Bull. Natl. Mus. Nat. Sci., Ser. A, 38(1), pp. 21–32, February 22, 2012

Arge enkianthus n. sp. (Hymenoptera, Argidae) Feeding on *Enkianthus campanulatus* in Japan

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(Received 15 November 2011; accepted 28 December 2011)

Abstract *Arge enkianthus* n. sp. is described from Honshu and Shikoku, Japan. Larvae are gregarious leaf feeders on *Enkianthus campanulatus* (Miq.) G. Nicholson (Ericaceae). Descriptions of the immature stages and notes on the life history are also given. This is the first record of sawfly associated with *Enkianthus*.
Key words: Argidae, *Arge enkianthus*, new species, *Enkianthus*, Japan.

During our studies on the taxonomy and biology of the Argidae in Japan, we came across strange argid larvae gregariously feeding on the leaves of *Enkianthus campanulatus* (Miq.) G. Nicholson (Ericaceae) in Miyagi, Kanagawa and Nagano prefectures, Honshu, almost simultaneously at the end of July, 2006. The larvae of the same species were subsequently discovered in Tochigi prefecture in 2008. We were able to obtain the adults by rearing the larvae and found that they belong to an undescribed species of *Arge*. Only several adult specimens of this species have been collected afield so far in Tochigi, Kanagawa, Nagano and Shiga prefectures, Honshu, and Kochi prefecture, Shikoku.

Here we describe and illustrate the new species of *Arge* and give notes on its life history. This is the first record of *Enkianthus* as a host plant of sawflies.

Materials and Methods

The material used in this work is kept in the National Museum of Nature and Science, Tsukuba, unless otherwise stated.

Observations of morphology were made with a Leica MS5 stereo binocular microscope and measurements of each structure were taken with an ocular micrometer. Photographs were taken with digital cameras, Canon EOS Kiss Digital, Konica Minolta DiMAGE A200X, Panasonic DMC-FZ30 and Ricoh Caplio GX100, Keyence Digital Microscope VHX-900 and AnMo Electronics Dinolite digital microscope. The digital images were processed and arranged with Adobe Photoshop Elements 7.0 software.

Rearings were made in a room without air-conditioning in Bibai by Hara and in an air-conditioned room in Tokyo by Shinohara. In the rearing rooms, the temperature was usually 18–25°C and the light was usually on for about 16 hours a day.

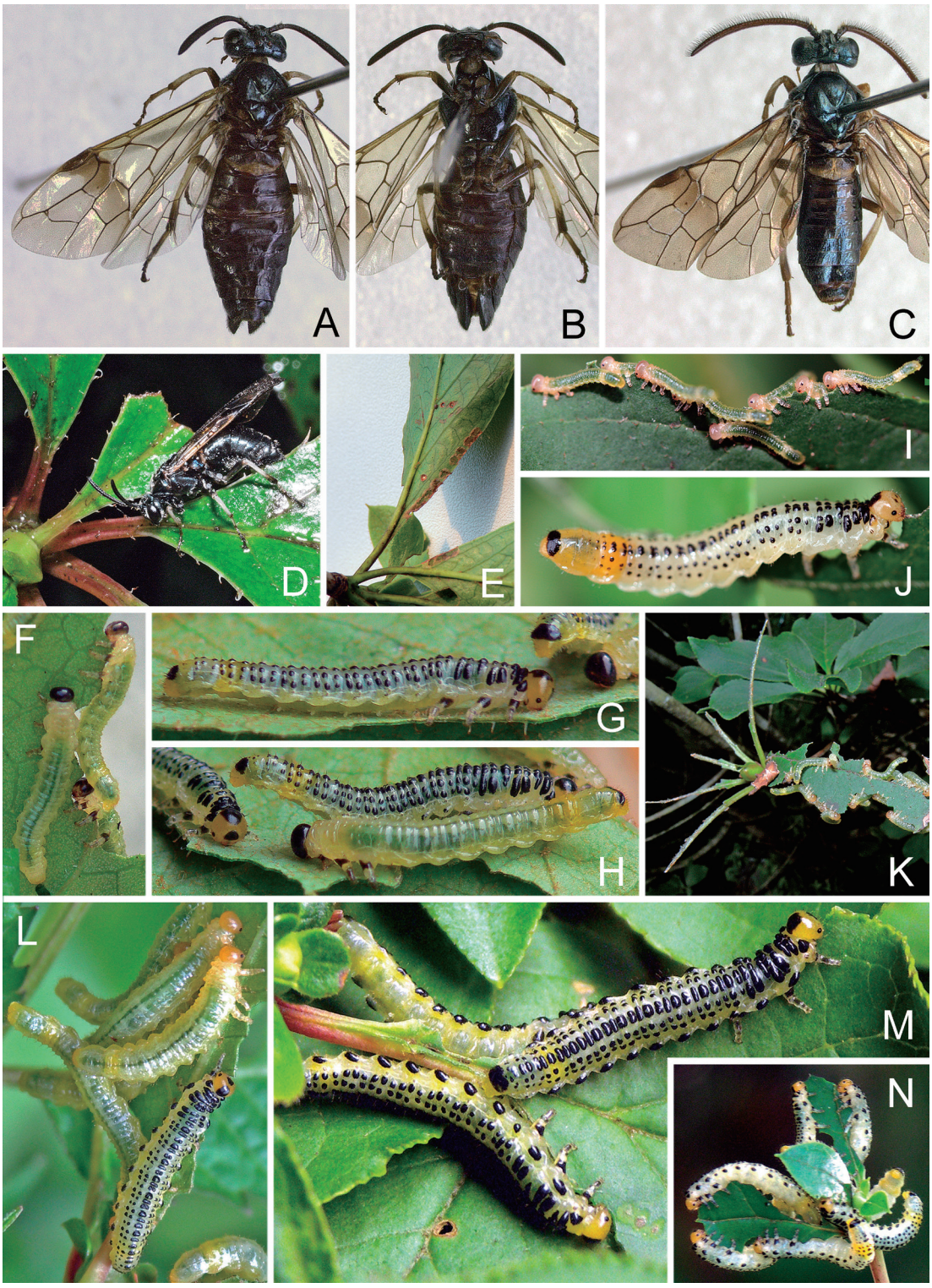
Results

Arge enkianthus n. sp.

