



## An Encounter with *Diprion similis*

by Marion Bryce

A jam jar full of striking-looking caterpillars delivered to my desk in mid August would not develop into the nice butterflies which my friend was loath to kill. A sawfly species was indicated simply by counting the number of prolegs – 7 pairs.

The sawflies belong to a sub-order of the Hymenoptera, the Symphyta. Worldwide, there are about 8,200 sawfly species. Britain has nearly 500 species. The name sawfly is derived from the ovipositor which is flattened and serrated like a saw blade, used to slice into a plant to lay the eggs. In other hymenoptera the ovipositor resembles a hypodermic needle. Confusingly, the name sawfly may also be used to refer specifically to members of the family Tenthredinidae.

Sawflies are considered to be the most primitive of the hymenoptera, with fossil evidence dating from the early Triassic, 200 million years ago. Sawflies occur in arctic, subarctic, northern temperate and humid subtropical regions. One eighth of the species live in temperate climates.

The adults are typical hymenoptera with two pairs of wings, biting and chewing mouthparts and a complete life cycle; egg, larva, pupa and adult. Sawflies are distinguishable from most other Hymenoptera by the broad connection between the abdomen and the thorax and by their caterpillar-like larvae. The majority of sawfly larvae are external plant feeders, so the larvae are as visible as the adults (in most Hymenoptera the larvae are hidden from view). Sawfly larvae differ from the legless larvae of most hymenopteran families, although there are a few sawfly larvae which are slug-like external feeders. Most sawfly larvae look like butterfly or moth caterpillars but those of sawflies have 5-7 pairs of 'false' or 'pro-legs' on the abdomen whereas caterpillars have 4 or fewer pairs of pro-legs on the abdomen, in addition to the 3 pairs of 'true' legs on the thorax.

Adult sawflies feed principally on nectar. They are short lived, living long enough to mate, lay eggs and die. Most often there is one generation a year. After feeding, most sawfly larvae fall to the ground, pupate in silken cocoons in the soil and over-winter in the pre-pupal stage. *Diprion similis* is one of the few species which attach their eggs to the vegetation instead of pupating in the soil. Most of the stem borers pupate and over-winter within the stems they inhabit.

The pine sawflies *Diprion pini* and *Diprion similis* are the only two European species of a genus, containing nine Eurasian species and occur in the coniferous forests of the Northern Hemisphere.

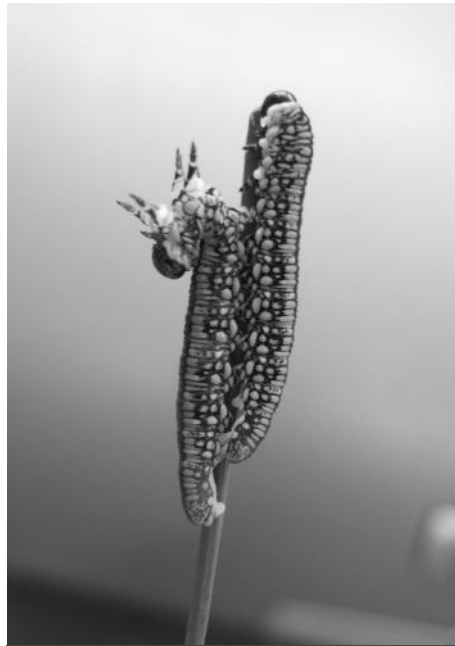
*Diprion* sawflies are medium-sized pudgy, seemingly overweight little wasps, broad-bodied, about 12mm in length, with antennae which are serrated in the females and feathery-pectinate in the males. The female is pale with black markings whereas the male is darker. Wings are diaphanous with the venation well developed and there are three or more closed basal cells on the hind wing. The fore tibiae have two more or less equal-sized apical spurs. There are no spurs on the hind tibiae. The ovipositor of the female does not visibly protrude.

The adults of *Diprion similis* and *Diprion pini* are very similar and externally possess almost no distinct morphological characteristics. Under the microscope they may be separated by the differences in shape and uniformity of the teeth on the ovipositor saw. However, there are distinct differences in the immature forms. The larvae of *D pini* are plain pale green whereas the larvae of *D similis* are marbled yellow-green with black stripes down the back and yellow and white spots on the sides.

