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Saddled Prominent

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The saddled prominent, *Heterocampa guttivitta* (Walker), defoliates hardwoods in the Northeastern United States and Southeastern Canada. Outbreaks of this native insect have occurred in the United States and Canada at intervals of approximately 10 years since they were first recorded in the early 1900's. Populations, characterized by their instability, build rapidly and without warning to outbreak proportions. These large populations cause severe defoliation for 1 to 3 years and then suddenly collapse.

In the United States, the most widespread outbreaks have been confined to the Northeast. However, smaller areas of locally severe defoliation have been observed in Michigan and Wisconsin as well. A particularly severe outbreak from 1968 to 1971 affected nearly 1.5 million acres (607,300 ha) in Maine, Massachusetts, New Hampshire,

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Figure 1—*A first instar with its horns and abdominal spikes. The interveinal feeding of the young larvae skeletonizes the undersides of the leaves.*

New York, Pennsylvania, and Vermont. Maine recorded further outbreaks in 1976–78 and in 1981—outbreaks during which the saddled prominent defoliated more than 500,000 acres (202,500 ha).

Hosts

Although saddled prominent caterpillars, or larvae, feed on the foliage of a variety of broad-leaved trees and shrubs, they favor American beech, sugar maple, yellow birch, and paper birch. As a result, large populations tend to develop in forests that have a high proportion of sugar maple and beech. Additional hosts include apple, cherry, mountain maple, oaks, poplar, and witch hazel. In fact, nearly all broad-leaved trees will be attacked if they are interspersed in a forest stand composed predominantly of the preferred hosts. Red maple, striped maple, and white ash are the exceptions; these broad-leaved trees are rarely attacked.

Description of Life Stages

The saddled prominent passes through four stages: egg, larva, pupa, and adult.

The egg is smooth, globose, and about 1 millimeter (0.04 inch) in diameter. A recently laid egg is pale green. Unless it has been parasitized, the egg becomes reddish as the developing larva becomes visible through the transparent egg shell. The red color is most pronounced just before the egg hatches. In contrast, parasitized eggs turn gray and are splotched with black.

The larval stages vary considerably in size, color, and shape. The first instar is about 5 to 6 millimeters long and reddish maroon to black. It has a pair of prominent antlerlike horns on the first thoracic segment and eight pairs of dorsal abdominal protuberances, which look like long black spikes (fig. 1). The head is dark red. The second instar is about 5 to 11 millimeters long and a light pink. It has reduced prothoracic horns and abdominal spikes.

Figure 2—*Larvae with different colors and markings. The variations are typical of the saddled prominent.*

The head is dark pink. The third and fourth instars vary in color, but greens and browns predominate. The prothoracic horns are further reduced, and the abdominal spikes disappear completely. In addition, each side of the head is marked with a multicolored stripe. The fifth—and final—instar is approximately 28 millimeters long. It is usually green and has a red saddlelike mark on its back. By this stage, the prothoracic horns have disappeared. (See cover photo and fig. 2.)

The pupa is rather stout, shiny dark brown, and approximately 19 millimeters long. It is enclosed in a thin, loosely constructed cocoon of silken threads and leaf fragments.

The adults are inconspicuous moths. They vary from greenish gray or brownish gray to olive with creamy white and black splotches. Generally, the male moths are darker and have less pronounced markings. The bodies of both male and female moths are about 19 millimeters long. The female, however, has a wingspan of 40 to 52 millimeters—slightly larger than the male's. When resting, the moths hold their wings in tentlike fashion over their abdomens (fig. 3).

Figure 3—*The pupal and adult stages of the saddled prominent. The cocoons around the pupae have been removed.*

Life History and Habits

In the Northeastern United States and Canada, the saddled prominent has one generation each year. The insects overwinter as pupae buried 1 to 3 inches (2.5 to 7.5 cm) down in the leaf litter.

Figure 4—*Translucent patches, which look like holes, on sugar maple leaves skeletonized by the saddled prominent.*

The adults begin to emerge from the leaf litter in late May. Emergence peaks in mid-June and ends about the first week of July. Male moths generally emerge 2 to 3 days before the females. The moths normally emerge during the daylight hours and crawl to a nearby tree or other vertical surface. Once there, they ascend about 3 feet (1 m), inflate their wings to dry them, and then rest for the remainder of the day. Because they are mottled, moths can rest inconspicuously on the bark.

The moths do not fly during the day. At dusk, they move into the crowns of the trees, where they rest on the underside of the branches unless they are mating or laying eggs.

Egg laying, or oviposition, begins about 1 week after the female emerges and continues for approximately 10 days. The female deposits eggs singly on the underside of leaves. Although females lay eggs throughout the crown, egg density is highest in the upper crown. Each female typically lays between 200 and 250 eggs, although the number can exceed 300. Females from larvae that developed on yellow birch are thought to produce more and larger eggs than females from larvae that developed on beech or maple.