[Japanese name: Dodan-churenji]

(Figs. 1–5, Table 1)

Female (Fig. 1A, B). Length 7.5–9.5 mm. Black or blackish brown, with weak blue reflection; clypeus with purplish reflection; basal and


A
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middle abdominal terga with faint purplish reflection. Flagellum brown to black, with colorless reflection. Labrum black. Mandible black, apically reddish. Palpi brown to dark brown. Legs dark brown to black, with colorless reflection; fore and mid femora yellowish apically, hind femur brownish apically; tibiae yellowish white, fore and mid tibiae narrowly brownish to blackish apically and hind tibia brown to black on apical third to fourth; tibial spurs brown to black; tarsi brown to black, usually more or less pale on basal parts of one to three basal tarsomeres. Wings hyaline, faintly yellowish or brownish; forewing with black band below stigma, extending to posterior margin of forewing but much weakened below vein M; stigma brown to black, narrowly pale basally and apically; veins brown to black, yellow on C, Sc and apical section of R1; section of R1 basal to stigma yellow to dark brown. Subanal area pale brown to black centrally. Setae generally whitish or yellowish, brownish on sawsheath.

Surface generally smooth and shining; punctures on anterior part of head fine, generally separated from each other.

Head in dorsal view (Fig. 2A) very slightly concave at outer orbits, with width across eyes about as long as width at genae. Distance between eyes 1.1–1.3× vertical diameter of eye; eye with vertical diameter 1.6–1.8× horizontal diameter. Postocellar area slightly convex, with anterior and lateral furrows indistinct (Fig. 2A), rarely lateral furrow distinct as in Fig. 2B. Ocellar area slightly concave between ocelli (Fig. 2D–G). Frontal area usually concave deeply and semicircularly before front ocellus medially and shallowly so anteriorly (Fig. 2D, G), sometimes not concave anteriorly (thus, frontal area anteriorly flat) (Fig. 2E), or rarely deeply concave throughout (Fig. 2F); lateral ridges almost parallel, not or slightly raised anteriorly. Distance between median fovea and front ocellus 1.7–2.8× diameter of front ocellus. Median fovea shallow to rather deep, with or without small round tubercle (Fig. 2H–K). Interantennal carinae sharp, dorsally becoming dull, usually curved medially and becoming low (Fig. 2H, I), rarely not curved (Fig. 2J), and ventrally fused together into median supraclypeal carina (Fig. 2C) above or at middle of supraclypeal area. Supraclypeal carina sharp; side slope weakly rounded and more or less rugulose laterally. Malar space 0.6–0.9× width of front ocellus. Clypeus distinctly sunk below supraclypeal carina, then almost flattened ventrally, with ventral margin deeply or moderately and roundly concave medially (Fig. 2C). Antennal length 1.4–1.6× maximum width of head; flagellum slightly compressed, curved basally and narrowly rounded at apex (Fig. 2L, M). Right mandible not incised on inner margin (Fig. 2C).

In forewing, cell 1Rs2 with anterior length 1.3–1.7× posterior length, and crossvein 3r-m distinctly oblique, curved anteriorly (Fig. 1A); in both wings, wing margin between veins Rs and Cu scarcely or sparsely ciliate, with marginal glabrous area narrower than width of vein M and marginal setae slightly longer than width of vein M (Fig. 2P).

Abdomen with second to fourth terga nearly glabrous above; fifth tergum anteromedially widely glabrous or with very sparse minute setae; sixth and more posterior terga setose, except for narrow anteromedial part of sixth glabrous or with sparse minute setae. Seventh sternum with posterior margin weakly roundly pro-

Fig. 1. *Arge enkianthus* n. sp. — A, B, Female, holotype, dorsolateral and ventral views; C, male, paratype, Hakone, dorsolateral view; D, ovipositing female, photographed in Nikko on 31 July 2011; E, rows of remains of egg shells, Osaki, photographed indoors on 5 August 2006; F, young larvae, Osaki, photographed indoors on 6 August 2006; G–H, final and semifinal instar larvae (HH060731B), Osaki, photographed indoors on 3 August 2006; I, group of larvae (AS080706A), early instar, photographed in Nikko on 6 July 2008; J, do., final instar, photographed indoors on 15 July 2008; K, young larvae and infested leaves, photographed in Nikko on 17 August 2010; L, M, semifinal and final instar larvae (AS060722A) photographed in Hakone on 22 July 2006; N, final instar larvae (AS060728B) photographed in Hara-mura on 28 July 2006. D, I–N, photographed by A. Shinohara; E–H, photographed by H. Hara.

