *A. rejecta* var. *imitator* Takeuchi, 1939 described from Japan as a distinct species, *A. imitator*. However, *A. rejecta* var. *imitator* is conspecific with *A. rejecta* (Kirby, 1882) (see also under *Arge rejecta* below).

There are the records of "*Arge metallica* (Klug, 1834)" [= *Spinarge metallica*] and *A. hasegawae* Takeuchi, 1927 from Japan, but those have been excluded from Japanese fauna by Hara and Shinohara (2006) and Shinohara *et al.* (2011a) respectively.

Arge rejecta (Kirby, 1882)

Hylotoma humeralis Snellen van Vollenhoven, 1860: 129. A junior primary homonym of *Hylotoma humeralis* Palisot de Beauvois, 1809.

Hylotoma ephippiata Smith, 1874: 375. A junior primary homonym of *Hylotoma ephippiata* Klug, 1834.

Hylotoma rejecta Kirby, 1882: 62. A replacement name for *Hylotoma ephippiata* Smith, 1874 (not Klug, 1834).
Arge simillima: Takeuchi, 1932: 33 (part); Taeger *et al.*, 2010: 139 (part). Not Smith, 1874.
Arge simillima var. *rejecta*: Takeuchi, 1932: 33.
Arge simillima var. *asahi* Takeuchi, 1932: 34.
Arge rejecta: Takeuchi, 1939: 405; Naito *et al.*, 2004: 12; Shinohara and Hara, 2007: 128, 130, 131.
Arge rejecta var. *asahi*: Takeuchi, 1939: 406; Abe and Togashi, 1989: 543.
Arge rejecta var. *imitator* Takeuchi, 1939: 406; Abe and Togashi, 1989: 543.
?*Arge imitator*: Wei *et al.*, 1998: 313; Wei and Wen, 2002: 423; Wei *et al.*, 2006: 514; Taeger *et al.*, 2010: 131.

Material examined. Syntype of *Hylotoma ephippiata* Smith, 1874: ♀, "Type H. T." "B.M.TYPE, HYM. 1.70" "H. rejecta Type" "H. rejecta Kb. 1882 = ephippiata Smith nec Klug, 1834" "Hiogo, Japan" "T 4/16" "Hylotoma ephippiata, Type / Smith", kept in the Natural History Museum, London (see also Shinohara and Hara, 2007). Holotype of *Arge rejecta* var. *imitator* Takeuchi, 1939: ♀, "30, v, 1915 Minomo Takeuchi" "HOLOTYPE Arge simillima imitator Takeuchi D. R. Smith".

HOKKAIDO: 1 ♀, Tokachi, Shintoku, Shintoku, 5. VII. 2012, H. Hara; 1 ♂, Bibai, Koshunai, coll. larva on *Rubus parvifolius* 10. VII. 2004, coc. 28. VII., em. 5. IV. 2005, H. Hara; 1 ♀, "5. 22 Sapporo Matsum", kept in Hokkaido University, Sapporo; 1 ♀, Iburi, Hobetsu, 1. VIII. 1983; 1 ♀ (HH070709E), Iburi, Hobetsu, Fukuyama, 9. VII. 2007, laid egg on *Rubus crataegifolius* in cage, H. Hara; 1 ♀, offspring of HH070709E; 1 ♀, Oshima, Kikonai, 12. VII. 1976, T. Kumata, kept in Hokkaido University, Sapporo.

Distribution. Japan: Hokkaido (new record), Honshu (Smith, 1874), Sadogashima Is. (Okutani, 1973), Awajishima Is. (Naito *et al.*, 2004), Shikoku (Takeuchi, 1939), Kyushu (Takeuchi, 1932), Tsushima Is. (Okutani, 1974), Tanegashima Is. (Nagase, 2012), Yakushima Is. (Takeuchi, 1932). ?China: Henan (Wei *et al.*, 1998).

Remarks. *Arge rejecta* var. *imitator* Takeuchi, 1939 was described from Honshu, Shikoku and Kyushu, Japan. The original description does not unambiguously reveal that the name *imitator* was proposed for an infrasubspecific entity, and accordingly the name is regarded as subspecific (Article 45.6.4, ICZN, 1999).

Wei *et al.* (1998) is probably the first paper which treated *imitator* as a full species. They listed this taxon as "*Arge imitator* Takeuchi" without any comments and this was the first record of "*A. imitator*" from China. Wei and Wen (2002), Wei *et al.* (2006) and Taeger *et al.* (2010) followed their treatment. We consider these two taxa conspecific after examining a syntype of *Hylotoma ephippiata* Smith, 1874 [= *Arge rejecta*] and the holotype of *Arge rejecta* var. *imitator*. Identity of the Chinese specimens of "*A. imitator*" (Wei *et al.*, 1998; Wei and Wen, 2002) should be confirmed by further studies.

