



Invasive Exotic Insect Species: Amber Marked Birch Leaf Miner

Issue

Invasive exotic insects and diseases are having major impacts on the economics and ecology of our forests nationwide. Due to Alaska's remoteness, an invasive pest infestation is extremely difficult to control. Global markets, global climate change, and increased mobility of goods and services are tremendously increasing risks to Alaska forests.

The Forest Health Protection staff in the Alaska Region has been working with our cooperators throughout the state to detect and respond to new insect and disease introductions. Despite these efforts, invasive insects continue to successfully establish within Alaska's borders. The amber-marked birch leaf miner (*Profenusa thomsoni*), is causing severe defoliation to urban birch trees in Anchorage and spreading elsewhere in Alaska. If not controlled, this pest has the potential to substantially impact the ecology of native birch forests of Southcentral and Interior Alaska and the economies of communities in these forests.



Background

The amber-marked birch leaf miner was introduced to northeastern U.S. from Europe in the early 1900s. Since then, it has spread across Canada, reaching Alaska in 1996, presumably on plant nursery stock. Since then, it spread across the MatSu Valley, Fairbanks, Haines, Skagway, and part of the Kenai Peninsula. Its pattern of dispersal suggests that this pest "hitchhikes" on vehicles following roadways. The leaf miner is currently being monitored for spread and impact in the native forests.

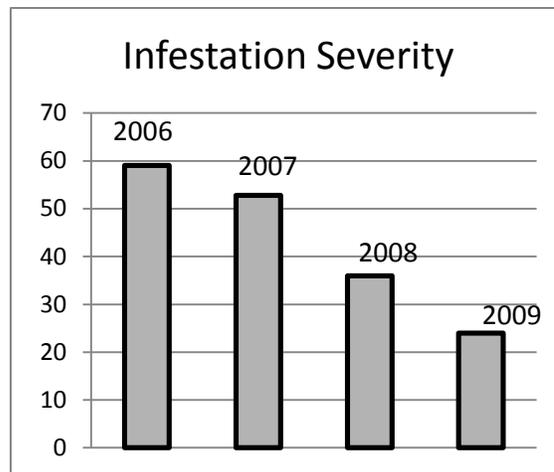
In its larval stage, this insect pest "mines" or eats the inside of a leaf during summer months, causing leaves to die, and entire urban landscapes to turn brown. Affected trees are obvious and many citizens are concerned about the browning landscape. Pesticide use against the leaf miner has increased dramatically.

Current Situation

A cooperative birch leaf miner biological control program using the parasitoid wasp *Lathrolestes thomsoni* was initiated in Alaska. Participating agencies include: U.S. Forest Service, Canadian Forest Service, USDA APHIS, State of Alaska Division of Forestry and Agriculture, University of Alberta, University of Massachusetts-Amherst, and the Municipality of Anchorage. This biological control program entails the release of parasitoids collected in Canada. To date, over 3,600 specimens have been released in Alaska. Evidence of parasitoids was witnessed in 2007, 2008, and 2009. In 2009, molecular methods showed the calculated percent parasitism at early release sites to be 25%. This demonstrated that the parasitoid is definitively established and increasing in number. Activities planned in 2010 aim to examine the spread of the released parasitoid. Two additional parasitoids have been found associated with the leafminer in Alaska: *Lathrolestes soperi* and *Aptesis segnis*. *Lathrolestes soperi*, a presumably native parasitoid, has

been found parasitizing the leaf miner in the leaves. Over the 2006-2009 period, parasitism rates by *L. soperi* at permanent plots have increased significantly, suggesting that this parasitoid may also have an impact in controlling the leafminer. While activities in 2009 were inconclusive as to whether *A. segnis* attacks the leafminer, both literature records on related species and this wasp's high density in emergence cone samples under birch trees both suggest that this species is attacking the amber marked birch leaf miner. Definitive experiments are currently underway.

In cooperation with the USFS Pacific Northwest Research Station, the UAF Cooperative Extension Service, and the Alaska Botanical Garden, additional biocontrol studies were conducted during 2008 and 2009 using entomopathogenic fungi and nematodes. Results of 2008 tests showed the fungal pathogen, *Beauveria bassiana*, to significantly reduce *P. thomsoni* severity in test plots, but during 2009, infestation severity was too low to show any differences. More generally, the amber marked birch leaf miner has shown a decreasing average severity trend since 2006 (see bar graph showing percentage of mined leaves of trees remeasured in Anchorage).



In 2007, the Amber-marked Birch Leaf Miner Integrated Pest Management Working Group was formed. This group is composed of members from several organizations in the Anchorage area. Its mission is to serve as an information clearinghouse and advisory group for those affected by the leaf miner. Our collaborative efforts will better enable us to manage future threats by invasive exotic insects, and minimize their potential impacts.

The Amber-marked birch leaf miner Working Group:

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Summary

The introduction of the amber-marked birch leafminer demonstrates the increasing threat to Alaska's forest ecosystems posed by invasive insects. The Alaska Region has an excellent opportunity to work cooperatively with its partners to successfully control the birch leaf miner using a pest-specific biological control agent, and reduce damage to acceptable levels in Alaska's urban and rural birch forests.

More Information

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