The conifer sawflies are exclusively externally feeding. They begin life as gregarious feeders with many tiny larvae

feeding on needles of the terminal branches of their host. They are so well disguised they are scarcely ever noticed until much damage has been done. Eventually they disperse, but not before reducing the terminal stem to a naked stalk. This feeding can stunt growth or even kill the tree, especially if they are young or not well established. Among the most damaging of external plant feeders conifer sawflies take first prize. They are considered enemies of the forest and if you ever had them in your garden you would know why. Conifer sawflies are destructive in forest ecosystems, Christmas tree farms, tree nurseries and gardens. *Diprion similis* is not implicated in the most problematic outbreaks, due to natural biological control.

I took the remaining caterpillars off their exotic diet of Himalayan pine and fed them on Scot's pine. As fibrous conical brown cocoons appeared it became a waiting game. I watched them carefully. I have been caught before by the fast development of hymenoptera. Within one week an adult hymenopteran emerged. Knowing that hymenoptera are notoriously difficult to identify I sent photographs to the Forestry Commission who might have a



*Diprion similis*  
larvae from Chilwell, Notts.  
August 2010



vested interest in the find. They kindly forwarded the photographs to Christine Tilbury who wrote.

*'The larval photographs show the pine sawfly *Diprion similis*. This species is much less commonly encountered than the 'large pine sawfly' *Diprion pini*. There are two generations a year, with larvae feeding in June and then in August/September. They spend the winter in cocoons spun in the host tree or adjacent plants. When present in numbers, larval damage can be significant in Christmas tree plantations or on ornamental pines. In forestry conditions outbreaks usually collapse due to a virus disease or by the action of parasitic wasps. Interestingly your adult photo's show parasitic wasps not adult sawflies.'*

So I still hadn't seen the sawfly. This also explained the strange behaviour of the larvae. Many had just died (I thought that might have been due to the change in diet or care wanting). Others had just wandered to the very tip of the branch and frozen (some people call it a threat posture) and recalling the sad case of my lime hawk moth caterpillar I should have known what the problem was. The rate of development of parasitic hymenoptera is truly astounding.

Once again I played the waiting game and finally in mid September, a few adult sawflies emerged. Many of the cocoons remained and I guess they were intending to over-winter. I had been advised not to release this potential pest species so they were humanely despatched.

I now know it has provisional Red Data Book 3 status. I don't know what that means with regard to how we should treat this sawfly which could have been the harlequin ladybird of the sawfly world. Guy Knight writes:

*'I only have about a dozen records of this species in the national recording scheme. Although this is representative of it being very uncommon I wouldn't be surprised if it is significantly more widespread than this*



*Diprion similis*  
Cocoons, most vacated and showing open lid-like structures & one adult



*Diprion similis*

*though. Most of the records are from southern England, particularly from pines on heathland, but it has also been found at Abbots Moss in Cheshire and Borth in mid Wales. There is also a vague pretty ancient one for Sutherland and a mention of a recent Scottish record which I don't have the details of. Nothing at all for the Nottinghamshire part of the East Midlands, though.'*

Undesirable as conifer sawflies appear to be they do provide some benefits to the ecosystem. Birds and mice can dine on over-wintering pupae at a time when protein is scarce. Some gardeners may not see the benefits of mice but they are considered one of the main biological agents controlling conifer sawflies. Also mice can form part of the food chain for other animals such as snakes and larger mammals. Conifer sawflies also serve as hosts for innumerable parasitic wasps and flies as well as fungi.

Finally, John, here is the advice you sought in August. If control is required in the garden, hand picking is recommended, or a strong water jet can be used to dislodge the larvae.

#### References:

Book: **Bees, Wasps, and Ants**  
by Eric Grissell

Website:  
**[www.dcnr.state.pa.us/forestry/leaflets/intosawfly.htm](http://www.dcnr.state.pa.us/forestry/leaflets/intosawfly.htm)**

The photographs are by the author