

# Bagworm *Thyridopteryx* *Ephemeriformis* (Haworth)

Fact Sheet FS1144



Figure 1



Figure 2



Figure 3

## Cooperative Extension

George H. Daniel, Master Gardener, Somerset County,  
Nicholas Polanin, Agriculture and Resource Management Agent, Somerset County,  
Richard J. Buckley, Director, Rutgers Plant Diagnostic Laboratory

### Introduction

Bagworms *Thyridopteryx ephemeriformis* (Haworth), are most easily recognized in the landscape by the cone-shaped case or cocoon-like bag that the caterpillar forms and suspends from ornamental plants on which it feeds (Figure 1). These insects can be found feeding on the foliage of nearly 125 different trees and shrubs all throughout New Jersey. Bagworms are widespread native pests that in the literature have been documented throughout most of the United States and the most common types are on the East Coast.

Early detection and removal of bagworms is important due to the rapid reproductive capabilities of this insect. Adult females can produce between 500 and 1,000 eggs. A large bagworm population on a tree or shrub can eventually result in complete defoliation. Excessive environmental stress on infested plants may eventually lead to severe decline and eventually death of the plant.

### Host Plants

Bagworms are ubiquitous in the landscape and can damage a wide range of both evergreen and deciduous shrubs and trees. Common evergreen hosts are arborvitae, juniper, cedar, fir, pine and spruce. Deciduous hosts include birch, boxelder, elm and willow, sycamore, black locust, honey locust, persimmon, poplar, maple and sweet gum.

Bagworms can be spread accidentally by transporting and planting infected nursery stock. Travel from plant to plant is generally slow as the females cannot fly, but the larvae can crawl to nearby plants if knocked off the original host plant. In addition, the larvae can move on the wind by "ballooning"

or sailing to adjacent or downwind host plants. They do this by producing long silk threads that catch the wind and carry them to new food sources.

### Damage

The young bagworm larvae feed on the upper layer of the leaves, leaving brown spots. Eventually, leaves of heavily infested deciduous trees can be skeletonized leaving only the main leaf veins. Evergreen trees will show loss of foliage and thinning of the canopy as larvae strip the needles and eat the terminal buds. First branches, and then an entire tree, may be defoliated, (Figure 3) which will kill an evergreen outright and severely damage or kill a deciduous tree.

### Life Cycle

#### Spring

Upon hatching in late May to early June in Mid-Atlantic States, the young larvae immediately begin to feed (Figure 2). As they feed, each larva constructs a 1- to 2.5-inch bag or case, resembling a small pine cone, composed of plant parts woven together with silk. It spends most of its larva stage in this 'bag' and only partly emerges when feeding. The young larvae have black tops and dull amber undersides. Fully grown bagworm larvae are gray with darker heads.

#### Summer

Growth and molting continue until late July to mid-August, when the larvae stop feeding. In order to pupate, each mature larva enters and closes the bag with a band of silk. The pupal stage lasts for about four weeks.

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New Jersey Agricultural  
Experiment Station

Rutgers, The State University of New Jersey  
88 Lipman Drive, New Brunswick, NJ 08901-8525  
Phone: 732.932.5000

## Fall

From September through early October, pupation ends and the males appear as adult flying moths with fur-covered black bodies and clear wings that span 1 inch. The adult females remain in their bags in a larval-like stage, releasing a sex pheromone to attract the male moths. Males leave their cases and fly to the female bags to mate. Females can then deposit between 500 and 1,000 eggs in each remaining bag, and both adults die after reproduction.

## Winter

Undisturbed, the eggs remain protected inside the bag throughout the winter months. Under New Jersey's weather conditions, there is one generation per year.

# Management Strategies

## Manual

When detected early, the bags containing eggs can be physically and easily removed, preferably by picking the bags by hand or cutting the silk thread with garden shears or a knife. The bagworm eggs can then be destroyed by dropping the bags into a container of soapy water. This method is effective for smaller trees and shrubs during fall, winter or early spring before the eggs have hatched. Unfortunately, the bags closely resemble cones, which on evergreen trees can make early detection more difficult.

## Natural

Biological predators of bagworm include certain species of birds, parasitoids, insects and fungi. The Ichneumonid wasps (*Itoplectis conquisito*) are one of the primary parasitoids. Wasps parasitize bagworms by laying their eggs inside larvae. Other parasitoids include ichneumonids *Epiurus indagator*, *Heiteles thyridoptergis*; a eupelmid *Eupelmus cyaniceps amicus*; and the chalcids *Spilochalcis mariae* and *Brachymeria ovata* (Van Driesche, et al., 1996). Select wasps and hornets will also eat larvae. Beneficial wasps can be attracted to gardens by planting pollen and nectar producing flowers, such as Shasta daisies and New England asters. Beneficial wasps are especially attracted to bronze fennel and other plants in the carrot family. Fungi such as *Apergillus parasiticus*, *Beauveria bassiana* and *Paecilomyces lanosum* can infect and kill from 13 to 51% of bagworm larvae under ideal high moisture conditions (Barisford and Tsao, 1975).

*Bacillus thuringiensis var kurstaki* (Bt) can be purchased and applied to infected trees. The product contains a beneficial bacterial disease that infects and destroys the digestive system of caterpillars, including bagworms. When properly applied

in mid- to late-June when the larvae are young and actively feeding, it can be effective in controlling bagworms. While Bt is short lived and has low mammalian toxicity, it will also kill butterfly larvae. Use Bt in accordance with labeled directions and only on plants that are infested by bagworms.

Mating disruption can also be used with the proper placement of sex pheromones to lure and trap male moths. The combination of mating disruption, attraction of beneficial insects and reduction of plant stress may reduce the level of infestation below threshold levels.

## Chemical

There are conventional chemical pesticides available for homeowner use that are labeled for this insect; however, these may vary somewhat for various plant hosts. Insecticides should be applied when the larvae have just emerged from the bag in the spring. Mature larvae are more resistant to chemical control methods. By late July, most insects have ceased feeding and subsequently ingest little chemical product; therefore, physical removal may be the best control. Contact your local Cooperative Extension Office to discuss options for the most appropriate method for control of bagworms for your specific situation.

If the tree or shrub infestation becomes severe, particularly in large trees, contact a licensed pesticide applicator who has the training, experience and equipment to safely control a bagworm outbreak.

# Selected Sources

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