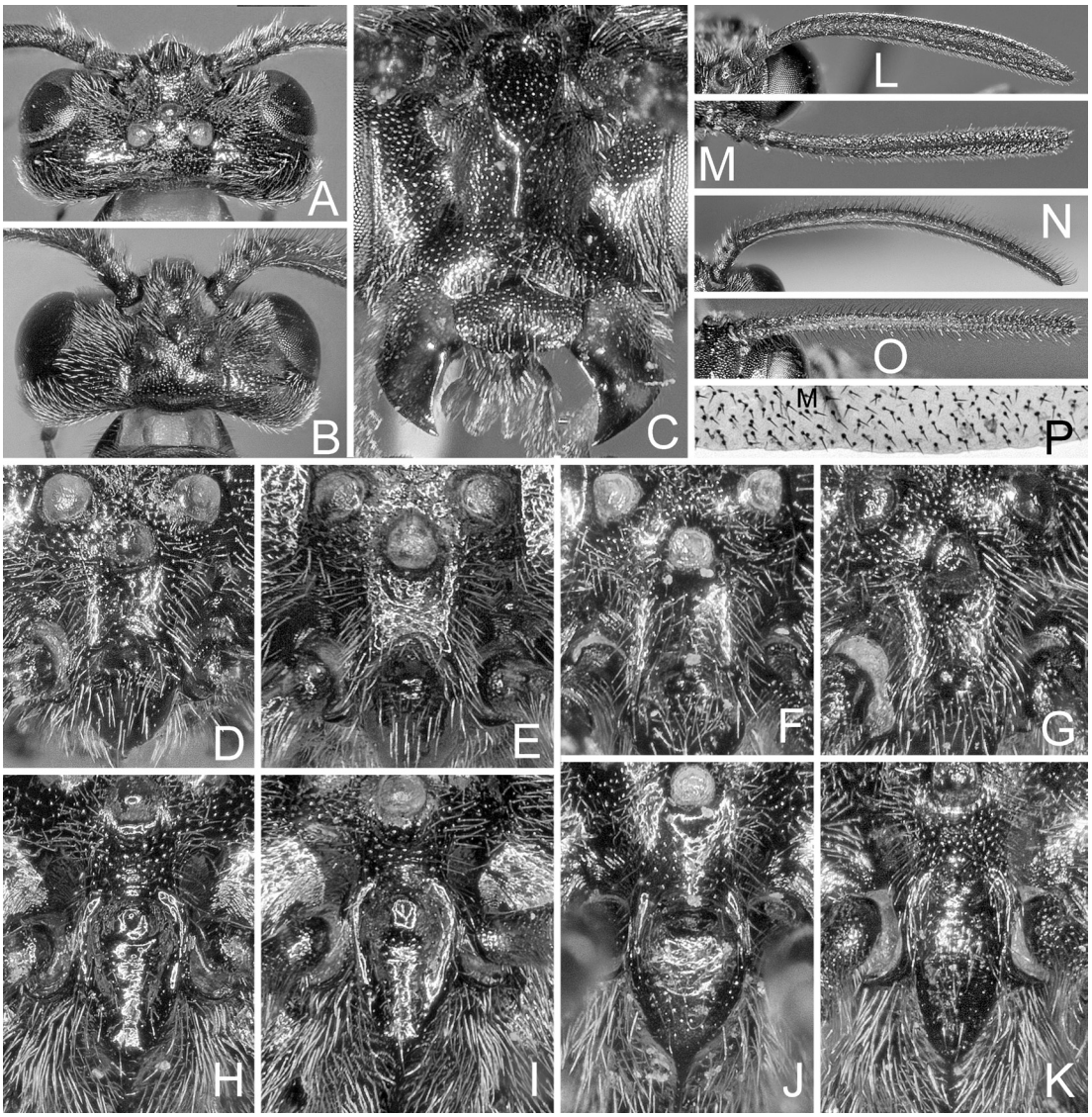

Fig. 2. A, B, Head, dorsal view; C, lower medial part of head, anterior view; D–G, ocellar and frontal areas, dorsal view; H–K, frontal and interantennal areas, anterior view; L, M, female antenna, inner lateral and ventral views; N, O, male antenna, inner lateral and ventral views; P, apical margin of forewing (small M means vein M). — A, D, H, L, M, P, Holotype; B, G, K, N, O, male paratype, Hakone (N, O reversed image); C, female paratype, Hakone; E, I, female paratype, Hakone; F, J, female paratype, Takayama-mura.

duced at middle. Sawsheath dorsally nearly flat (Fig. 3A, B) or weakly convex (Fig. 3C) except for basal concavity, in posterodorsal view longer than wide, with lateral margin weakly convex (Fig. 3A–C), apex nearly pointed, medial margin edged basally, and basal median lobe small, in lateral view with ventral margin except for basal convexity, weakly and roundly convex, sometimes slightly and roundly concave midapically, dorsal margin straight, and apex nearly pointed (Fig. 3D); inner surface spinose.

Lance with several linear membranous areas (Fig. 3E) and group of minute setae along ventral margin at middle (Fig. 3G); apical crest finely serrate on dorsal margin (Fig. 3F). Lancet with dorsal margin weakly roundly convex (Figs. 3H,