This species is here recorded from Hokkaido for the first time.

Aproceros mikagei Togashi, 2003

Aproceros mikagei Togashi, 2003b: 59; Taeger *et al.*, 2010: 160.

Material examined. HOKKAIDO: 1 ♂, Fukagawa, Takadomari, coll. larva on *Ulmus davidiana* var. *japonica* 2. VII. 2012, em. 10. VII. 2012, H. Hara; 1 ♀, Nopporo, coll. pupa on *Ulmus davidiana* var. *japonica* 29. VI. 1994, em. 6. VIII., S. Suzuki. HONSHU: 1 ♀1 ♂, Tochigi Pref., Nakagawa, Koisago, coll. cocoons on *Ulmus davidiana* var. *japonica* 31. V. 2012, em. 31. V. – 1. VI., S. Ibuki.

Distribution. Japan: Hokkaido (new record), Honshu (Togashi, 2003b).

Bionomics. Host plants: Ulmaceae: *Ulmus davidiana* Planch. var. *japonica* (Rehder) Nakai (new record).

This sawfly is multivoltine. The larva is a solitary leaf feeder, and spins a netted cocoon on a leaf. The netted cocoon is probably a summer cocoon as in the related *A. leucopoda* Takeuchi, 1939 (*cf.* Blank *et al.*, 2010).

Remarks. This species was described from a single female collected in "Noshito,

Tateiwamura, Fukushima Pref.", Honshu, and the host plant was unknown (Togashi, 2003b). The occurrence in Hokkaido and the host plant are recorded for the first time.

Orussidae

Ophrynopus tosensis (Tosawa and Sugihara, 1934)

Oryssus [*sic*] *tosensis* Tosawa and Sugihara, 1934: 1.
Ophrynopus tosensis: Guiglia, 1937: 423; Vilhelmsen *et al.*, 2013: 469.
Orussus tosensis: Takeuchi, 1938: 177.
Stiricorsia [*sic*] *tosensis*: Benson, 1938: 8; Tsuneki, 1963: 2; Okutani, 1965: 464; Abe and Togashi, 1989: 560.
Stirocorsia tosensis: Togashi, 2003c: 71; Makihara *et al.*, 2005: 38; Taeger *et al.*, 2010: 62; Choi and Suh, 2011: 268; Nagase, 2012: 74.

Material examined. HOKKAIDO: 1♀, Kitahiyama, Hiyama, 19. VII. 2000, H. Hara; 1♀, Sapporo-shi, Maruyama, 29. VII. 2009, K. Watanabe.

Distribution. Japan: Hokkaido (new record), Honshu (Tsuneki, 1963), Miyake-jima Is. (Makihara *et al.*, 2005), Shikoku (Tosawa and Sugihara, 1934), Kyushu (Yamagishi, 1980), Yakushima Is. (Togashi, 2003c), Tanega-shima Is. (Nagase, 2012). Korea (Choi and Shu, 2011).

Remarks. Okutani (1965) referred to the occurrence of this species in Hokkaido (possibly erroneously) without publishing any collection records. The collection records given above represent the first definite distribution records of *O. tosensis* from Hokkaido.

Pamphiliidae

Pamphilius confusus Shinohara, 2005 (Fig. 1)

Pamphilius confusus Shinohara, 2005b: 69.
See Shinohara (2005b) for more references.

Bionomics. Host plants: Betulaceae: *Alnus firma* Siebold et Zucc. (new record), *A. viridis* (Chaix) Lam. et DC. subsp. *maximowiczii* (Callier) D.Löve (Shinohara, 2005b).

Observations on life history: In May, 2018, Shinohara found one egg (on May 6) and seven very small to large larval leaf-rolls (on May 6 and 12), each one on separate leaves of *Alnus firma*, in Sichiri (about 480 m), Nikko city, Tochigi Prefecture, central Honshu. All the egg, remains of the egg shells and the larval leaf-rolls were situated on the upper surface of the leaf (Fig. 1A–D). Of the seven egg and remains of the egg shells found, two were located on the second side vein from the base of the leaf, three were on the third side vein (two of them shown in Fig. 1A–C and D, respectively) and two were on the fourth side vein, all in the basal part of the leaf. On May 8, the egg hatched, and on May 15, one larva, which was collected in its middle instar on May 6, reached maturity (Fig. 1I). On May 15, all the others were still in the feeding stage (fixed in ethanol on May 18).

