

Discovery of Host Plants and Larvae of Three Species of Tenthredinidae (Hymenoptera, Symphyta) in Japan

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Abstract Based on field observations and rearing experiments, new host plant records are given for three sawfly species of the family Tenthredinidae: *Fallopia japonica* (Houtt.) Ronse Decr. var. *japonica* (Polygonaceae) for *Ametastegia luridiventer* Takeuchi, 1952, *Carex* sp. (Cyperaceae) for *Eutomostethus togashii* Seiyama, 1981 and *Angelica pubescens* Maxim. (Apiaceae) for *Tenthredo adusta adusta* Motschulsky, 1866. The larvae and life history of the three species are briefly described and illustrated for the first time.

Key words: Symphyta, Tenthredinidae, *Ametastegia*, *Eutomostethus*, *Tenthredo*, new host plant record, larva.

Introduction

The Tenthredinidae (Hymenoptera, Symphyta) is the most diverse sawfly family, with over 400 genera and nearly 6000 species worldwide (Tae-ger *et al.*, 2018) and about 600 species in Japan (Hara, 2020). In 2020, the host plants were known for at least 250 tenthredinid species (Naito *et al.*, 2020). Since then, several authors have published additional host plant records for about 30 Japanese species in this family, including new species and the species previously unrecorded from the country (e.g., Hara *et al.*, 2021, 2022, 2023; Hara and Ibuki, 2022; Shinohara *et al.*, 2024). However, the host plants of many Japanese species remain unknown.

In this study, I present new host plant records and brief descriptions of the larvae for three Japanese species of Tenthredinidae, *Ametastegia luridiventer* Takeuchi, 1952, *Eutomostethus togashii* Seiyama, 1981 and *Tenthredo adusta adusta* Motschulsky, 1866, based on field observations and rearing experiments conducted in Honshu, Japan.

Materials and Methods

The material used in this study is kept in the National Museum of Nature and Science, Tsukuba, Japan. Photographs were taken with a digital camera, Olympus Stylus TG-4 Tough. The digital images were processed and arranged with Corel PaintShop Pro® 2018 software.

Rearing was done in rooms in Kawasaki City and Yokohama City, Kanagawa Prefecture. The temperature and day length of the rearing rooms were not rigidly controlled. Morphological terminology and the scientific names of the host plants follow Viitasaari (2002) and Yonekura and Kajita (2025), respectively.

Results and Discussion

Ametastegia luridiventer Takeuchi, 1952

(Fig. 1A–F)

Materials examined. JAPAN: HONSHU—Tokyo Met.: 1 female, Hachioji-shi, Uratakaomachi, Kogesawa, 31. VIII. 2019, Y. Kato; 1 female, same data as above, except for 7. IX; 1 female,

same data as above, except for 2. V. 2021; 1 female, same data as above, except for 23. IX; 1 female, Hachioji-shi, Uratakaomachi, Oshimo, oviposited on *Fallopia japonica* var. *japonica* in field and captivity, YK20200912A, 12. IX. 2020, Y. Kato; 1 final instar larva (in ethanol), offspring of YK20200912A, hatched 17. IX, fixed 5. X, Host: *Fallopia japonica* var. *japonica*; 1 final feeding instar larva (in ethanol), same data as above, except for fixed 6. X; 1 male, same data as above, except for hatched 17–18. IX, mat. 5. X., emerged 1–20. XII. 2020.

Larva. Early instar (Fig. 1B): Length about 2 mm; head brown to dark brown, with ocularium and stemmatum black; trunk translucent white. Middle instar (Fig. 1C): Length 5–10 mm; head bluish gray dorsally and whitish gray ventrally,

with ocularium and stemmatum black; trunk translucent white, abdominal segment each with pair of obscure black spots on supraspiracular zone. Final feeding instar (Fig. 1D, E): Length about 14 mm; color similar to middle instar, but obscure black spots on supraspiracular zone distinct and with large black spot on abdominal tergum 10. Final instar (= mature larva) (Fig. 1F): Length about 14 mm; similar to final feeding instar, but ground color dark greenish gray dorsally, dark creamy white ventrally. Trunk covered with thin layer of white wax in all feeding instars.

Host plant. Polygonaceae: *Fallopia japonica* (Houtt.) Ronse Decr. var. *japonica* (new record).