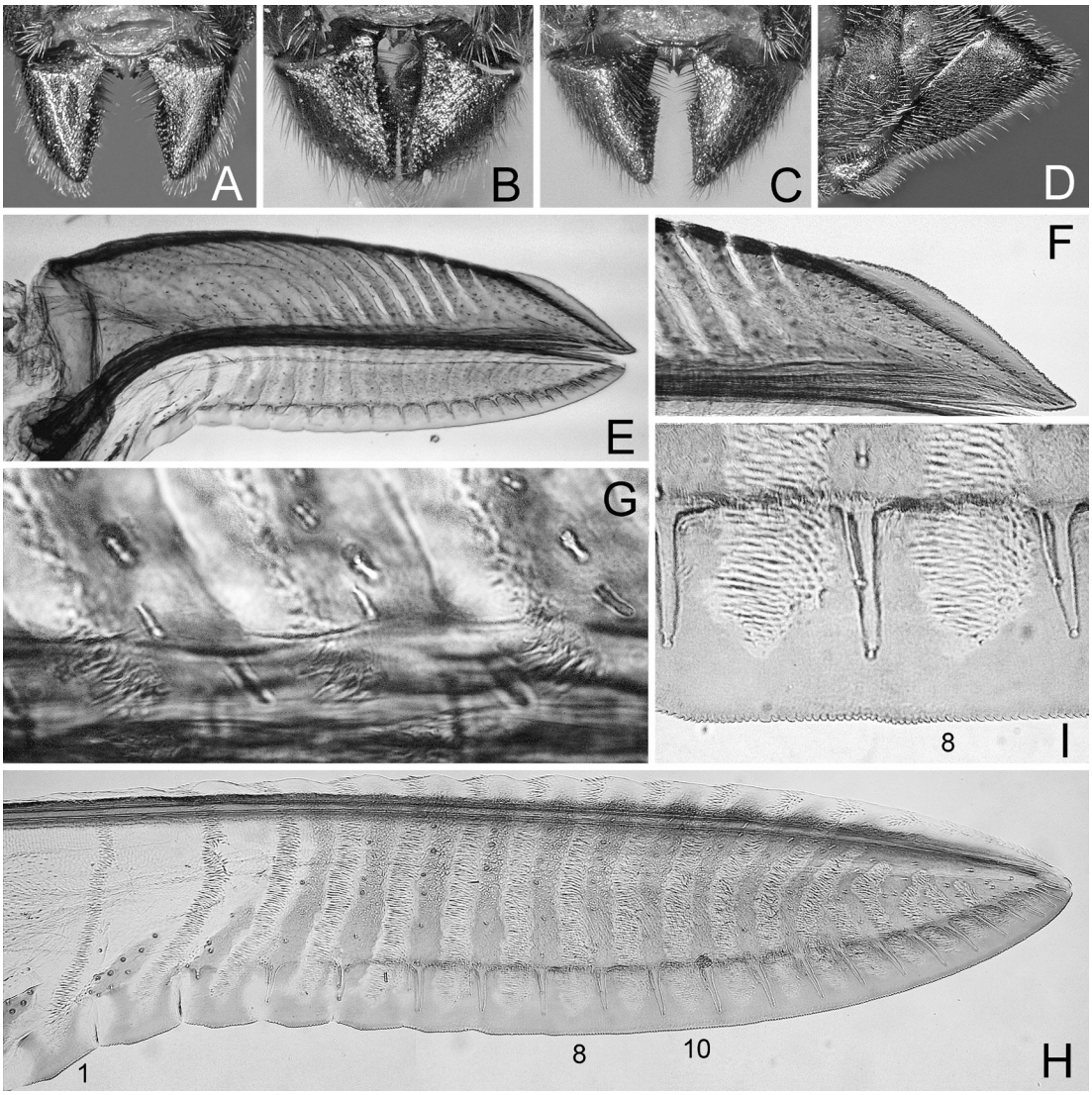

Fig. 3. A–C, Sawsheath, posterodorsal view; D, do., lateral view; E, lance; F, apical part of lance; G, ventral part of middle of lance; H, lancet (reversed image; numerals each indicate serrula number); I, do., seventh and eighth serrulae. — A, D–I, Holotype; B, paratype, Takayama-mura; C, paratype, Hara-mura.

4A–C) or straight (Fig. 4D), and ventral margin roundly convex midapically, ventrally weakly serrate basally and flattened midapically, with about 19–22 serrulae, dorsoapically with nonannulate area very narrow or indistinct; marginal sensillae long; dorsal membranous areas with groups of minute setae at intervals; wide longitudinal rows of setae present between annular plates and before first annular plate; first and second annular plates not reaching dorsal margin of lancet; middle annular plates with three to six sensory pores except for ventral ones; apical annuli arched toward base of lancet; serrulae finely dentate (Fig. 3I).

Male (Fig. 1C). Length 6.5–9.0 mm. Coloration as in female, but flagellum brown to dark brown; wings often darker; genital capsule mostly dark brown. Head in dorsal view with width across eyes often slightly longer than width at genae. Postocellar area often with dis-

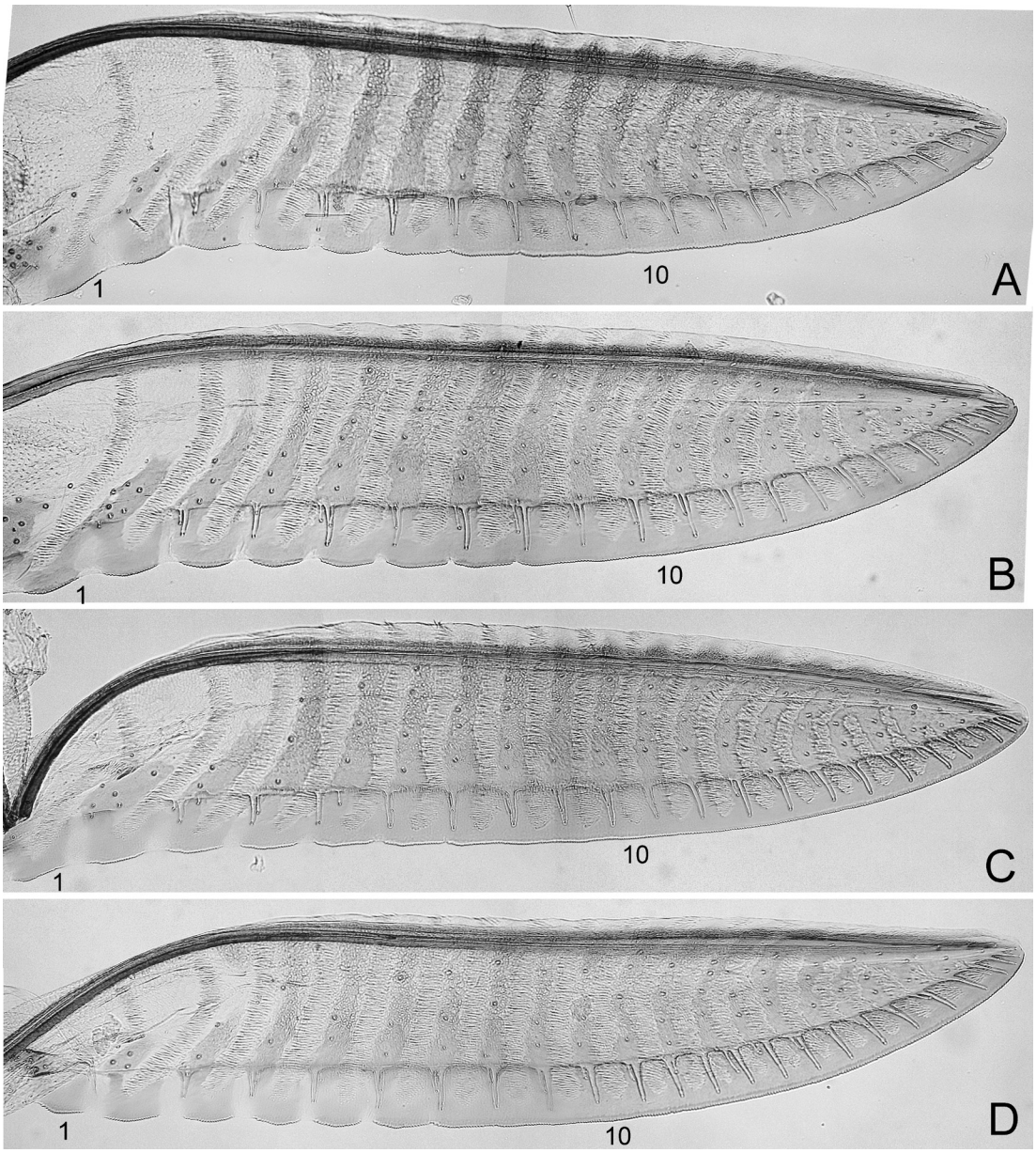

Fig. 4. Lancet, paratypes (numerals each indicate serrula number). — A, Osaki; B, Nikko; C, Hara-mura (reversed image); D, Takayama-mura.