Description of the larva. Middle instar (Fig. 1E, F): Head black, with obscure whitish spot near antenna; antenna creamy white; trunk creamy white, slightly yellowish, with dorsal and lateral prothoracic fields, cervical sclerite, base of coxa and elongate spot just above it, three spots on dorsum of anal segment, suranal hook, and large spot on venter of anal segment black. Late instar and mature larva (Fig. 1G–I): Head black; antenna pale, sclerotized areas blackish brown; trunk greenish white, with dorsal and lateral prothoracic fields, cervical sclerite, elongate spots above legs, and suranal hook dark brown to black.

Remarks. The *Alnus firma*-feeding larvae from Nikko were identified with *P. confusus* because of their characteristic oviposition and leaf-rolling habits and the host plant. The only other species known to feed on *Alnus* ovipositing and making a leaf-roll on the upper surface of the leaf in Honshu is *P. flavipectus* Shinohara, 2005 (Shinohara and Kojima, 2006). The late instar larva of *P. flavipectus* has a large black spot on the venter of the anal segment (fig. 1B in Shinohara and Kojima, 2006), which is entirely greenish white in *P. confusus* (Fig. 1G, H). The two known host plants of *P. flavipectus*, *A. hirsuta*

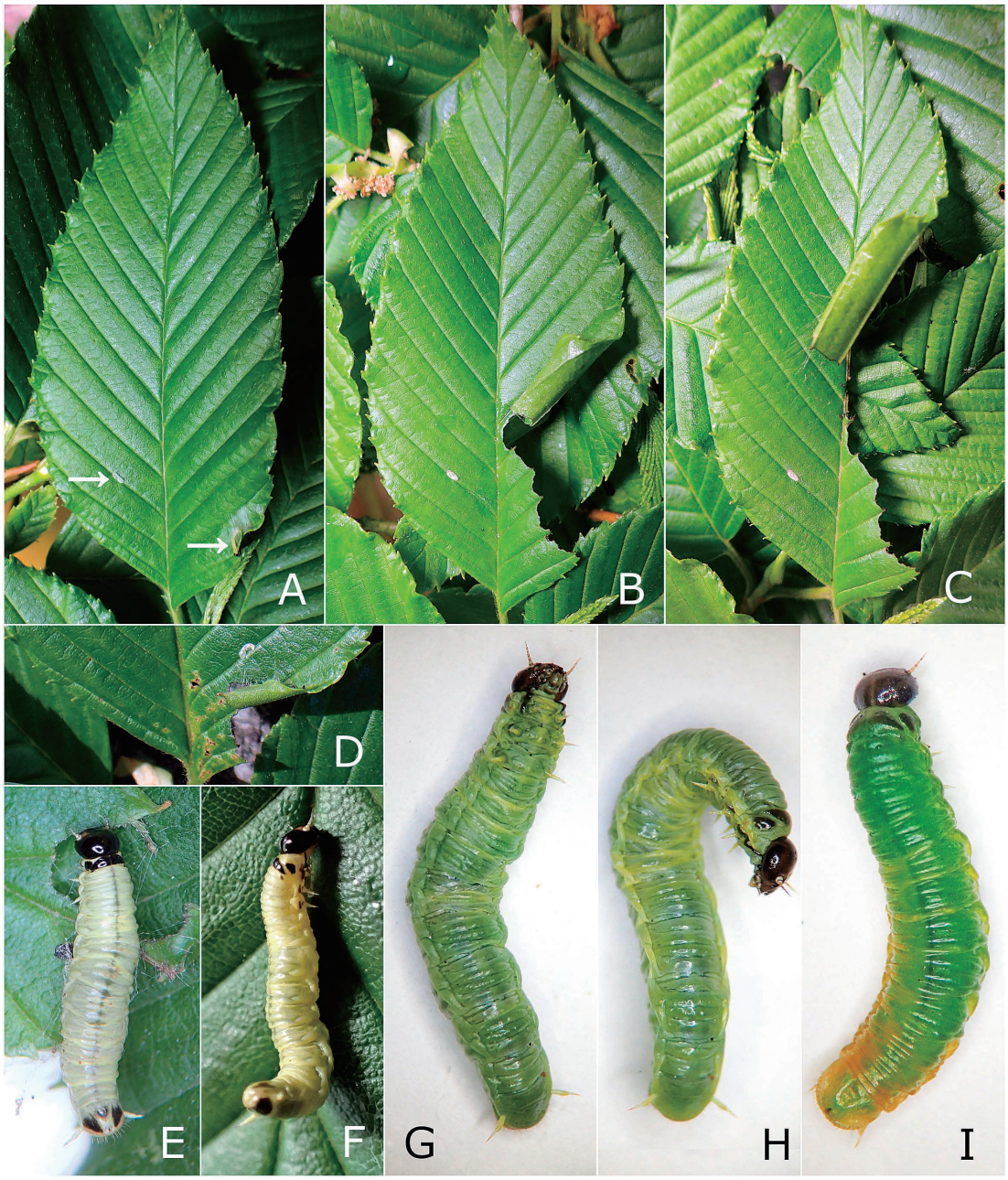

Fig. 1. *Pamphilius confusus*. A, Leaf of *Alnus firma* with remains of egg shell (left arrow) and very small larva beginning to make a leaf-roll (right arrow), May 6; B, same leaf with a leaf-roll, May 10; C, same leaf with a large leaf-roll, May 12; D, another leaf with remains of egg shell and a small leaf-roll, May 12; E, middle instar larva, May 18; F, another middle instar larva, May 17; G, H, last instar larva, May 18; I, mature larva, May 18. Photographed by A. Shinohara.

Turcz. and *A. matsumurae* Call., both belong to the subgenus *Alnus* of the genus *Alnus*. The previously known host plant of *P. confusus*, *A. viridis* subsp. *maximowiczii*, and *A. firma* belong to the subgenus *Alnaster* of the genus *Alnus*.

Pamphilius confusus occurs in Hokkaido,

