

Home and Horticultural PESTS

European Pine Sawfly

When inspecting plantings in early spring, homeowners may be dismayed to find pines that have been stripped of needles (Figure 1). Such early season needle loss can be attributed to European pine sawfly larvae feeding. While homeowners may be confronted with spindly looking plantings, damaged stock represents an economic loss for nurseries and Christmas tree growers. Trees intended for sale later in the year may not be marketable because of their sparse appearance.



Figure 1

Although similar to caterpillars in appearance, European pine sawfly can be distinguished by a pair of fleshy prolegs on all abdominal body segments (Figure 2, top). True caterpillars, which are the immature stages of butterflies and moths, (Figure 2, bottom) do not have prolegs on all abdominal segments and belong to the taxonomic order Lepidoptera. Likewise, adult sawflies are not true flies in the order Diptera, but are classified as a nonstinging wasp

in the order Hymenoptera. The name “sawflies” is based on their fly-like appearance, and specifically, the saw-like ovipositor used for slitting pine needles into which females insert their eggs.



Figure 2

Developmental Stages and Seasonal Life History

Eggs

Eggs are inserted into pine needles in the fall and overwinter hidden from view (Figure 3, top). Needle tissue can be stripped away to reveal elongated, cream-to-pinkish eggs (Figure 3, bottom).

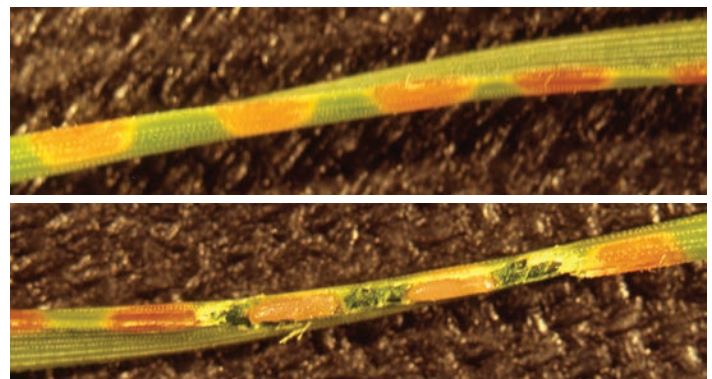


Figure 3

Larvae

In the spring, embryos develop as temperatures warm. Eggs swell (Figure 4A) and darken, with larvae becoming visible through the egg shell/chorion (Figure 4B). This is known as the blackhead stage. Shells burst in a day or so, leaving them empty (Figure 4C) with the 1 mm larva close by (Figure 4D).

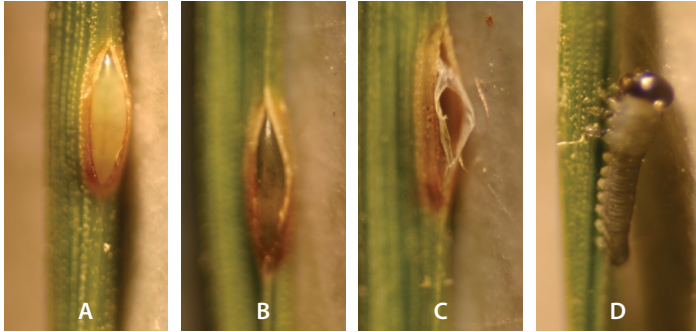


Figure 4

Eggs hatch the first or second week of April. Emerging larvae are nondescript and dingy with shiny black heads (Figure 5).



Figure 5

They develop grayish green bodies with a longitudinal dorsal stripe and two distinct green-to-black lateral stripes on each side. Larvae molt, shedding the outer layer of skin as they grow. Head capsules are light in color after each molt but darken to shiny black (Figure 6).



Figure 6

Cocoons

After a final molt, larvae feed briefly. By mid-May, they begin to spin silken cocoons — sometimes on the host tree (Figure 7, left) but typically on the ground where they wrap themselves in ground debris, which includes fecal pellets (Figure 7, right).



Figure 7

Cocoons appear light at first and darken to a golden brown. Inside, larvae enter a resting stage to escape summer heat. This is known as aestivation. When cooler temperatures return at the end of the summer, larvae transform into the pupal stage. Adults emerge in fall with activity peaking during the first or second week of October (Figure 8).



Figure 8

Adults

European pine sawfly adults are dimorphic, meaning they vary in appearance. Males are slightly smaller and black with a large feathery antennae (Figure 9).



Figure 9

The male waves his antennae, equipped with numerous olfactory receptors (Figure 10, left), to pick up the pheromone scent released by the female (Figure 10, right). After mating, the female selects a needle into which she deposits eggs that will overwinter (Figure 11).



Figure 10



Figure 11

Damage

European pine sawfly larvae feed on needles produced in previous years. Newly emerged larvae cluster and nibble on tender portions of needles (Figure 12, top), bypassing “tough” mid-veins, which become desiccated, browned, and twisted. Feeding damage makes it easy to detect small larvae (Figure 12, bottom and insert) from a distance.



Figure 12

Larvae develop rapidly and are soon capable of consuming entire needles. In less than a month, feeding can dramatically alter a tree's appearance (Figure 13, left, March 17; right, April 15).



Figure 13

Despite this defoliation, the tree survives to begin producing new needles by the end of April (Figure 14, left-top). Growth accelerates and needle loss is overcome by mid-May (Figure 14, left bottom). With sawfly larvae resting in their cocoons, new needles are left untouched. By late October, enough needles have been produced during the growing season to give the pine a fluffy, but not full, appearance (Figure 14, right). New needles offer egg-laying sites and should be monitored carefully, destroying eggs so they do not overwinter and repeat the cycle. It usually takes a couple of years for the pine's appearance to be restored.



Figure 14

Control Recommendations

European pine sawfly damage can be prevented with proper management. On a nice winter day, inspect needles for eggs that appear as series of small, rust-colored dots. Once located, use twist-ties to mark the needle clusters

(Figure 15, top). Check sites regularly and be ready to eliminate larvae before they become large enough to destroy needles (Figure 15, bottom). This is fairly easy with horticultural oils, horticultural soaps, and other insecticides registered for use against the European pine sawfly.



Figure 15

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