tinct lateral furrow (Fig. 2B), very rarely with distinct anterior furrow. Frontal ridges sometimes weakly converging anteriorly (Fig. 2G). Antennal length 2.0–2.1× maximum width of head; flagellum narrow and not compressed, in inner lateral view gently curved and very slightly narrowing toward apex (Fig. 2N), in ventral view nearly straight with same width throughout and rounded apically (Fig. 2O). In forewing, cell 1Rs2 with anterior length 1.1–1.5× posterior length, and crossvein 3r-m as in female or gently curved throughout. Abdomen with fifth tergum or its posterior half and more posterior terga with minute setae. Subgenital plate with posterior

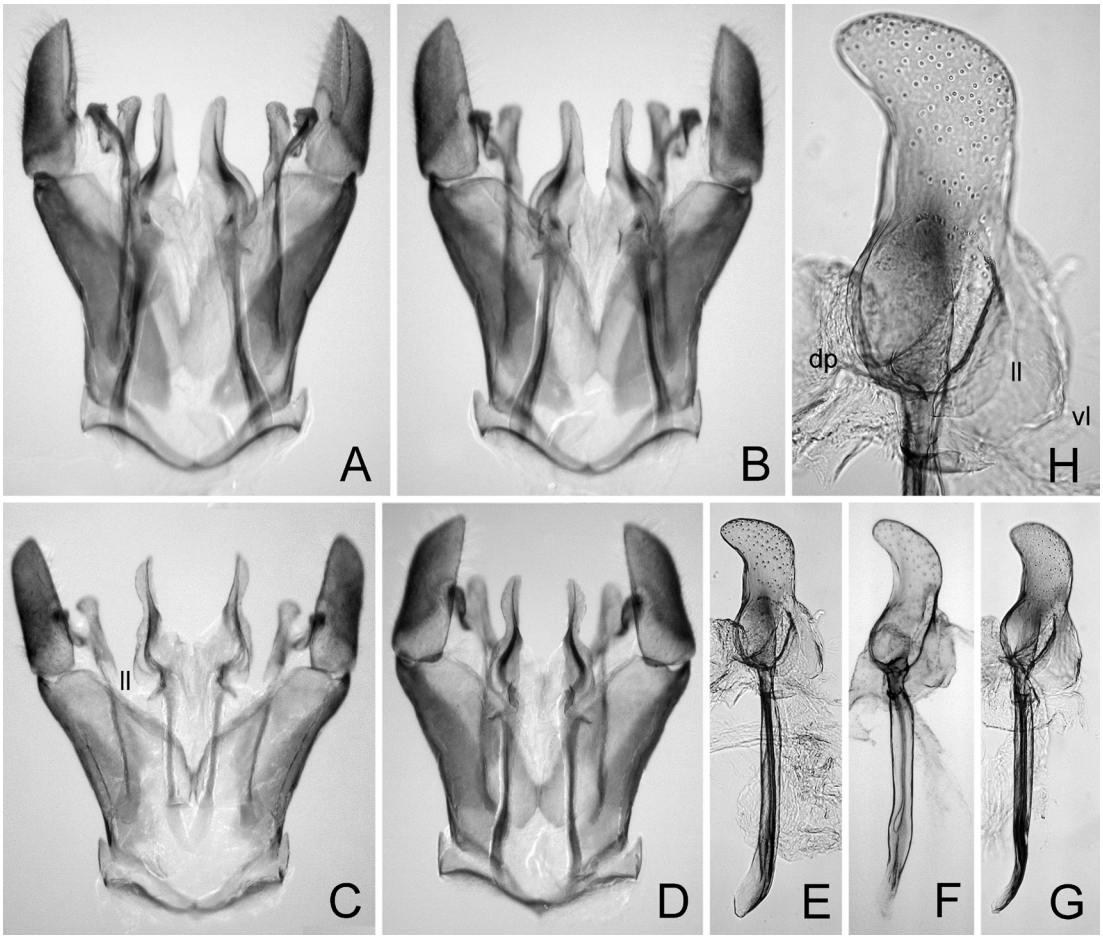

Fig. 5. Male genitalia, paratypes. — A, Dorsal view; B–D, ventral view; E–G, penis valve, lateral view (left dorsal); H, valviceps, lateral view (left dorsal). — A, B, E, H, Hakone; C, F, Osaki; D, G, Hara-mura. Abbreviations: dp, dorsal apodemal projection; ll, lateral lobe; vl, ventral lobe.

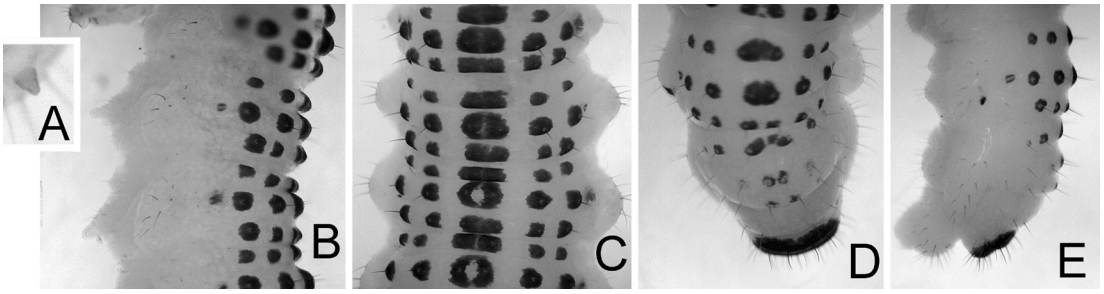

Fig. 6. Final instar larva, Naruko. — A, Antenna, frontal view; B, C, first to third abdominal segments, lateral and dorsal views; D, E, eighth to tenth abdominal segments, lateral and dorsal views.

margin broadly rounded in ventral view. Genitalia as in Fig. 5; gonostipes in ventral view more or less narrowing apically and apical width slightly wider than basal width of harpe (Fig. 5B–D). Harpe in dorsal view narrow, with median margin nearly straight, lateral margin

rounded near apex, and apex pointed. Valviceps in dorsal view (Fig. 5A–D) apically narrow, basally convex laterally, in lateral view (Fig. 5E–H) with dorsal margin roundly concave and apex narrowly rounded, basally with large ventral lobe (vl), small dorsal apodemal projection (dp) and flat lateral lobe (ll) (Fig. 5C, H); lateral lobe (ll) directed ventrolaterally, in lateral view with ventral margin rounded.

