

# Pine Sawflies, *Neodiprion* spp. (Insecta: Hymenoptera: Diprionidae)<sup>1</sup>

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## Introduction

Pine sawfly larvae, *Neodiprion* spp., are the most common defoliating insects of pine trees, *Pinus* spp., in Florida. Sawfly infestations can cause growth loss and mortality, especially when followed by secondary attack by bark and wood-boring beetles (Coleoptera: Buprestidae, Cerambycidae, Scolytidae). Trees of all ages are susceptible to sawfly defoliation (Barnard and Dixon 1983; Coppel and Benjamin 1965).

## Distribution

*Neodiprion* spp. are indigenous to Florida. Host tree specificity and location will bear on sawfly distribution statewide.

## Description

Six species are covered here so there is some variation in appearance. However, an *adult female* has a length of 8 to 10 mm, with narrow antennae on the head and a stout and thick-waisted body. This is unlike most Hymenopteran insects which have the thinner, wasp-like waist. The

background color varies from light to dark brown, with yellow-red-white markings common. The two pairs of wings are clear to light brown with prominent veins.



Figure 1. Larvae of the blackheaded pine sawfly, *Neodiprion excitans* Rohwer, on *Pinus* sp.

Credits: Arnold T. Drooz, USDA Forest Service; [www.forestryimages.org](http://www.forestryimages.org)

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## Adult

The adult male has a length of 5 to 7 mm. The male has broad, feathery antennae on the head with a slender, thick-waisted body. It generally has brown to black color wings, similar to the female.

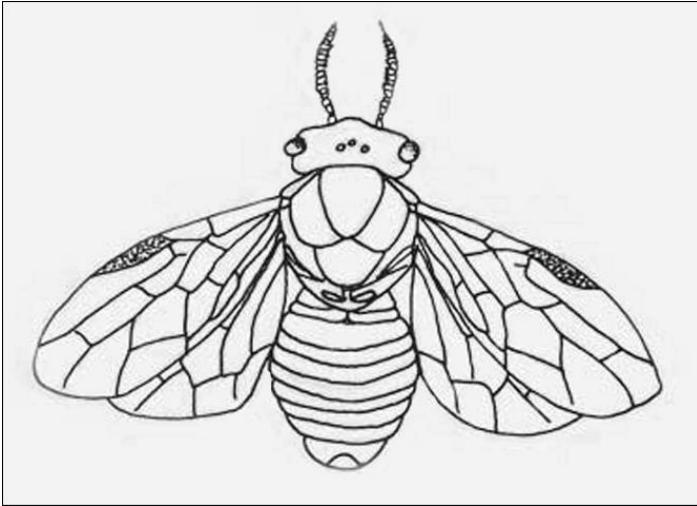


Figure 2. Adult female *Neodiprion* sp.

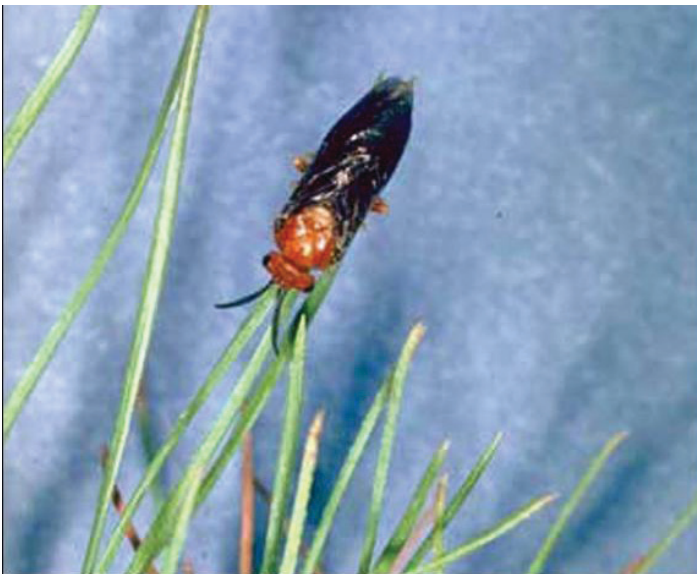


Figure 3. Adult female redheaded pine sawfly, *Neodiprion lecontei* (Fitch).

Credits: Lacy L. Hyche, Auburn University, [www.forestryimages.org](http://www.forestryimages.org)

## Egg

The egg is small (0.5 mm wide x 1.8 mm long), green-yellow-white color and ovoid.

## Larva

The length of the mature larva is 18 to 25 mm with variable coloration (see Table 1).



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Figure 4. Adult male slash pine sawfly, *Neodiprion merkei* Ross.

Credits: G. Keith Douce, University of Georgia, [www.forestryimages.org](http://www.forestryimages.org)



Figure 5. Adults of the blackheaded pine sawfly, *Neodiprion excitans* Rohwer.