Oviposition, which usually lasts 4 to 5 weeks, ends about mid-July. Larvae emerge about 9 days after the eggs are laid—normally in the latter part of June or early in July.

The first and second instars feed on the underside of the leaves, where they cling tightly to silken feeding mats. Their interveinal feeding produces translucent lacelike patches on the leaves (fig. 4).

Later instars feed on the margins of the leaf so that they consume all the tissue except the major veins. The fourth and fifth instars are wasteful feeders, littering the forest floor with severed fragments of leaves. Unlike the young larvae, later stages do not adhere tightly to the leaves but wander among the leaves and twigs (fig. 5). Consequently, they are easily dislodged and often fall to the ground.

Larval development is usually completed by mid-August; feeding ceases in late August or early September, and the larvae crawl down into the leaf litter and spin cocoons.

Because emergence and oviposition take place over an extended period, several stages of the saddled prominent are often present at the same time.

Damage

The saddled prominent is a late season defoliator; most of its feeding occurs from late July until early September. Defoliation in late summer is generally not considered serious. However, several seasons of moderate defoliation (less than 50 percent) can lead to some branch mortality and crown dieback. Similar damage can result when a tree is severely defoliated. Severe defoliation (more than 50 percent) can cause a tree to refoliate—even in late summer. But the new leaves are often killed by frost and very little normal bud set occurs.

Although growth loss and some dieback are more typical impacts, tree mortality may occur after two or more summers of severe defoliation, particularly during periods of drought. Mortality of 10 to 15 percent has been reported in New York, Pennsylvania, and New England.

Secondary pests frequently invade and kill trees previously stressed and weakened by successive summers of saddled prominent defoliation. Such secondary pests include an ambrosia beetle, *Xyloterinus politus,* and root disease fungi (*Armillaria* species).

The saddled prominent can also affect forest recreation and maple syrup production. Severe defoliation, wandering larvae, and falling frass (caterpillar droppings) may significantly reduce the quality of recreational experiences. Sugar maples defoliated by the saddled prominent produce less sap when tapped for maple syrup production.

Figure 5—*Larvae migrating to a new food source—the typical response when they have stripped a tree.*

Associated Insects

Although the saddled prominent, by itself, has caused widespread defoliation, it also sometimes occurs concurrently with other hardwood defoliators. Aside from four other minor species of *Heterocampa,* the insects that most commonly occur with the saddled prominent include

Figure 6—*A mottled gray egg parasitized by* Telenomus coelodasidis.

the greenstriped mapleworm, *Dryocampa rubicunda*; the variable oakleaf caterpillar, *Heterocampa manteo*; and the orangehumped mapleworm, *Symmerista leucitys*. Once in a while, the saddled prominent is found with the redhumped oakworm, *Symmerista canicosta*, and the yellownecked caterpillar, *Datana ministra*. All these insects, except the greenstriped mapleworm, belong to the family Notodontidae and have similar life histories. They feed together late in the summer and thus may cause damage as a group.

Natural Factors Affecting Populations

Predators and parasites of the saddled prominent include birds, mammals, and insects. Other natural controls that contribute to the reduction of saddled prominent populations are starvation, fungal diseases (*Cordyceps* species and *Entomophthora* species), and an unidentified virus.

Notable predators of this insect are the bronzed grackle, which feeds on the larvae, and two shrews, which reportedly feed on the pupae. The most prevalent insect predators of the saddled prominent pupae are a ground beetle, *Calosoma frigidum*, and a stink bug, *Podisus modestus*.

A number of insect parasites have been found on the saddled prominent, but only a few appear to exert significant control. For example, two small wasps, *Trichogramma minutum* and *Telenomus coelodasidis* (fig. 6), accounted for 40 to 78 percent of the egg mortality during the outbreak of 1968–71 in the Northeast. During that same period, pupal parasitism by another wasp, *Cratichneumon sublatus*, ranged from 1 to 17 percent and was up to 57 percent when the outbreak collapsed.

None of these parasites and predators can prevent populations of saddled prominent from building, but in combination with factors such as starvation and fungal and viral diseases they contribute to the eventual demise of outbreak populations.

Control

The saddled prominent can cause severe, widespread defoliation (fig. 7). Most outbreaks, however, collapse before extensive tree mortality occurs. Therefore, chemical control is not recommended as a routine treatment. Nevertheless, managers may find chemical control helpful in special areas, such as those used for recreation or for production of maple syrup.

Figure 7—*Severe defoliation in a stand of maple caused by the saddled prominent.*

Conventional chemical controls include insecticides containing carbaryl or acephate. Both are registered for use against this defoliator. An alternative to conventional chemicals is a biological insecticide containing the bacterium *Bacillus thuringiensis*. When applied correctly, this bacterium is effective against many lepidopterous defoliators and has no direct effect on the parasite/predator complex.

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