Larva (Figs. 1F–N, 6). Coloration showing geographical variations. Osaki population: Early to semifinal instars (Fig. 1F–H): Head black except for ventral part brownish and legs whitish, widely or only basally brownish to blackish; trunk pale creamy white; semifinal instar with 10th abdominal tergum apically black. Final instar (Fig. 1G–H): Head yellow with very large spot on vertex and large spot on frons black; trunk pale creamy white, yellowish on eighth and apex of 10th abdominal segments, each segment with three rows of black spots, subspiracular lobe without black spot or some basal ones each with very small black spot; thoracic legs almost white with black bases. Nikko population: Early instar (Fig. 1I): Head, thorax and thoracic legs pale pinkish white except for black eyes and brownish apex of mandible, and abdomen pale creamy white (infested greenish leaf inside visible from outside) and slightly yellowish on eighth and apex of 10th abdominal segments. Middle instar: Head creamy, trunk pale creamy white, yellowish on eighth and apex of 10th abdominal segments. Final instar (Fig. 1J): Head creamy, with large spot on vertex and pair of small spots on frons black; legs white with narrow black bases; trunk white, orange on eighth to 10th abdominal segments, dorsal black spots relatively small and inconspicuous on ninth and basal half of 10th abdominal segments, subspiracular lobe without black marks, and apical half of 10th abdominal tergum black. Hakone population: Semifinal instar (Fig. 1L): Head pale yellow, trunk pale creamy white, yellowish on eighth and apex of 10th abdominal segments. Final instar (Fig. 1L, M): Similar to Osaki specimens, but thoracic legs mostly blackish except for membranous areas, black spots on dorsum of trunk larger and more developed throughout, and subspiracular lobe largely marked with black. Hara-mura population: Semifinal and final instars: Similar to Hakone specimens, but final instar (Fig. 1N) black marks on subspiracular lobes smaller. In all populations, setae on trunk generally pale in early to semifinal instars, generally brownish to blackish in final instar.

Structure (final instar): Length 15–17 mm; antenna conical (Fig. 6A); clypeus with two pairs of setae; labrum with two pairs of setae; mandible with two or three setae on outer surface; maxillary palp with four palpomeres; palpifer with four to six setae; labial palp with three palpomeres; first to ninth abdominal segments each with three annulets (Fig. 6B–E); prolegs on second to sixth and 10th segments (Fig. 1G), those on second to sixth elongate (Fig. 6B); dorsal black spots each with one seta, except for dorsomedial fused spots each with pair of setae (Fig. 6); 10th tergum in dorsal view very broadly rounded or nearly truncate apically (Fig. 6D); subanal lobe slightly extending posteriorly beyond suranal lobe (Figs. 1G, J, 6E).

Cocoon. Creamy, rarely almost white. Length 10–12 mm. Elongate oval, double walled; outer wall netted; inner wall parchment like.

Distribution. Japan (Honshu, Shikoku).

Material examined. Holotype (Fig. 1A–B): ♀, labeled "[JAPAN: Honshu], Owakudani, Hakone, 1020 m, Kanagawa Pref., larva coll. 22. VII. 2006, made coc. 25. VII., em. 27. IX. 2006, AS060722A, Host: *Enkianthus campanulatus*, A. & N. Shinohara". Deposited in the National Museum of Nature and Science, Tsukuba. Paratypes: Honshu: Miyagi Pref. – 5♀2♂, Osaki, Onikobe, ca. 300 m, from 16 gregarious larvae (HH060802F), coll. 2. VIII. 2006, made coc. 9–12. VIII, em. 24. VIII–8. IX. 2006, Host: *Enkianthus campanulatus*, H. Hara; 1♀2♂, Osaki, Naruko, 250–300 m, from 15 gregarious larvae (HH060731A), coll. 31. VII. 2006, made coc. 9–10. VIII, em. 24. VIII. 2006, Host: *Enkianthus campanulatus*, H. Hara; 12♀5♂, do., but from 45 gregarious larvae (HH060731B), coll. 31. VII.