Honshu and Shikoku, and the larvae were known to feed on *A. viridis* subsp. *maximowiczii* (Shinohara, 2005b). In Honshu, it has been collected mostly at the higher altitudes over 1500 meters, but some adult specimens were found at the lower altitudes (e.g., collection records from Nippara [lower than 600 m, in Tokyo met.], Asagai [about 950 m in Niigata pref.]) in Honshu and on Mt. Tsurugisan in Shikoku (Shinohara, 2005b), where *A. viridis* subsp. *maximowiczii* does not occur. Shinohara (2005b) noted "*Pamphilius confusus* should also feed on another species of *Alnus* (possibly another species of *Alnaster*), because *Alnus maximowiczii* [*sic*] does not occur in Shikoku (Ito, 1989), where *P. confusus* has been collected" (p. 77).

Tenthredinidae

Euura ulmicola (Togashi, 1998)

Nematus (*Pteronidea*) *ulmicola* Togashi, 1998: 21; Taeger *et al.*, 2010: 427.
Euura ulmicola: Shinohara and Hara, 2015: 176.

Material examined. HOKKAIDO: 2 ♀1 ♂, Hakodate, Kikyo, coll. 13 gregarious larvae on *Ulmus davidiana* var. *japonica* (HH090810A) 10. VIII. 2009, made cocoon 14–17. VIII., em. 29–30. VIII. 2009, H. Hara.

Distribution. Japan: Hokkaido (new record), Honshu (Togashi, 1998).

Bionomics. Host plant: Ulmaceae: *Ulmus davidiana* Planch. var. *japonica* (Rehder) Nakai (Togashi, 1998, as *U. japonica* Sargent).

This sawfly is probably multivoltine. The larvae feed gregariously on leaves, leaving the petioles.

Remarks. This species was known only from the type locality, "Chichibu City, Saitama Prefecture, Honshu". It is here recorded from Hokkaido for the first time.

Nematinus cuneiformis (Togashi, 1990), **new combination**

(Fig. 2)

Dineura cuneiformis Togashi, 1990: 107; Taeger *et al.*, 2010: 400.

Material examined. Holotype: ♀, "Takanegahara, Mt. Taisetsu, Hokkaido, 12. VII. 1985" "Dineura cuneiformis Togashi, n. sp., det. Togashi, 1990" "NEM-10" "HOLOTYPE" "NSMT-I-Hym No. 23012".

Remarks. In the key by Prous *et al.* (2014), this species does not go to *Dineura* and only up to the couplet 26. It has the clypeus 2.6 times as wide as long (Fig. 2C) as in the first half of couplet 26, while it has the labrum apically rounded (Fig. 2C) and the antenna about 2.8 times as long as the head width (Fig. 2A) as in the second half.