Observations and rearing records. On September 12, 2020, I observed a female ovipositing

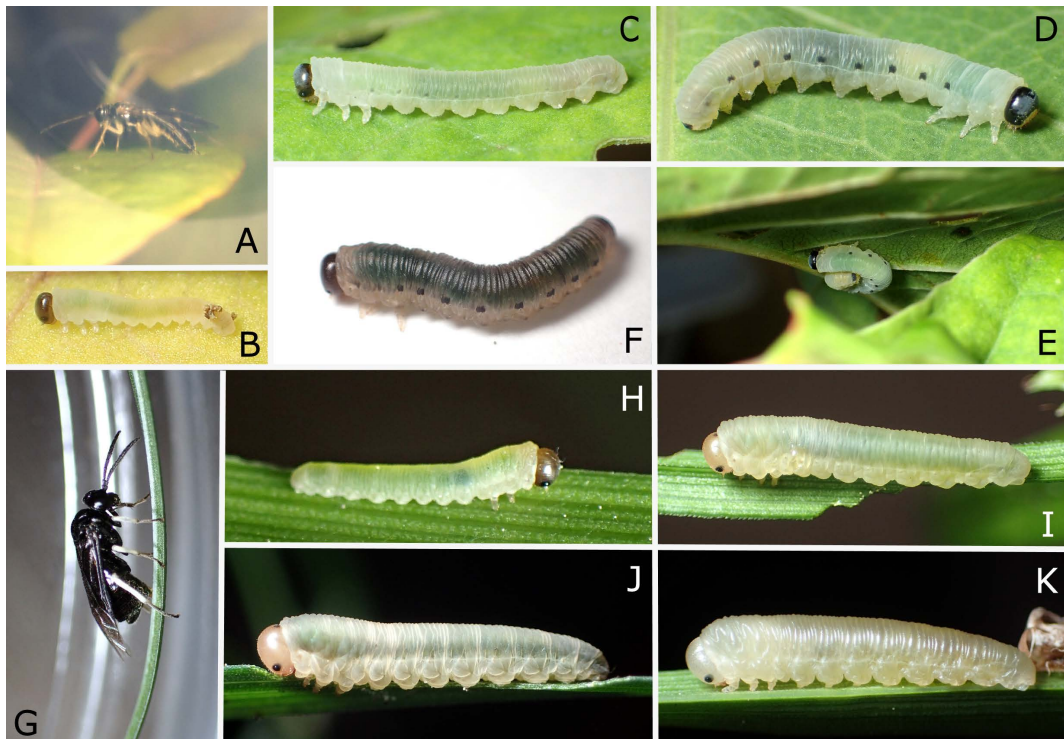


Fig. 1. *Ametastegia luridiventer* Takeuchi, 1952, photographed in 2020 (A–F) and *Eutomostethus togashii* Seiyama, 1981, photographed in 2023 (G–K). —A, Adult female ovipositing on a leaf of *Fallopia japonica* var. *japonica*, September 12; B, early instar larva, September 17; C, middle instar larva, September 27; D, final feeding instar larva, October 5; E, final feeding instar larva, staying on the undersurface of the leaf of *Fallopia japonica* var. *japonica*, October 4; F, final instar larva, October 5; G, adult female ovipositing on a leaf of *Carex* sp., April 23; H, early instar larva, May 3; I, middle instar larva, May 10; J, final feeding instar larva, May 19; K, final instar larva, May 27.

on a leaf of *Fallopia japonica* in Oshimo, Uratakaomachi, Hachioji City, Tokyo Metropolis, Honshu, Japan. After observing oviposition, I collected this female and kept it alive in a container with the same live plant species, and it laid 10 or more eggs on the same plant from September 12 to 13. The eggs were individually inserted in the tissue of the leaf from the upper surface (Fig. 1A). All eggs hatched between September 17 and 18. The larva always stayed on the under-surface of the leaf, with the coiling resting position (Fig. 1E). Three larvae reached the final feeding instar from October 1 to 2 and the others died. One of them was fixed in ethanol on October 6. The remaining larvae executed extra molts and matured from October 5 to 6. They entered the decaying wood, not the soil. A male adult emerged on December 15 to 20, 2020.

Life history. Adults were collected in early May and late August to late September in Hachioji City, Tokyo, Japan (see collection data above). According to my rearing records, one larva that hatched in mid-September matured in early October and became an adult in the same year. Therefore, this species is probably multivoltine in Honshu, Japan.

Remarks. The larva and host plant are recorded here for the first time. Among the Japanese congeners, the larva of *Ametastegia polygona* Takeuchi, 1929 is also known to feed on *Fallopia japonica* (Hara *et al.*, 2022). The final feeding instar larva of *A. luridiventer* is easily distinguished from that of *A. polygona* by the each abdominal segment with a pair of distinct black spots on the supraspiracular zone (no black spots on the trunk in *A. polygona*, fig. 3C, D in Hara *et al.*, 2022).

