AERIAL DISPERSAL BEHAVIOR OF THE BAGWORM[1]

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The bagworm, *Thyridopteryx ephemeraeformis*, is a common defoliator and pest of arborvitae, spruce, juniper, and many other species of woody plants in the landscape and in nurseries. In this research, which was supported in part by a grant from the International Society of Arboriculture Research Trust, we studied the behavior of bagworms to learn how far they can disperse and how new infestations come about. Understanding the behavior of this insect is important in optimizing management tactics.

For most insects, the adult female is the life stage responsible for dispersal to new locations. However, in bagworms the adult female is both wingless and legless, so that dispersal to new locations is totally dependent on the larval, or immature stage. Bagworm eggs spend the winter inside the maternal bag, which is usually attached to the host upon which the mother developed. In spring, the newly-hatched larvae spin strands of silk and drop from the tip of the mother's bag or from the host foliage. The wind breaks the silk at the point of attachment and lifts the insect into the air with the silk trailing, a process referred to as "ballooning". Bagworms can also disperse to a lesser degree as older larvae by crawling overground. This occurs mainly when the host foliage becomes depleted before the caterpillars have matured.

We studied larval behavior, the seasonal and daily patterns of ballooning, and the effect of host condition on aerial dispersal of bagworms from *Juniperus virginiana.* In Kentucky, ballooning begins in mid-May and lasts through mid-June. Interestingly, we discovered that of those larvae that dispersed by ballooning, about 75% first formed a tiny bag from silk and covered it with bits of bark. Newly hatched bagworms generally exited from the maternal bag between 9 AM and noon. Most larvae that ballooned without a bag did so in the morning, while those dispersing with a bag did so mainly in the afternoon.

Our studies showed that, barring turbulence and convection updrafts, larvae ballooning from 15 ft height on an 11 mph wind could easily disperse 245 ft downwind without a bag, and 150 ft with a bag. Although dispersing with a bag makes the larva heavier and reduces the distance it can be blown, dispersing with a bag may help the larvae to survive should it fail to land on a suitable host. We found that 50% of the larvae dispersing with bags survived at least 3.5 days off of a host, whereas larvae without bags survived only 1.5 days. The bag seems to provide protection from desiccation and solar radiation, which would be readily absorbed by the dark-colored larva. This may allow time for a larva that is unsuccessful in landing on a host on its first attempt to climb back up to a suitable vantage point so it can balloon again.

Most bagworms hatching from an egg mass disperse from the "parental" host plant regardless of the degree of defoliation. Since progeny from just a few females could completely defoliate a small host, dispersal may be imperative in order to survive.

These findings have significance for nurserymen, landscape managers and homeowners who must deal with bagworm problems. New bagworm infestations originate mainly from ballooning larvae, so failure to control populations upwind from preferred hosts may leave a reservoir of potential dispersants. Since the ballooning period lasts from mid-May until mid-June (in Kentucky), it may be advisable to wait for several weeks after the first larvae are observed exiting from maternal bags before implementing controls. Bagworms are a potential problem each year since most individuals hatching on hosts in wood lots or hedgerows will be ballooning

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regardless of host condition. More detailed accounts of this research have been reported elsewhere (1, 2).

Literature Cited

1. Cox, D.L., and D.A. Potter. 1986. *Aerial dispersal behavior of larval bagworms, Thyridopteryx ephemeraeformis (Lepidoptera: Psychidae).* Canadian Entomologist 118:525-536.

2. Cox, D.L., and D.A. Potter. 1988. *Within-crown distributions of male and female bagworm (Lepidoptera: Psychidae) pupae on Juniper as affected by host defoliation.* Canadian Entomologist 12:559-567.

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ABSTRACTS

ROBINSON, M.L. 1988. **Video value.** Am. Nurseryman 168(10):94-95, 97.

Extension services offer many programs for urban gardeners and nurserymen. The use of mass media, and television in particular, has become essential to the distribution of Cooperative Extension Service horticulture programs. But before the extension's programs were picked up by public television, the extension service had to figure out how to deliver them to people. The extension service also faced the challenge of providing continuing education to nursery personnel who infrequently attended workshops given by the extension service. Videos at nursery outlets are quite popular on weekends and during other peak sales times. To evaluate the effectiveness of videos, customers are being surveyed to find out how much they have learned and how much their gardening skills have improved as a result of watching the programs.

SCHROEDER, J.G. and D. GAMSTETTER. 1988. **Street smart trees.** Am. Nurseryman 168(10):100-105.

If, as a grower, you've never considered municipalities an important or significant part of your market, read on. The numbers may surprise you. In a recently published report, Dr. James Kielbaso of Michigan State University's Forestry Department revealed that the national total of municipal plants is approximately a million trees a year. But why do these eager customers insist on specifying plants that are often unavailable in the necessary size, quality or quantity? The answer is that cities are not willing to part with their tax dollars for just any trees. Many factors determine the composition of each city's master street tree list. Another factor governing tree lists is the urban environment, which limits the number of acceptable species. Although no one can precisely predict just how big this market may become, the upward growth of tree use is evident. The public is increasingly aware that trees are an important urban asset, and the government's mandate is to serve its people.