

Onycholyda decorata (Insecta, Hymenoptera, Pamphiliidae),
a Leaf-rolling Sawfly Feeding on *Agrimonia pilosa*
var. *japonica*, Found in Central Tokyo

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Abstract *Agrimonia pilosa* Ledeb. var. *japonica* (Miq.) Nakai is newly recorded as a host plant of a leaf-rolling sawfly, *Onycholyda decorata* Shinohara, 1985, based on the observation made in the garden of the Institute for Nature Study, Tokyo, in 2006. The host plant and immature stages of *O. decorata* were unknown and this is the first record of *Agrimonia* for the host plant of pamphiliid sawflies. Brief notes are given for the life cycle, eggs, larvae, and larval leaf-rolls. No collection data of pamphiliid sawflies were available in central Tokyo in the last 67 years.

Key words: Hymenoptera, Pamphiliidae, *Onycholyda decorata*, immature stages, host plant, *Agrimonia pilosa* var. *japonica*, central Tokyo.

Onycholyda decorata Shinohara, 1985, is an uncommon species of leaf-rolling sawfly known to occur in Honshu and Hokkaido. Most of the specimens available are from the lowlands and lower mountains in Honshu, but the species has not been recorded from central Tokyo. The host plant and immature stages were unknown. I was recently able to find this species in the garden of the Institute for Nature Study in central Tokyo and confirmed its host plant and observed its immature stages. In the following lines, I will report on this discovery. The host plant is *Agrimonia pilosa* Ledeb. var. *japonica* (Miq.) Nakai (Rosaceae); this is the first record of *Agrimonia* for the host of pamphiliid sawflies. The occurrence of *O. decorata* in central Tokyo is noteworthy, because no collection data of pamphiliid sawflies were available in this region in the last 67 years.

I wish to thank M. Yano and N. Hisai, Institute for Nature Study, National Science Museum, Tokyo, for their help in various ways. The present work was supported in part by a Grant-in-aid for Scientific Research No. 15570093 from the Ministry of Education, Culture, Sports, Science

and Technology, Japan.

Observations

In the garden of the Institute for Nature Study, Tokyo (139°43'11"E, 35°38'17"N), *Agrimonia pilosa* var. *japonica* is common in the open places along the road. Adults, eggs and young larvae of *O. decorata* were found on May 15 and 20, 2006. I was able to collect 10 females and one male on May 15 and two females on May 20. On the latter day, I saw a female on the under surface of a leaf of *Agrimonia pilosa* var. *japonica* nearly finishing oviposition by its characteristic brushing behavior (Hara, 1993; Vikberg, 2002). On June 13, numerous leaf-rolls or abodes were found on the host plants. Most of the abodes examined still contained middle to late instar larvae, but some abodes were already empty, suggesting that the larvae had already matured and left the abodes.

The eggs were found only on the leaves near the apex of each branch in the upper part of the plant. They were always on the under surface of the leaf close to the branching point of the veins

(Fig. 1 A, B, D). Of the 100 leaves with the eggs examined, 72 leaves had only one egg each (Fig. 1 A, B), 17 had two eggs and 11 had three eggs. Even in the cases where two or three eggs were found on one leaf, the eggs were separated, not in a group, probably laid by different females or on different occasions. The egg is cylindrical with rounded ends, about 1.9×0.75 mm, ivory, and covered with glutinous coat (Fig. 1D).

Only one larva was found in each of the leaf-rolls in all cases. The abode of a young or a middle instar larva was a simple roll, always on the under surface of the leaf (Fig. 1 A, B). The abode of a late instar larva was more irregular in shape, almost always involving adjacent leaves (Fig. 1 C, G). The original leaf, often largely or entirely consumed, and other leaves nearby were tightly connected together by silk (Fig. 1 C, G, H). Large amount of frass was kept in the abode (Fig. 1 F).

The late instar larva is characterized as follows (terminology generally follows Viitasaari, 2002): Length about 20 mm when extended; head capsule black (Fig. 1 E); antenna creamy white, partly blackish brown; labrum pale brown, darkened medially; mandible brown, becoming blackish at apex. Trunk olive green; prothoracic shield olive green, slightly darker than surrounding parts; lateral shield concolorous with trunk; cervical sclerite black; thoracic legs all pale green; subanal appendage creamy white.

Discussion

Life Cycle, Larval Abode, and Host Plant of O. decorata

On May 15, females and eggs were found together with very few males and young larvae, and on May 20, no males were found. On June 13, most abodes contained middle or late instar larvae but some abodes were already empty. This observation suggests that *O. decorata* has the following life cycle in Tokyo: male adults appear mainly in the end of April and early May and female adults are active and oviposit on the host plant *Agrimonia pilosa* var. *japonica* mainly in

early to middle May; larval feeding period is from middle May to middle or late June. Considering the collection data of the adult specimens from various localities at hand, this species is most probably univoltine as in other pamphiliid species.

The female usually lays one egg per leaf. Two or three eggs were found on 28 out of 100 leaves examined, but this is probably due to unusually high density of individuals in the Institute for Nature Study in 2006 (see below).