This species has the malar space 2.0 times as wide as the median ocellus, the clypeus 1.0 times as long as the torulus, each mandible widely flattened laterobasally, the left mandible tapered gradually and constantly (Fig. 2D), the inner apical fore tibial spur with a velum (= transparent lamella) (Fig. 2E), the tarsal claw with the inner tooth shorter than the apical tooth (Fig. 2F), the fore wing with the vein Sc situated before the joint of veins R and M (Fig. 2A), the female abdomen with the ninth tergum very large, 3.0 times as long as the eighth tergum at the level of the longest part of the ninth tergum (Fig. 2H), the ovipositor sheath distinctly widened basally (Fig. 2G), 2.9 times as wide as the apex of the hind tibia, and the lancet stout without ctenidial teeth (Fig. 2H, I). These character states, especially the very large ninth abdominal tergum and the stout lancet, show that this species belongs to *Nematinus*, not to *Dineura*. Prous *et al.* (2014) regarded the large anterior depressed section of metepisternum as a character of *Nematinus*. The holotype of *Dineura cuneiformis* has this part widely covered by the mesopleuron, and therefore its condition is unknown.

This species is easily separated from other members of *Nematinus* by the presence of a crossvein 2r-rs. However, the venation of the

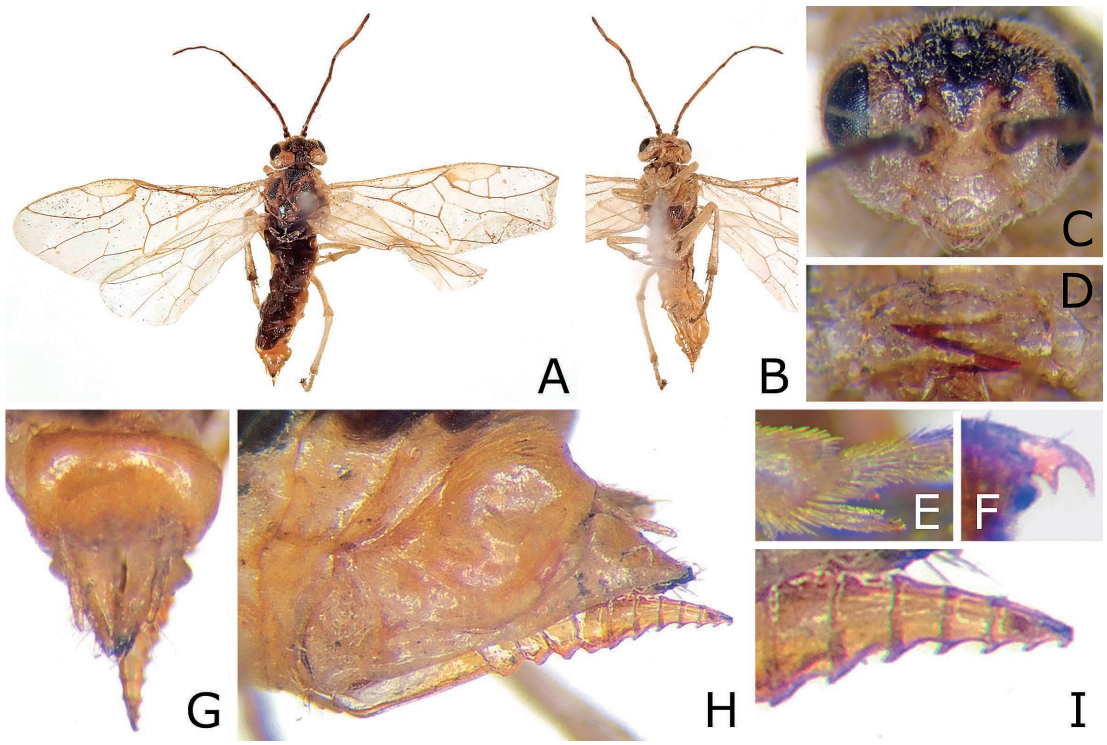

Fig. 2. *Nematinus cuneiformis*, holotype, female. A, B, Dorsal and ventral views; C, head, anterior view; D, mandibles, ventral view (above anterior); E, inner apical fore tibial spur; F. tarsal claw; G, H, apex of abdomen, dorsal and lateral views; I, apex of lancet.

holotype is somewhat abnormal (Fig. 2A). The presence of a crossvein 2r-rs may possibly be an unusual condition in this species. If a crossvein 2r-rs is absent, this species runs to *N. bensoni* Togashi, 1964 known from Honshu, Japan in the key to Japanese congeners by Togashi (1991), but will be distinguished from *N. bensoni* by the lancet with relatively long serrulae and narrow annuli (compare Fig. 2I with fig. 21 in Togashi, 1964).