2006, made coc. 5–7. VIII, em. 19–25. VIII. 2006; 4♀2♂, do., but from 20 gregarious larvae (HH060802C), coll. 2. VIII. 2006, made coc. 6–8. VIII, em. 22–27. VIII. 2006; 9♀4♂, do., but from 19 gregarious larvae (HH060802D), coll. 2. VIII. 2006, made coc. 6–8. VIII, em. 22. VIII. — 8. IX. 2006; 2♀3♂, do., but from 22 gregarious larvae (HH060802E), coll. 2. VIII. 2006, made coc. 9–10. VIII, em. 26–27. VIII. 2006; 2♀1♂, do., but from 5 gregarious larvae (HH060804B), coll. 4. VIII. 2006, made coc. 6–7. VIII, em. 24. VIII.–8. IX. 2006. Tochigi Pref. — 1♂, Nasu, Sandogoya, 25. VII. 1970, T. Saito; 9♀, Hanaishi-cho, Nikko, ca. 640 m, from group of larvae (AS080706A), coll. 6. VII. 2008, matured 14. VII., em. 30–31. VII. 2008, Host: *Enkianthus campanulatus*, A. and N. Shinohara; 8♀, do. (AS110731D), coll. 31. VII. 2011, made coc. 1. VIII, em. 22–29. VIII. 2011; 1♀, same locality, 31. VII. 2011, ovipositing (Fig. 1D), A. Shinohara; 1♀, Nikko, Yumoto, 30. VII. 1986, T. Saito. Kanagawa Pref. — 1♂, same data as holotype, but made coc. 24. VII., em. 30. VIII. 2006; 1♂, do., but made coc. 24. VII., em. 13. IX. 2006; 1♂, do., but made coc. 24. VII., em. 17. IX. 2006; 1♂, do., but made coc. 24. VII., em. 19. IX. 2006; 1♀, do., but made coc. 24. VII., em. 28. IX. 2006; 1♀, do., but made coc. 24. VII., em. 30. IX. 2006; 1♀, do., but made coc. 25. VII., em. 24. IX. 2006; 1♂, do., but made coc. 25. VII., em. 26. IX. 2006; 1♀, do., but made coc. 25. VII., em. 27. IX. 2006; 1♀, do., but made coc. 26. VII., em. 15. VIII. 2006; 3♀, do., but made coc. 27. VII., em. 28. IX. 2006; 1♀, do., but made coc. 28. VII., em. 7. IX. 2006; 1♂, do., but made coc. 28. VII., em. 9. IX. 2006; 1♀, do., but made coc. 28. VII., em. 11. IX. 2006; 1♀, do., but made coc. 28. VII., em. 14. IX. 2006; 1♀, do., but made coc. 28. VII., em. 17. IX. 2006; 2♂, Hakone, Owakudani-Ubako, 17. VI. 2004, K. Kubo; 1♂, Hakone, Ubako, 17. VI. 2004, K. Kubo; 1♀, Hakone, Owakudani, 19. VIII. 2004, K. Kubo; 1♀, Hakone, Komagatake, 21. VIII. 2002, H. Nagase. Gunma Pref. — 1♀, Tsumakoi-mura, Kazawa-onsen, 6. VIII. 2010, H. Kojima. Nagano Pref. — 1♀, Takayama-mura, "Yamanokami", 5. VIII. 2010, H. Kojima; 1♂, Utsukushigahara, 10. VIII. 1976, Y. T. and H. Suda; 2♀, Tateshina-yama, Tenshojihara, 29. VII. 1972, A. Shinohara; 1♂, Hara-mura, ca. 1300 m, from group of larvae (AS060728B), coll. 28. VII. 2006, made coc. 29. VII., em. 24. VIII. 2006, Host: *Enkianthus campanulatus*, A. Shinohara; 1♂, do., but made coc. 29. VII., em. 25. VIII. 2006; 1♀, do., but made coc. 29. VII., em. 27. VIII. 2006; 1♀, do., but made coc. 29. VII., em. 10. IX. 2006; 1♀, do., but made coc. 30. VII., em. 18. VIII. 2006; 1♀, do., but made coc. 30. VII., em. 12. IX. 2006; 1♀, do., but made coc. 30. VII., em. 14. IX. 2006; 1♀, do., but made coc. 30. VII., em. 18. IX. 2006; 2♀, do., but made coc. 2. VIII., em. 28. IX. 2006; 1♀, do., but made coc. 3. VIII., em. 30. IX. 2006; 2♀, Otaki, Mt. Ontake-san, 1600m, Nakanoyu, 21. VII. 1981, A. Shinohara. Shiga Pref. — 1♀, Otsu, "Mt. Hira", 9. VIII. 1939, Takeuchi (Osaka Prefecture University, Sakai). Shikoku: Kochi Pref. — 1♂ "Prov. Tosa, H. Okamoto, Ishizuchi, 23. VII. 1935" (HU). Other material: 9 larvae, part of HH060731A; 9 larvae, part of HH060731B; 4 larvae, part of HH060802D; 4 larvae, part of HH060802F, fixed 6. VIII. 2006; 11 larvae, part of AS060722A; 1 larva, part of AS060728B, fixed 2. VIII. 2006.

Etymology. The specific epithet, *enkianthus*, refers to the host plant and is a noun in apposition.

Host plant. Ericaceae: *Enkianthus campanulatus* (Miq.) G. Nicholson.

Field observations and rearing records. We collected 26 groups of gregarious larvae in the period from early July to early September, in 2006–2011 (Table 1). The groups found in the field consisted of one to 45, most frequently 10 to 30 larvae. In the group of HH060804A, some rows of remains of eggs were found along basal margins of the neighboring leaves where larvae were found (Fig. 1E). Shinohara observed a female ovipositing into the basal margin of a leaf (Fig. 1D). Larvae fed on leaves, leaving the main veins and petioles (Fig. 1K). Larvae spun

Table 1. Summary of rearings.

Locality		Larval group code*	Number of larvae	Found	Cocooned	Emerged (number and sex**)
Prefecture	Details					
Miyagi	Onikobe, 300 m, Osaki	HH060802F	16	2.VIII.2006	912.VIII	24.VIII.–8.IX.2006 (5♀1♂)
	Naruko, 250–300 m, Osaki	HH060731A	15	31.VII.2006	9–10.VIII	24.VIII.2006 (1♀2♂)
		HH060731B	45	31.VII.2006	5–7.VIII	19–25.VIII.2006 (12♀5♂)
		HH060802B	2	2.VIII.2006	5.VIII	(dead in cocoons)
		HH060802C	20	2.VIII.2006	6–8.VIII	22–27.VIII.2006 (4♀2♂)
		HH060802D	19	2.VIII.2006	6–8.VIII	22.VIII.–8.IX.2006 (9♀2♂)
		HH060802E	22	2.VIII.2006	9–10.VIII	26–27.VIII.2006 (2♀3♂)
		HH060804A	26	4.VIII.2006	(dead before maturity)	—
		HH060804B	5	4.VIII.2006	6–7.VIII	24.VIII.–2.IX.2006 (1♀)
		HH060804C	19	4.VIII.2006	9–16.VIII	(dead in cocoons)
Tochigi	Hanaishi-cho, 640 m, Nikko	AS080706A	10+	6.VII.2008	13–14.VII.	30–31.VII.2008 (9♀)
		AS080706B	6+	6.VII.2008	9–11.VII.	(dead in cocoons)
		AS080706C	4+	6.VII.2008	7–9.VII.	(dead in cocoons)
		AS080706D	3+	6.VII.2008	8–10.VII.	(dead in cocoons)
		AS090712C	several	12.VII.2009	29.VII.	(dead in cocoons)
		AS090802I	3+	2.VIII.2009	12.VIII.	(dead in cocoons)
		AS090813H	7+	13.VIII.2009	14.VIII.	(dead in cocoons)
		AS100905B	1	5.IX.2010	7.IX.	(dead in cocoon)
		AS110731D	8+	31.VII.2011	1.VIII.	22–29.VIII.2011 (8♀)
		AS110909B	several	9.IX.2011	(dead before maturity)	—
		AS110909C	several	9.IX.2011	(dead before maturity)	—
		AS110909D	several	9.IX.2011	(dead before maturity)	—
		AS110909E	1	9.IX.2011	9.IX.	(dead in cocoon)
	Kirifuri, 1230 m, Nikko	AS100817A	2+	17.VIII.2010	15.VIII.	(dead in cocoons)
Kanagawa	Owakudani, 1020 m, Hakone	AS060722A	30+	22.VII.2006	24–28.VII.	15.VIII.–30.IX.2006 (13♀6♂)
Nagano	Hara-mura, ca. 1300 m	AS060728B	10+	28.VII.2006	29.VII.–2.VIII	18.VIII.–30.IX.2006 (8♀2♂)