The abode of early to middle instar larva is a simple leaf-roll, whereas it is modified into an irregularly shaped abode involving adjacent leaves as the larva grows. This is more or less similar to the larval leaf-rolling habit of *O. lucida* (Rohwer, 1910) and *O. viriditibialis* (Takeuchi, 1930), both Japanese species feeding on *Rubus* (see Okutani & Fujita, 1955, 1956) and a Eurosiberian species, *O. sertata* (Konow, 1903), which is closely allied to *O. decorata* (see Shinohara, 1985) (Kangas & Syrjänen, 1962; Vikberg, 2002). Keeping the frass in the abode is conspicuous in *O. decorata*. A similar behavior is reported also for *O. sertata* (see Vikberg, 2002), and the gregarious nest of the late instar larvae of *O. viriditibialis* also seems to contain much frass (Okutani & Fujita, 1956, figs. 4–5).

So far as is known, sawflies of the genus *Onycholyda* feed mainly on the shrubby or herbaceous Rosaceae. Of the 10 species of *Onycholyda* for which hosts are known, seven species feed on *Rubus*, two species on *Filipendula*, and one species on *Cornus* (Shinohara, 2002). *Onycholyda decorata* is the first species of the genus known to feed on *Agrimonia*. There is no other species of the Pamphiliidae associated with this plant genus and only three species of two other sawfly families are known to feed on *Agrimonia*. They are two tenthredinids, *Fenella nigrita* Westwood, 1839, a leaf-miner, and *Macrophya rufipes* (Linnaeus, 1758), an external leaf-feeder, and a cephid, *Hartigia linearis* (Schrank, 1781), a stem-borer (Taeger *et al.*, 1998). The larvae of *O. decorata* are solitary leaf-rollers and thus immediately distinguished from the other known