Eutomostethus togashii Seiyama, 1981

(Fig. 1G–K)

Material examined. JAPAN: HONSHU—Saitama Pref.: 1 female, Koshigaya-shi, Sagami-cho, Motoarakawa River (oviposited on *Carex* sp. in field and captivity), 21. IV. 2023, Y. Kato.

Larva. Early instar (Fig. 1H): Length about

2 mm; head dark brown, with ocularium and stemmatum black; trunk translucent white. Middle instar (Fig. 1I): Length 3–8 mm; head pale brown, with ocularium, stemmatum and small spot on posterior end of vertex black; trunk translucent white to yellowish white. Final feeding instar (Fig. 1J): Length about 10 mm; color similar to middle instar, but dorsal half of trunk pale gray, with supraspiracular region dark gray. Final instar (= mature larva) (Fig. 1K): Head white to light brown; trunk translucent white to yellowish white, cuticle smooth and shiny.

Host plant. Cyperaceae: *Carex* sp. (new record).

Observations and rearing records. On April 21, 2021, I observed a female ovipositing on a leaf of *Carex* sp. in the riverbed of the Motoarakawa River, Koshigaya City, Saitama Prefecture, Honshu, Japan. After observing oviposition, I collected this female and kept it alive in a container with the same live plant species, and it laid 11 eggs on the same plant between April 21 and 23. The eggs were individually inserted in the tissue of the leaf from the lower surface (Fig. 1G). All eggs hatched between May 2 and 4. The hatched larvae solitarily fed on the leaf edge. One larva executed an extra molt and matured on May 27. It entered the soil on the same day. The other 10 larvae died before maturity. No adult emerged.

Life history. Naito (2020) noted that *E. togashii* was a univoltine species and the adults occur in spring to summer, but he did not present any evidence. On the other hand, in the quantitative survey conducted at the Imperial Palace, the lowland of Tokyo, Honshu, Japan (Shinohara, 2000, 2014), adults were collected from mid-April to early June and from late August to early September, possibly suggesting a multivoltine life cycle.

Remarks. The larva and host plant are recorded here for the first time. The Japanese congener, *Eutomostethus pumicosus* Seiyama, 1981 is also known to feed on *Carex* sp. (Seiyama, 1981), but the larva of this species is still undescribed. Therefore, the larvae of the two

species cannot be distinguished at this time.

***Tenthredo adusta adusta* Motschulsky, 1866**

(Fig. 2A–H)

Materials examined. JAPAN: HONSHU—Kanagawa Pref.: 2 females, Yugawara-machi, Yoshihama, Mt. Makuyama, ca 600 m alt., 29. V. 2021, Y. Kato; 1 female, same data as above, except for oviposited on *Angelica pubescens* in field and captivity, YK20210529A; 3 final feeding instar larvae (in ethanol), offspring of YK20210529A, hatched 4–6. VI, fixed 19. VI; 1

final instar larva (in ethanol), same data as above, except for fixed 20. VI.

Larva. Early instar (Fig. 2B, C): Length 6–7 mm; head brownish orange, with ocularium and stemmatum black; trunk translucent opaque white. Middle instar (Fig. 2D, G): Length 10–23 mm; head orange, with ocularium and stemmatum black; antenna dark brown; mandible pale orange, becoming black apically; trunk white to light gray. Final feeding instar (Fig. 2E, H): Length 26–32 mm; color similar to middle instar, but trunk gray to dark gray dorsally, light gray ventrally, with pale brown arrowhead-like