Credits: Gerald J. Lenhard, Louisiana State University, [www.forestryimages.org](http://www.forestryimages.org)

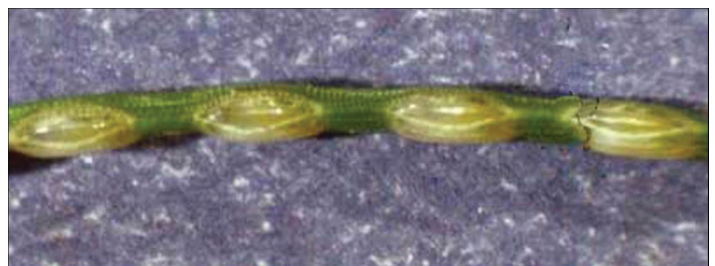


Figure 6. Eggs of the redheaded pine sawfly, *Neodiprion lecontei* (Fitch), in pine needle.

Credits: Lacy L. Hyche, Auburn University, [www.forestryimages.org](http://www.forestryimages.org)

## Pupa

The pupa length is similar to that of the adult. The cocoon is light brown to dark reddish-brown, papery, and 3.5 to 6.0 mm wide x 7.1 to 10.0 mm long (Coppel and Benjamin 1965; Thatcher 1971; Wilkinson 1965).



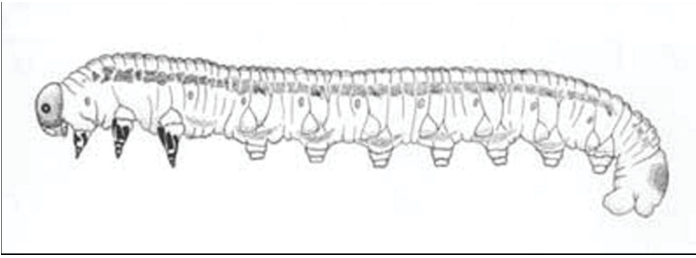


Figure 7. Virginia pine sawfly larva.  
Credits: Georgia Forestry Commission

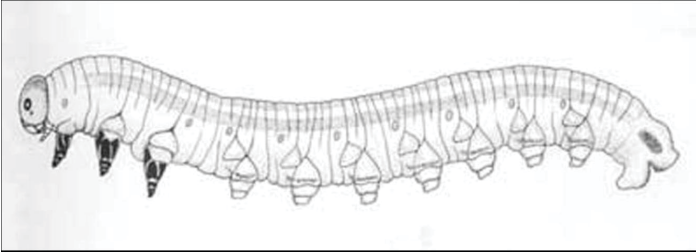


Figure 8. Slash pine sawfly larva.



Figure 9. Larvae of the redheaded pine sawfly, *Neodiprion lecontei* (Fitch).  
Credits: Ronald F. Billings, Texas Forest Service, [www.forestryimages.org](http://www.forestryimages.org)

## Biology

Mature sawfly larvae spin cocoons in the duff or pine litter, mineral soil, or under bark scales. Adult sawflies emerge by removing a cap at one end of cocoon. After mating, female sawflies lay eggs in slits sawed in pine needles. Small larvae feed on outer needle tissues; larger larvae consume entire needles. Most species prefer older foliage, but all foliage is susceptible at the end of the growing season. Larval colonies may migrate from one tree to another, especially upon complete defoliation of the host tree or high feeding competition. The number of sawfly generations (one to four) varies from year to year and according to species. Larvae may diapause (a survival behavior for adverse conditions) for more than one year (Coppel and Benjamin 1965; Wilkinson 1980).



Figure 10. Larvae of the blackheaded pine sawfly, *Neodiprion excitans* Rohwer.  
Credits: Ronald F. Billings, Texas Forest Service, [www.forestryimages.org](http://www.forestryimages.org)



Figure 11. Cocoon of the redheaded pine sawfly, *Neodiprion lecontei* (Fitch), on branch.  
Credits: Jana Albers, Minnesota Department of Natural Resources, [www.forestryimages.org](http://www.forestryimages.org)

## Hosts

All southern pines, *Pinus* spp., are susceptible to sawfly infestation.



Figure 12. Adult of a dipteran parasitoid of the redheaded pine sawfly, *Neodiprion lecontei* (Fitch), emerging from a cocoon.  
Credits: Arnold T. Drooz, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org).



Figure 13. Cocoons of the blackheaded pine sawfly, *Neodiprion excitans* Rohwer, in bark crevices on truck.  
Credits: Arnold T. Drooz, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)

## Survey and Detection

Early damage is evidenced by reddish-brown straw like remains of needles that are incompletely consumed by young larvae; older larvae leave only short stubs. Partially defoliated branches often have a “bottle brush” appearance. Sawfly colonies may consist of a few to over a hundred individuals. Upon disturbance, larvae may drop from branches or assume a U-bend by raising head and abdomen. An oral exudate, which can paralyze insect parasitoids and repel predators, often accompanies such displays (Barnard and Dixon 1983; Coppel and Benjamin 1965).