Nematus yokohamensis (Konow, 1895)

Holcocneme Yokohamensis [*sic*] Konow, 1895: 54, 56.
Holcocneme yokohamensis: Takeuchi, 1936b: 162.
Nematus yokohamensis: Takeuchi, 1952: 68; Okutani, 1954: 80; Abe and Togashi, 1989: 552; Naito *et al.*, 2004: 27; Yoshida, 2006: 54.
Nematus yokohamensis yokohamensis: Vikberg, 1972: 30.
Nematus (*Paranematus*) *yokohamensis*: Taeger *et al.*, 2010: 420; Sundukov and Lelej, 2012: 85.

Material examined. Holotype: ♀, "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" deposited in the Senckenberg Deutsches Entomologisches Institut, Müncheberg.

HOKKAIDO: 1 ♀, Tokachi, Shikaoi, Lake Shikaribetsu-ko, 25. VII. 1939, K. Takeuchi.

Distribution. Japan: Hokkaido (new record), Honshu (Konow, 1895; Vikberg, 1972), Sadogashima Is. (Takeuchi, 1936b). Korea, Russia (Sakhalin, Russian Far East, Siberia), China, Finland (Sundukov and Lelej, 2012).

Remarks. This species is here recorded from Hokkaido for the first time. The Hokkaido female is almost identical with the holotype (see Vikberg, 1972 for the distinguishing characters

from the related species), although vein C is mostly dark yellow (that of the holotype is dark brown).

Tenthredo babai Takeuchi, 1936

Tenthredo babai Takeuchi, 1936b: 151; Ishii, 1955: 11; Seiyama and Tachikawa, 1983: 181; Abe and Togashi, 1989: 556; Shinohara, 2005a: 187.

Material examined. HOKKAIDO: 1 ♀, Shimizu, Tokachi, 29. V. 2012, H. Hara.

Distribution. Japan: Hokkaido (new record), Honshu (Ishii, 1955), Sado Is. (Takeuchi, 1936), Shikoku (Seiyama and Tachikawa, 1983), Kyushu (Shinohara, 2005a).

Remarks. This species is here recorded from Hokkaido for the first time.

Tenthredo providens Smith, 1874

Tenthredo providens Smith, 1874: 382; Abe and Togashi, 1989: 557; Lee *et al.*, 2000: 148; Hayashi *et al.*, 2013: 25.

Material examined. HOKKAIDO: 1 ♂, Shintoku, Tokachi, 7. VI. 2012, H. Hara; 1 ♀, Shintoku, Tokachi, 12. VI. 2012, H. Hara.

Distribution. Japan: Hokkaido (new record), Honshu, Sadogashima Is., Awashima Is., Shikoku, Kyushu (Abe and Togashi, 1989). Oki Nishinoshima Is. (Hayashi *et al.*, 2013). Korea (Lee *et al.*, 2000).

Remarks. This species was described from "North Japan" (Smith, 1874) but has not been recorded from Hokkaido. This is the first record from Hokkaido.

Tenthredo rufonotalis Mallach, 1936

Dipteromorpha ussuriensis Malaise, 1931: 103. Preoccupied in *Tenthredo* by *Allantus ussuriensis* Mocsáry, 1909 [= *Tenthredo ussuriensis* (Mocsáry, 1909)].

Tenthredo rufonotalis Mallach, 1936: 219.

Propodea ussuriensis: Malaise, 1945: 181; Togashi and Murota, 1984: 4; Abe and Togashi, 1989: 555.

Material examined. HOKKAIDO: 1 ♀, Bibai, 27. VIII. 1996, H. Hara.

Distribution. Japan: Hokkaido (new record), Honshu (Togashi and Murota, 1984). Russia (Primorskij kraj) (Malaise, 1931), China (Mallach, 1936).

Remarks. In Japan, this species was known to occur only in Honshu (Togashi and Murota, 1984) and this is the first distribution record from Hokkaido.

Xiphydriidae

Hyperxiphia nakanishii (Takeuchi, 1938)

Euxiphydria leucopoda var. *nakanishii* Takeuchi, 1938: 185.

Hyperxiphia nakanishii: Maa, 1949: 40; Abe and Togashi, 1989: 559; Taeger *et al.*, 2010: 114; Smith and Shinohara, 2011: 7.

Platyxiphydria saitoi Togashi, 2003a: 55; Taeger *et al.*, 2010: 119. **New synonymy**.