*Reared by Hara in Bibai (HH) or by Shinohara in Tokyo (AS).
**Other specimens died or fixed in larval stage.

cocoons within soil or paper in cages, and became adults within the same year. For the individuals in the groups AS060722A, AS060728B, AS080706A, and AS110731D, the dates on which larvae made cocoons and adults emerged were recorded as detailed in the material examined. Cocoon periods were 20 to 68 (55.2 on average) days in females (n = 13) and 37 to 63 (51.0) days in males (n = 6) in AS06722A, 19 to 59 (46.9) days in females (n = 8) and 26 to 27 (26.5) day in males (n = 2) in AS060728B, 16 to 17 days in females (n = 9) in AS080706A, and 21 to 28 days in females (n = 8) in AS110731D.

Discussion

Comparison with the Related Species

Arge enkianthus is one of the blue-black species having hyaline wings with a black transverse band on the forewing and a basally pale hind tibia. It is distinguished from the similar looking species by the long and sub-triangular sawsheath (Fig. 3A–C) and the apically narrow and basally rounded valviceps with a basal lateral lobe (Fig. 5). A combination of the following features also serve to recognize this species: Setae mostly whitish; abdomen without pale areas; flagellum brown to black; hind coxa to femur black; hind tarsus brown to black, at most pale on bases of one to three basal tarsomeres; wings with stigma mostly black, veins dark except for C, Sc and apical section of R1 yellow and section of R1 basal to stigma often widely yellow; frontal area medially concave throughout or posteriorly, with lateral ridge not or slightly raised anteriorly; interantennal carinae sharp, dorsal end curved medially and becoming low or separated from each other, and ventrally fused into sharp supraclypeal carina; male antenna narrow and not compressed, 2.0–2.1 × head width; right mandible without notch on inner margin; in both wings, wing margin between veins Rs and Cu scarcely or sparsely ciliate, with marginal glabrous area narrower than width of vein M and marginal setae slightly longer than width of vein M; in female, seventh sternum with posterior margin weakly roundly produced at middle; lancet ventrally serrate only basally, with apical annuli arched toward base of lancet; in male genitalia, gonostipes in ventral view more or less narrowing apically, and harpe in dorsal view narrow and pointed at apex.

In Takeuchi's (1939) key, this species runs to *A. jonasi* (Kirby, 1882) described from Japan. *Arge jonasi* is similar to *A. kobayashii* Takeuchi, 1931 and *A. solowiyofka* (Matsumura, 1911), both from Japan and Sakhalin (Hara *et al.*, 2007). All three are larger species, usually more than 10 mm long in females and more than 8 mm long in males, and have a weakly carinate or rounded median supraclypeal ridge and a robust sawsheath. For more characters of the three species, see Hara *et al.* (2007). In Gussakovskij's (1935) key, this species runs to the couplets 145/162, but does not agree with either of them.

In immature stages, this species is easily distinguished from Japanese congeners by the host plant and the unique coloration of the final instar larva.

Geographical Variation in Larval Coloration

The adults of this species show small variation both in external and genitalic characters, but the larvae vary rather greatly in color pattern and this variation is apparently related to geography. We have examined larvae from four widely separated areas, namely, Osaki (250–300m, Miyagi Prefecture, early to final instars), Nikko (640–1230m, Tochigi Prefecture, early to final instars), Hakone (1020m, Kanagawa Prefecture, semifinal and final instars) and Hara-mura (1300m, Nagano Prefecture, semifinal and final instars). As described above, most conspicuous difference is in the head coloration of the early to semifinal larvae, which is mostly black in the northernmost Osaki population (Fig. 1F, G) and entirely creamy to yellow in other three populations located in more southwestern areas (Fig. 1I, L). The final instar larvae also exhibit some differences among the populations as detailed above. The significance of these apparent regional variations is still unknown. The stability of these characters in each local population and distribution of

these variations within the entire range of the species should be examined with more material in the future.

Host Plant

Larvae of argid sawflies feed on plants of various families, including the Ericaceae. In Japan, two species, *Arge similis* (Snellen van Vollenhoven, 1860) and *Spinarge affinis* Hara and Shinohara, 2006, are known to feed on *Rhododendron* (Shinohara and Hara, 2010) and one species, *Spinarge pumila* Hara and Shinohara, 2006, is known to feed on *Elliottia* (Shinohara and Hara, 2011). In North America, two species of *Arge*, *A. abdominalis* Leach, 1817, and *A. azaleae* Smith, 1989, are associated with *Rhododendron* (Smith, 1989). These are probably the only available records of the association of argid sawflies with Ericaceae. *Arge enkianthus* is the first argid sawfly known to feed on *Enkianthus*, and this is the first record of *Enkianthus* as a host plant of sawflies.

Life History

The field collection dates of the adults (11 females and six males) are roughly divided into two periods; three males in middle June, and 11 females and three males from late July to late August. We collected larvae in the field from early July to early September (Table 1). These became adults from late July to late September in the same year and the cocoon periods greatly varied from 16 to 68 days. Based on our observations, the life history of this species may be summarized as follows: Adults occur from late spring to early autumn; the female lays her eggs in a row along basal margins of adjacent leaves (Fig. 1D, E); the larvae gregariously feed on leaves, leaving the main veins and petioles (Fig. 1K); the mature larva enters the soil and spins a cocoon. The sawfly probably has two or more generations a year and the adult emergence is probably polymodal, which is a rather common feature in multivoltine species of the genus (Shinohara and Hara, 2008, 2009; Shinohara *et al.*, 2009).

Acknowledgements

We thank T. Hirowatari (Osaka Prefecture University, Sakai), H. Kojima (Nagano), K. Kubo (Yokohama), H. Nagase (Kamakura), M. Ohara (Hokkaido University, Sapporo), T. Saito (Nikko), N. Shinohara (Tokyo) and H. Suda (Sakura) for making the material available for this study, and David R. Smith (United States Department of Agriculture, Washington, D.C.) for his careful review of the manuscript.

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