Figure 14. Cocoons of the blackheaded pine sawfly, *Neodiprion excitans* Rohwer. Adults have emerged from pupal cases with the ends of the cases missing. Openings in the sides of cases indicate the emergence of a parasite.  
Credits: Arnold T. Drooz, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)



Figure 15. Adult female redheaded pine sawfly, *Neodiprion lecontei* (Fitch), ovipositing on pine needle.  
Credits: James McGraw, North Carolina State University, [www.forestryimages.org](http://www.forestryimages.org)

## Management

Suppression of sawfly populations by insecticides is usually successful. However, consideration should be given to conserving natural enemies (small mammals, birds, insects) through minimal insecticide use and preservation of cypress-hardwood pond stands around pine plantations. The appearance of numerous dead larvae hanging from needles, i.e., virus-infected, usually signals the collapse of a sawfly outbreak. Sawfly outbreaks are cyclical—an eight-to-10-year interval is common. A fully stocked stand and promotion of early crown closure minimizes risk of sawfly damage in pine plantations (Wilkinson 1980).





Figure 16. Oviposition damage to pine needle by the blackheaded pine sawfly, *Neodiprion excitans* Rohwer.  
Credits: Arnold T. Drooz, USDA Forest Service, [www.forestryimages.org](http://www.forestryimages.org)



Figure 17. Typical straw-like feeding damage caused by the redheaded pine sawfly, *Neodiprion lecontei* (Fitch).  
Credits: G. Keith Douce, University of Georgia, [www.forestryimages.org](http://www.forestryimages.org)



Figure 18. Straw-like feeding injury caused by young larvae of the Virginia pine sawfly, *Neodiprion pratti pratti* (Dyar).  
Credits: G. Keith Douce, University of Georgia, [www.forestryimages.org](http://www.forestryimages.org)



Figure 19. Severe pine defoliation caused by the Virginia pine sawfly, *Neodiprion pratti pratti* (Dyar).  
Credits: Caleb L. Morris, Virginia Department of Forestry, [www.forestryimages.org](http://www.forestryimages.org)



Figure 20. Frass under tree resulting from feeding by larvae of the redheaded pine sawfly, *Neodiprion lecontei* (Fitch).  
Credits: G. Keith Douce, University of Georgia, [www.forestryimages.org](http://www.forestryimages.org)

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Table 1. Description of pine sawfly larvae, *Neodiprion* spp., in Florida.

Common Name	Species	Description	Host Trees <sup>1</sup>
slash pine sawfly	<i>Neodiprion merkei</i> Ross	Two-tone head (red above, black below); yellow-green body with two faint black stripes and a large black spot on hind end of each side	slash pine
redheaded pine sawfly	<i>Neodiprion lecontei</i> Rohwer	Red head; whitish or yellowish green body with three rows of irregular black spots; large black spot on hind end of each side	longleaf pine, slash pine
blackheaded pine sawfly	<i>Neodiprion excitans</i> Rohwer	Shiny black head; olive-green body with two black stripes and row of black spots; large black spot on hind end of each side	loblolly pine, pond pine, sand pine, spruce pine
Virginia pine sawfly	<i>Neodiprion pratti</i> <i>pratti</i> (Dyar)	Black head; pale green body with two black stripes and a row of black spots on each side of the body	loblolly pine, Choctawhatchee sand pine
a pine sawfly	<i>Neodiprion virginianus</i> Ross	Black head; row of distinct, nearly square black spots on each side of the body	Ocala sand pine
spruce pine	<i>Neodiprion warreni</i> Ross	Black head; two dark stripes on each side of the body	spruce pine
Abbot's sawfly	<i>Neodiprion abbotii</i> (Leach)	Brown-black head with a white spot on the front; yellow to pale green body with two dark green stripes on each side of the body	loblolly pine, longleaf pine, shortleaf pine, slash pine
<sup>1</sup> Choctawhatchee sand pine = <i>Pinus clausa</i> var. <i>immuginata</i> D.B.Ward; loblolly pine = <i>Pinus taeda</i> L.; longleaf pine = <i>Pinus palustris</i> Mill.; Ocala sand pine = <i>Pinus clausa</i> var. <i>clausa</i> (Chapm.) Vasey; pond pine = <i>Pinus serotina</i> Michx.; shortleaf pine = <i>Pinus echinata</i> Mill.; slash pine = <i>Pinuselliottii</i> Engelm.; spruce pine = <i>Pinusglabra</i> Walt			