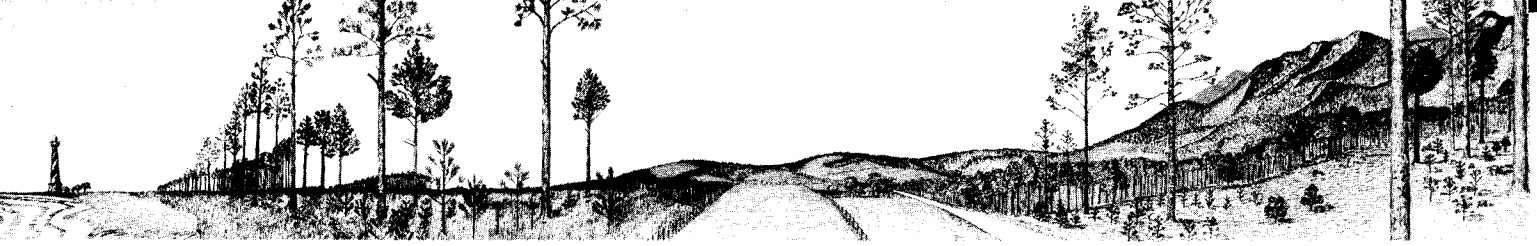

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THE INTRODUCED PINE SAWFLY,[1] A DEFOLIATOR OF WHITE PINE NEW TO NORTH CAROLINA

by A. T. Drooz, C. A. Doggett, and H. C. Coppel[2]

Abstract.–The introduced pine sawfly, *Diprion similis* (Hartig), was reported in North Carolina for the first time in 1978. The initial finding was of the cocoon stage in the autumn of 1977 at Linville Falls. It is a European species that defoliates eastern white pine in this country and is capable of damaging hard pines. A brief account of its description, hosts, life history, survey, and control is included.

KEYWORDS: *Diprion similis*, introduced pine sawfly, defoliator of eastern white pine.

The introduced pine sawfly, *Diprion similis* (Hartig), was found in North Carolina for the first time in the Linville Falls area of Avery County by Coleman Doggett in September 1977 (Doggett 1978). At that time cocoons occurred on Fraser fir, *Abies fraseri* (Pursh) Poir., which is not a host. The preferred host, eastern white pine, *Pinus strobus* L., was nearby. In October 1978, sawflies were reported also in Caldwell, Burke, and Jackson Counties.

The first adult sawflies emerged from cocoons in the spring of 1978 and were identified tentatively by A. T. Drooz as *D. similis*. Sawfly specialist D. R. Smith, USDA Systematic Entomology Laboratory, confirmed the identification.

Although new to North Carolina, this pine sawfly from Europe and Siberia has been known in the United States since its discovery in Connecticut in 1914 (Britton 1915). Wilson (1966) reported the U.S. distribution to be from the New England States to Minnesota and south to Virginia. The report of its presence in Virginia is incorrect. Cocoons sent from New Haven, Connecticut, to a laboratory in Falls Church, Virginia, were erroneously labeled with that location.[3] Southern Pennsylvania was the previous nearest known locality to North Carolina (Coppel and others 1974).

The introduced pine sawfly has been reported to attack and develop upon a number of species of *Pinus*, especially eastern white pine, *P. strobus*, but also with decreasing frequency, Scotch pine, *P. sylvestris* L., jack pine, *P. banksiana* Lamb., and red pine, *P. resinosa* Ait., among others (Coppel and others 1974). Its success on the various species of southern pines remains to be learned.

In the North, this sawfly has two generations per year. When weather is favorable, a partial third generation may be produced. In the mountains of western North Carolina, conditions are favorable for three complete generations.

Defoliation by the introduced pine sawfly can result in the death of white pine, but extensive mortality has not resulted from defoliation in the North (fig. 1). However, the value of Christmas tree plantings is reduced even by light defoliation.

Eggs are laid in pine needles and covered with a frothy green material (fig. 2). Cuts made by the ovipositor cause needles to curve and possibly die. Mature

[1] *Diprion similis* (Hartig) (Hymenoptera: Diprionidae).

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[3] Smith, D. R. October 26, 1978. Personal communication.

Figure 1.–Eastern white pine heavily defoliated by the introduced pine sawfly. (Photo courtesy of H. C. Coppel.)

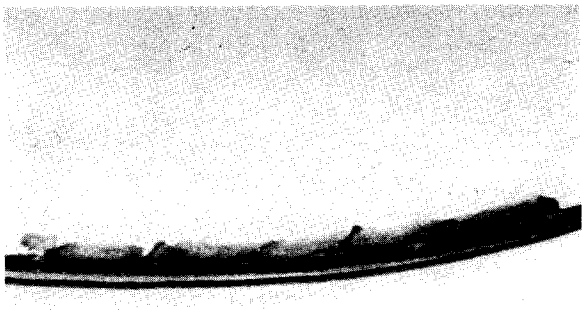

Figure 2.–Eggs of the introduced pine sawfly are cut into the needle in rows and covered with a frothy green material.

feeding larvae are about 25 mm (1 in.) long and appear marbled white, yellow, and black with a jet-black head (fig. 3). Ultimate-stage larvae which do not feed are lighter in color, shorter, and have gray head capsules (fig. 4). This is the stage of the sawfly that constructs cocoons. The leathery-brown cocoons are fastened to twigs, needles, and bark of host and nonhost trees (fig. 5a). They may even be found on grass, weeds, and shrubs (fig. 5b). Because it forms its cocoons on a variety of substrates, the introduced pine sawfly is a potentially destructive "hitchhiker" into new areas. The adult female is a stout yellow and black sawfly with serrate antennae (fig. 6). Males are smaller, mostly black, and have feathery antennae (fig. 6).