Material examined. Holotype of *Platyxiphydria saitoi* Togashi, 2003: ♀, "Happogahara, Yaita-shi [Tochigi Pref.], 20. VI. 1976, T. Saito" "Holotype *Platyxiphydria saitoi* new species".

HONSHU: 1 ♀, Dodaira [ca. 1200 m, Tanzawa Mts., Kanagawa Pref.], 18. VII. 1993, T. Kinoshita; 1 ♀, Kamikochi [ca. 1500 m, Matsumoto-shi, Nagano Pref.], 27. VII. 1953, O. Sato.

Distribution. Japan (Honshu).

Remarks. *Platyxiphydria saitoi* was described from one female collected in Tochigi Prefecture, central Honshu, Japan. The holotype does not belong to the genus *Platyxiphydria*, because the upper part of the head is mostly smooth and the hindwing has a closed middle cell Rs. Further study has shown that the specimen is not distinguishable from the holotype of *Euxiphydria leucopoda* var. *nakanishii* Takeuchi, 1938, which is now treated as a good species in the genus *Hyperxiphia* (Maa, 1949; Smith and Shinohara, 2011). Here we propose to treat *Platyxiphydria saitoi* Togashi, 2003 as a junior synonym of *Euxiphydria leucopoda* var. *nakanishii* Takeuchi, 1938 (see figs. 7–12 in Smith and Shinohara, 2011, for images of the holotype).

Xiphydria annulitibia Takeuchi, 1936

Xiphydria annulitibia Takeuchi, 1936a: 55; Takeuchi, 1938: 182; Miyatake, 1950: 38; Watanabe, 1956: 9; Abe and Togashi, 1989: 559; Taeger *et al.*, 2010: 119; Sundukov and Lelej, 2012: 114; Sundukov, 2015: 253.
Euxiphydria amphybolia Sundukov, in Sundukov and Lelej, 2012: 115; Sundukov, 2015: 252. **New synonymy**.

Material examined. HOKKAIDO: 1 ♀, Sapporo-shi, Moiwa, 31. VII. 2000, T. Nambu; 1 ♀, Sapporo-shi, Hokkaido University, 7. VII. 2007, on *Ulmus pumila*, H. Hara; 1 ♀, Sapporo-shi, Chuo-ku, Mt. Maruyama, 2. VIII. 2016, K. Kuroda; 1 ♀, Sapporo-shi, Kita-ku, Hokkaido University, 30. VII. 2016, K. Kuroda. HONSHU: Saitama Pref.: 1 ♀, Kenritsu Green School, Ootaki, Chichibu, 13–14. VII. 2002, YPT, T. Nambu. Tokyo Met.: 1 ♀, Imperial Palace, Chiyoda-ku, 22. V.–18. VI. 1997, in pheromone trap, A. Saito; 1 ♀, Kajuen, Fukiage-gyoen, Imperial Palace, Chiyoda, 9–16. VI. 2009, Malaise trap; 1 ♀, Institute for Nature Study, Minato-ku, 11. VI. 1999, Y. Arita & U. Jinbo. Kanagawa Pref.: 2 ♀, Higashiikuta, Kawasaki, 5–18. VI. 2003, pheromone trap; 3 ♀, same data, kept in Kanagawa Prefectural Museum of Natural History, Odawara; 1 ♀, Hadano city, Mt. Koubouyama (40–211 m), N35.22/E139.14, 28. V. 2016, K. Watanabe; 1 ♀, "No" (= Nokendai), Yugu-hiroba, Kanazawa-ku, Yokohama, 25. V. 1995, K. Kubo. Nagano Pref.: 1 ♀, Minoto, 1750–2000 m, 35.59N 138.20E, Yatsugatake Mts., 31. VII.–1. VIII. 2005, A. Shinohara. Hyogo Pref.: 2 ♀, Akazai, 25. VI. 1978, M. Toyama. Tottori Pref.: 1 ♀, Daisen, Hoki, 1. VII. 1931, M. Tokunaga.

Distribution. Japan (Hokkaido, Kunashiri Is., Honshu, Shikoku). Russia (Sakhalin, Primorskij kraj).

Remarks. This species was described from Sakhalin, Russia (Takeuchi, 1936a). It was later recorded from Honshu (Takeuchi, 1938), Shikoku (Miyatake, 1950), and Hokkaido (Watanabe, 1956), Japan.