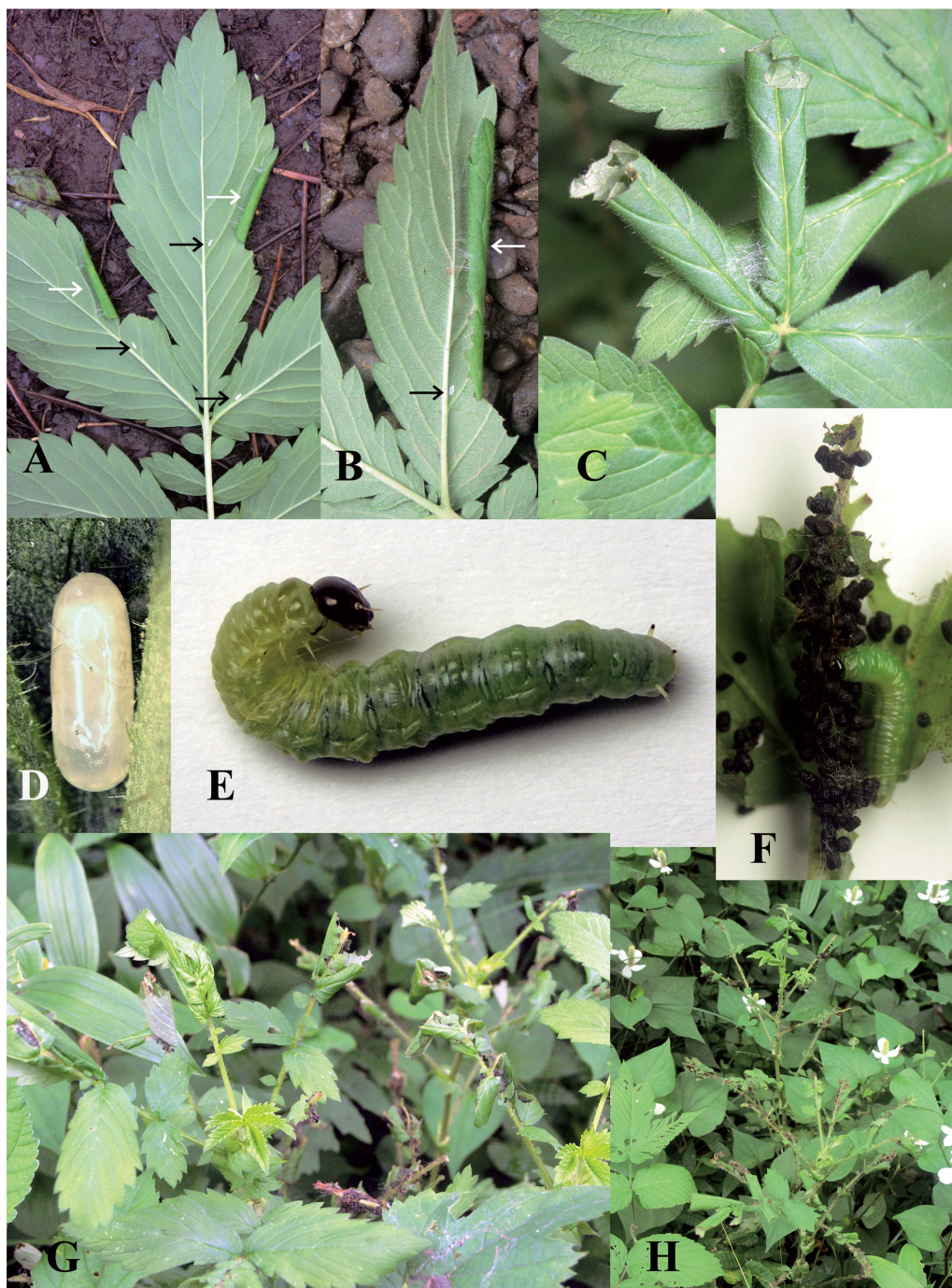


Fig. 1. *Onycholyda decorata* Shinohara, immature stages and larval abodes, photographed on May 20 (A–B, D) and June 13 (C, E–H), 2006. —A, Two larval leaf-rolls of young larvae (white arrows) and two egg shells (upper black arrows) and one unhatched egg (lower black arrow) on *Agrimonia pilosa* var. *japonica*; B, larval leaf-roll of middle instar larva (white arrow) and egg shell (black arrow); C, two larval leaf-rolls of late instar larvae; D, egg; E, late instar larva; F, inside of larval abode (leaf-roll), showing late instar larva and frass; G–H, heavily infested host plants, with many late instar larval abodes.

sawfly larvae feeding on *Agrimonia*.

Occurrence of O. decorata in the Institute for Nature Study in Central Tokyo

The 23 special-ward area of Tokyo, or simply called “central Tokyo” in this paper, is mostly an urban area, but it has some large green areas, parks or gardens. Shinohara (2000, 2001, 2005) studied sawfly fauna of three comparatively well-preserved green areas, the Imperial Palace, Akasaka Imperial Gardens, and the Institute for Nature Study, where he found seven of the eleven sawfly families known in Japan. The Pamphiliidae were not found then, and the present discovery of a pamphiliid, *O. decorata*, in the Institute for Nature Study was therefore quite unexpected.

Collection records of the pamphiliid sawflies in central Tokyo are very few. Matsumura (1912), Takeuchi (1923, 1930, 1955), Yano & Sato (1928), and Shinohara (1997) noted “Tokyo” for the distribution of some pamphiliid species, but detailed localities were not given. Takeuchi (1938) recorded *Neurotoma iridescens* (André, 1882) (under the name of *N. flaviventris*) from Meguro [in Meguro ward] (1♂, 23. IV. 1924, T. Kano) and Shinohara (1980) examined three specimens of the same species from Meguro (1♀, 22. IV. 1916, M. Yano; 1♀, V. 1920) and Totsuka [in Shinjuku ward] (1♀, 24. IV. 1938, S. Asahina). Shinohara (1997) listed a male specimen of *Acantholyda nipponica* (Yano & Sato, 1928) labeled “Meguro, 1917. V. 2”. Besides these published records, I have examined the following specimens from central Tokyo (all kept in the National Science Museum, Tokyo).

Onycholyda lucida (Rohwer, 1910): 1♂, Meguro, 25. IV. 1916, K. Sato; 1♀, Meguro, 23. IV. 1919, K. Sato.

Onycholyda minomalis (Takeuchi, 1930): 1♀, Meguro, 24. IV. 1919, K. Sato.

Pamphilius volatilis (Smith, 1874): 1♀1♂, Meguro, 22. IV. 1916; 1♀, Meguro, 25. IV. 1916; 1♀, Meguro, 2. V. 1917; 1♀, Meguro, 16. IV. 1925, M. Yano; 1♂, Nishigahara [in Kita ward], feeding on cherry tree No. 2; 1♀, Totsuka, 2. V.

1939, S. Asahina.

It should be noted that all those specimens were collected during the period of 1916 to 1939 (one specimen without collection date). Even the newest specimen of these was obtained 67 years before the present discovery of *O. decorata*.

In 1999–2000, when the sampling of sawflies was made in the Institute for Nature Study (Shinohara, 2001), *O. decorata* doubtless occurred there but somehow escaped the collectors’s eyes. It is known that the population density greatly fluctuates in some sawflies (e.g., Larsson *et al.*, 1993), including certain Pamphiliidae (e.g., Shinohara & Hara, 1991; Shinohara, 1997). Probably, *O. decorata* was very scarce in the Institute for Nature Study at least in 1999–2000 but the population has apparently reached an outbreak proportion in 2006. *Onycholyda decorata* may also occur in other areas in central Tokyo, where host plant grows, but large urban areas surrounding the Institute for Nature Study apparently lack *Agrimonia*. There was considerable reduction of vegetated areas in central Tokyo associated with the rapid urbanization in the latter half of the last century, and many phytophagous insects accordingly lost their habitat. The survival of *O. decorata* in the Institute for Nature Study is fortunate, but the population of this sawfly in the garden should be small and isolated and thus instable and vulnerable.

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