Virgin females produce a powerful chemical (pheromone) which attracts the males (fig. 7). These females can be caged to attract males, or pheromone can be extracted from the females and used in traps to determine presence of adult males. Pheromone-trap surveys can delimit the distribution of the sawfly accurately even where populations are low (Coppel and others 1974).

Twenty-five to 40 years ago Canadian entomologists liberated a number of species of parasitic insects which attacked the introduced pine sawfly with beneficial results (Munroe 1971). These insect parasites have since migrated to northern states where they play a role in the biological control of the sawfly. Two notable hymenopterous parasites originating from Europe are the solitary ichneumon-wasp, *Exenterus amictorius* (Panzer), which attacks pre-spinning larvae and the gregarious torymid, *Monodontomerus dentipes* (Dalman), which attacks cocoons and destroys their contents. If not already present, attempts to introduce these parasites in North Carolina should be made. Numerous other

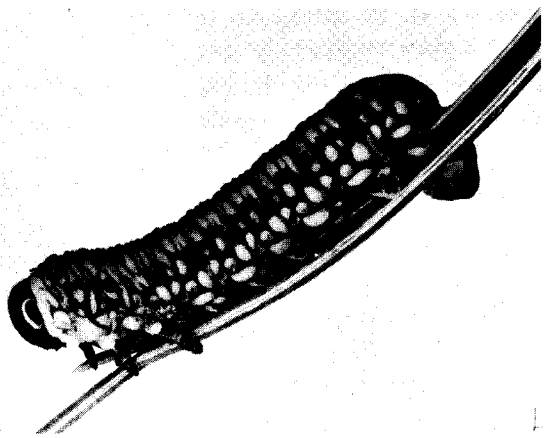

Figure 3.–Final feeding-stage larva of the introduced pine sawfly has a black head and a darker body than the next stage, which spins the cocoon.

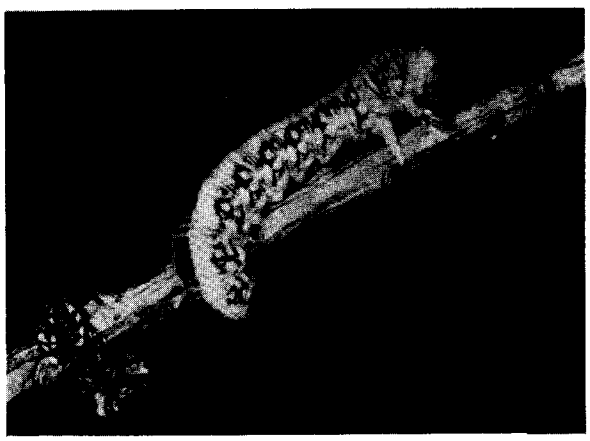

Figure 4.–The ultimate-stage larva has a gray head and lighter colored body than the final feeding-stage larva. The insect spins its cocoon in this stage.

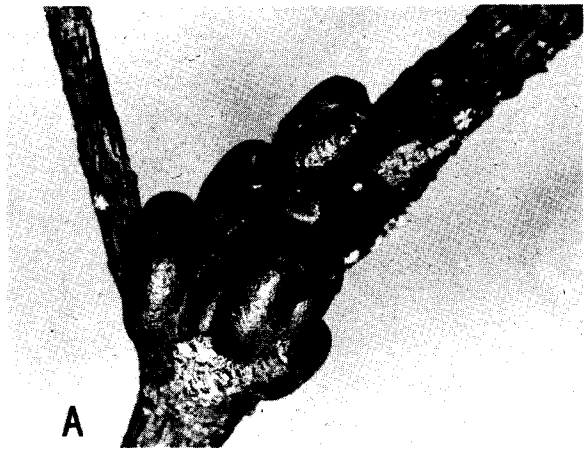

Figure 5.–Cocoons of the introduced pine sawfly are tough and brown. They are spun on (A) host pines or (B) non-host species such as grasses. (Photos courtesy of H. C. Coppel.)

Figure 6.–A mating pair of introduced pine sawflies. The female is stout and has serrate antennae. The male is smaller and has feathery antennae.

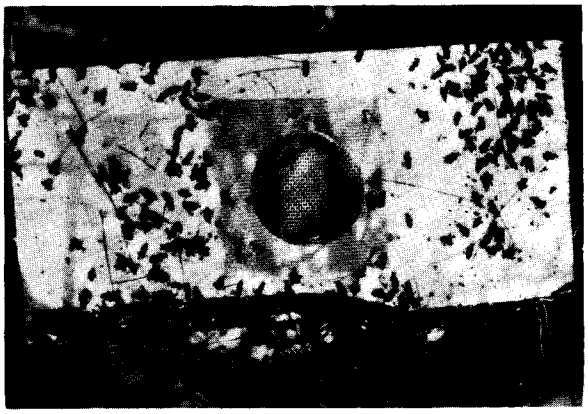

Figure 7.–Males attracted to a sticky trap baited with a virgin female introduced pine sawfly. This simple device is a good survey tool.

insects prey on or parasitize the introduced pine sawfly to some extent (Coppel and others 1974). Liberation of these parasites in North Carolina might reduce damage by the sawfly.

Chemical insecticides can be effective on individual trees and small plantings. State or federal entomologists, district foresters, or county agents should be consulted for the currently recommended insecticides.

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