Euxiphydria amphybolia Sundukov, in Sundukov & Lelej, 2012, was described from Primorskij kraj (Lazo) and Sakhalin, Russia. The original description of *E. amphybolia* agrees well with *X. annulitibia*, including the features of the labial and maxillary palpi. One apparent discrepancy may be that the dark part of the tibia is "ryzhiye" (Sundukov and Lelej, 2012, p. 115, meaning "red" or "ginger") in *E. amphybolia*, while it is "pale brown" (Takeuchi, 1936a, p. 55) in the holotype of *X. annulitibia* from Sakhalin. In Japanese specimens examined, the dark part of the tibia is brown to black. Here we treat the two taxa as synonyms.

Xiphydria kastsheevi Ermolenko, 1979

Xiphydria kastsheevi Ermolenko, 1979: 129; Taeger *et al.*, 2010: 119; Sundukov and Lelej, 2012: 114.

Material examined. HOKKAIDO: 1 ♀, Hitsujigaoka, Sapporo, Malaise trap, 27. VIII.–3. IX. 2003, K. Konishi; 1 ♀, Bibai, Koshunai, 13. IX. 2013, H. Hara. HONSHU: 1 ♀, Take, foot of Mt. Hayachine, Iwate Prefecture, 8. VII. 1967, R. Ishikawa.

Distribution. Japan (new record): Hokkaido, Honshu. Russia (Primorsky Krai).

Remarks. *Xiphydria kastsheevi* was described from one female collected in Chuguevsky District of Primorsky Krai, Russia. The three Japanese specimens examined generally agree with the original description and the figures given by Ermolenko (1979). However, the Japanese specimens have the ventral part of frons, the median part of clypeus and the lateral parts of 2nd and 3rd abdominal terga also marked with creamy white, and the antennae with 15–17 antennomeres. The color of the ventral part of frons and the median part of clypeus in the holotype was not clearly mentioned in the original description. The 2nd and 3rd abdominal terga have no pale areas laterally and the antennae have 15 antennomeres in the holotype. These differences are considered within a range of individual or geographical variations.

Xiphydria kastsheevi, thus understood here, resembles *X. annulitibia* Takeuchi, 1938, among the Japanese congeners, but is separated from the latter as follows (character states in *X. annu-*

litibia in brackets): clypeus, supraclypeal area, malar space, and lower part (often most) of gena whitish [all black]; wings heavily infuscated, with apical 1/3 of forewing hyaline [all hyaline]; vein Rs in hindwing (and in forewing) always connected with vein R at apex, thus cell R always closed [vein Rs usually atrophied just before apex, not connected with vein R, thus cell R narrowly open at apex]. The length without ovipositor varies from 9 to 10 mm (the holotype is 10.5 mm with ovipositor) in *X. kastsheevi*, whereas it ranges from 8 to 14.5 mm (usually 11–12 mm) in *X. annulitibia*.

Xyelidae

Megaxyela togashii Shinohara, 1992

Megaxyela gigantea: Takeuchi, 1937: 25; Takeuchi, 1938: 205; Togashi, 1965: 235. Not Mocsáry, 1909, in part.

Megaxyela togashii Shinohara, 1992: 789; Shinohara *et al.*, 2017: 220; Blank *et al.*, 2017: 30.

Material examined. HONSHU: 1 ♀1 ♂, Kamikusukawa, 910 m, 36-43-28N 138-3-44E, Togakushi, Nagano, 24. V. 2017, A. Shinohara; 1 ♀, Hirao, 900 m, 36-42-54N, 138-27-16E, Yamanouchi, Nagano, 27. V. 2017, A. Shinohara.

Distribution. Japan (Hokkaido, Honshu, Shikoku).

Remarks. This is a rare sawfly known from one or a few specimens each collected in Hokkaido, Aomori, Ishikawa, Hyogo, Okayama, Hiroshima, and Yamaguchi prefectures in Honshu and Ehime Prefecture in Shikoku (Blank *et al.*, 2017; Shinohara *et al.*, 2017). Most of the specimens were obtained in western Honshu (from Yamaguchi to Hyogo prefectures) and only one specimen each has been collected in central Honshu (Ishikawa Prefecture) and eastern Honshu (Aomori Prefecture). Considering the very common occurrence of the host plant, *Juglans ailanthifolia* Carrière, throughout Honshu, this is an inexplicable distribution pattern, which is at least partly due to insufficient sampling in central and eastern Honshu.

The three specimens listed above represent the first distribution record of *M. togashii* from Nagano Prefecture in central Honshu. The newly found localities in Nagano Prefecture are about 120 km southeast of the collecting site in Ishikawa Prefecture and about 560 km southwest of the collecting site in Aomori Prefecture. Extensive sampling should be made particularly in the vast areas between Aomori and Nagano prefectures.

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