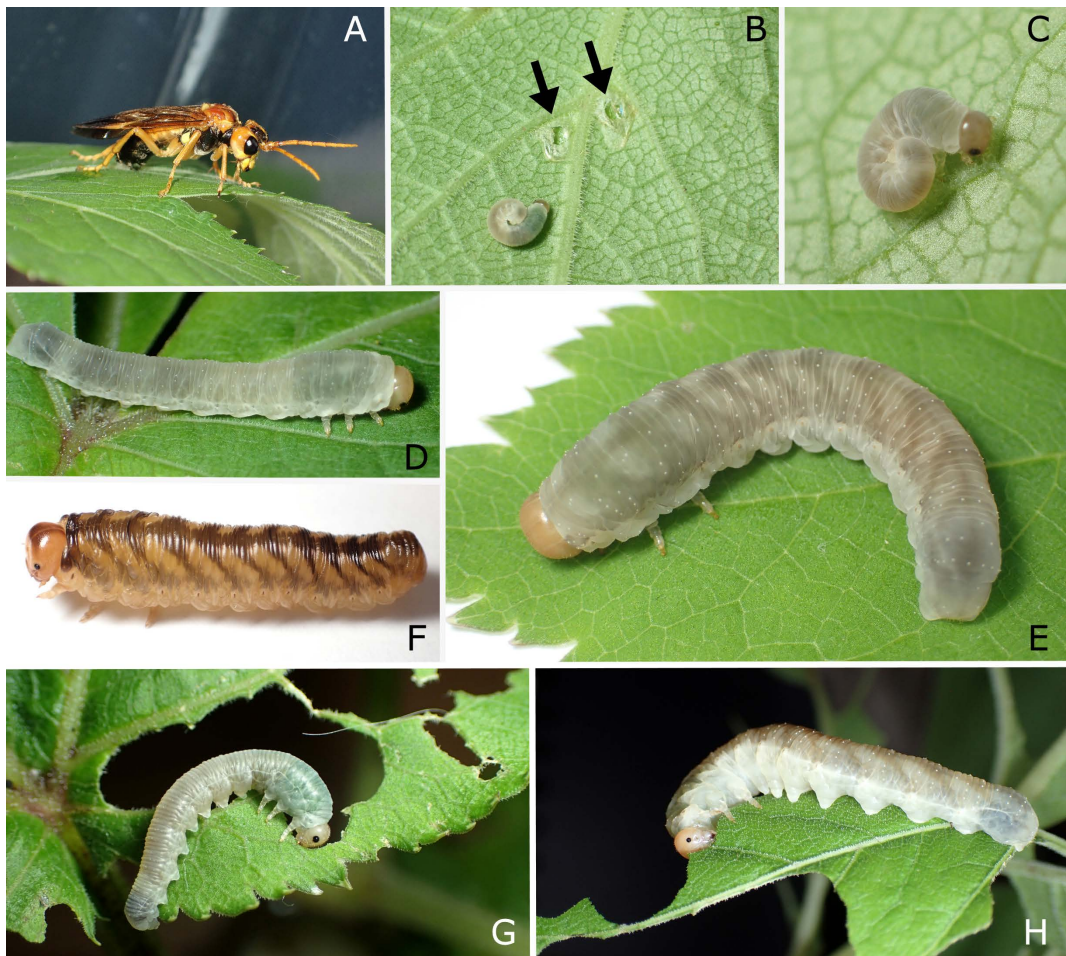


Fig. 2. *Tenthredo adusta adusta* Motschulsky, 1866, photographed in 2021. —A, Adult female ovipositing on a leaf of *Angelica pubescens*, May 29; B, early instar larva and remains of eggs (arrowed), June 4; C, early instar larva, June 6; D, G, middle instar larva, June 10; E, final feeding instar larva, June 13; F, final instar larva, June 19; H, final feeding instar larva, June 19.

dorsal stripe on each segment. Final instar (= mature larva) (Fig. 2F): Length about 26 mm; head orange with dark brownish fleck on anterodorsally; trunk clear orange with dark brown arrowhead-like dorsal stripe on each segments. Trunk covered with thin layer of white wax in all feeding instars.

Host plant. Apiaceae: *Angelica pubescens* Maxim. (new record).

Observations and rearing records. On May 29, 2021, I observed a female ovipositing on a leaf of *Angelica pubescens* in Yoshihama, Yugawaramachi, Kanagawa Prefecture, Honshu, Japan. After observing oviposition, I collected this female and kept it alive in a container with the same live plant species, and it laid 24 eggs on three leaves under the rearing conditions from May 29 to 30. The eggs were individually inserted in the tissue of the leaf from the upper surface (Fig. 2A). All the eggs hatched between June 4 and 6, and the hatched larvae came out from the undersurface of the leaf (Fig. 2B). The early to middle instar larvae fed on the leaf areas close to the edge and bored holes from the upper surface (Fig. 2G). The late instar larvae fed on the leaves from the edges (Fig. 2H). The larvae were always solitary. All larvae reached the final feeding instar from June 13 to 16 and three of them were fixed in ethanol on June 19. The remaining larvae executed extra molts and matured from June 20 to 22. One of them was fixed in ethanol on June 20 and the others went into the soil but died.

Life history. According to the collection data listed above and the literature (Naito *et al.*, 2004), adults were collected only from late May to June in the mountainous areas of Honshu, Japan. Therefore, this species is probably univoltine as in other *Tenthredo* species (e.g., Shinohara and Ibuki, 2019; Shinohara *et al.*, 2019).

Remarks. This is the third record of *Angelica* as a host plant of Japanese *Tenthredo*. Other two species of *Tenthredo* associated with *Angelica* in Japan are *Tenthredo fagi* Panzer, 1798 and *T. providens* Smith, 1874 (Okutani, 1967). The larvae of *T. fagi* and *T. providens* may be distin-

guished from that of *T. adusta adusta* by the presence of dark colored area on the vertex in the feeding instars (Lorenz and Kraus, 1957; Okutani, 1959).

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