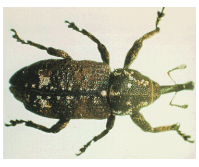

Nipping the Problem in the Bud!

Using IPM Techniques for Control of White Pine Weevil

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Abstract

A 2004 survey of New Jersey Christmas tree growers revealed an average yield loss of 10% to white pine weevil, *Pissodes strobi*. Since Lindane is no longer available, growers, landscapers and other sources have reported more damage from this pest than ever before. White pine weevil (WPW) is known to emerge at 7 growing degree days (GDD_{50}). Preliminary data from 2005 indicate that although WPW activity coincides with the flowering of the accepted plant phenological indicator (PPI) forsythia, it may not be a reliable indicator of WPW emergence. In New Jersey WPW was trapped after only 0.6 GDD_{50} at one location. It is also the contention of many farmers that forsythia bloom is highly variable and that red maple may prove to be a viable and more reliable alternative. The objectives of this study are to 1) evaluate *Forsythia spp*. and red maple (*Acer rubrum*) as PPI's; 2) re-evaluate 7 GDD_{50} as an accurate emergence time; 3) evaluate the insect growth regulator (IGR) diflubenzuron as an alternative control to the pyrethroid bifenthrin; 4) educate Christmas tree growers on IPM techniques, including GDD, insect identification, trapping, and control options. In 2006, data will be collected from multiple locations across New Jersey and Connecticut on temperature, flowering stages of PPI's, trap counts and chemical and cultural controls. Educational workshops on weevil emergence, identification, IPM and intervention techniques will be presented to assist growers in effectively managing this pest.

Background

Nursery conifers and Christmas trees grown throughout the country are susceptible to attack from white pine weevils, *Pissodes strobi*. In the Northeast, white pine weevil is noted as the most important insect pest of white pine, and is one of the few arthropod pests that damages many conifer species in nurseries and all species grown as Christmas trees. White pine weevil is a major pest causing significant annual losses to both the Christmas tree and nursery industries.

Lifecycle

The white pine weevil adult is a rust-colored weevil about 4-6 mm long. Adults spend the winter in the leaf litter under or near host trees. On warm spring days they fly or crawl to the leaders of suitable hosts usually during the period from mid-March through April. Weevils mate from mid-April through early May, and each female deposits one to five eggs in feeding wounds. Hundreds of eggs may be deposited in one terminal leader. The eggs hatch in about seven days. The larval stage, which lives beneath the bark, is white with a distinct brown head capsule. When the terminal is heavily infested larvae feed side by side in a ring encircling the stem. They feed downward on the inner bark of the leader. The legless, slightly C-shaped larvae reach a mature size of approximately 7 mm in mid- to late July, and pupate in the infested terminal. Adults emerge in 10 to 15 days through small circular holes at the base of the dead terminal, usually in late July through August. Following adult emergence, there is limited feeding, before they enter the leaf litter to overwinter. The white pine weevil has one generation per year.

WPW Damage Photos, S. Gardosik, PA Dept. Ag.

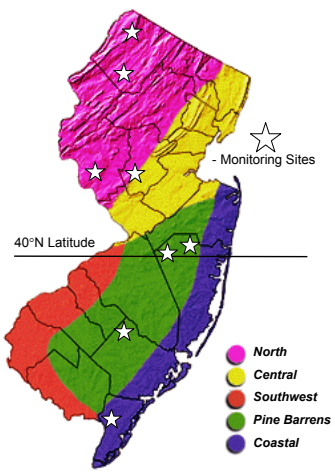
Damage

The first symptom of attack by the adult white pine weevil is glistening droplets of resin on terminal leaders in March and April. This is the result of punctures made by adults in the process of feeding and cutting oviposition sites. Injury is usually confined to the previous year's terminal leader. Infested trees are seldom killed. Feeding larvae cause the significant damage. They are found just under the bark of infested terminals from May through July. Larvae chew and burrow completely around the stem causing the current year's growth to wilt, droop, and eventually die. The "shepherd's crook" appearance of the terminals is most obvious in July. Upon the death of the terminal leader, one or more side branches (laterals) may then bend upward to take over as the new terminal leader. For several years after successful attacks, a few more laterals may grow as leaders. This condition results in either a forked or permanently crooked tree of limited or no value to nurseries and Christmas tree growers.

Control

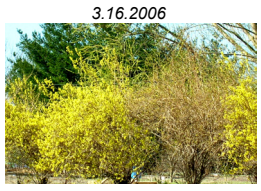
For many years, lindane, an organochlorine insecticide, was the material of choice for controlling white pine weevils because of its long residual activity. Due to federal regulations, lindane is no longer available for purchase. As a result, replacement insecticides often require multiple applications in early spring. Effective management is often inconsistent and expensive, due to one or a combination of factors: inadequate scouting data, improperly timed spray applications, ineffective rates of standard insecticides, and limited efficacy data of new materials. There is a need for an assessment of alternative chemistries, such as pyrethroids, insect growth regulators, and biological control agents, to compare with currently used products in order to provide the best management information to nurseries and Christmas tree growers.

NEW JERSEY CLIMATE ZONES



PINE BARRENS PPI – FORSYTHIA 3.16.2006

PINE BARRENS PPI - FORSYTHIA VARIABILITY 3.16.2006



PINE BARRENS PPI – SILVER MAPLE AND RED MAPLE (l. to r.) 3.13.2006

Project

This project will seek to advance the adoption of IPM practices among nursery and Christmas tree growers throughout the northeast by:

- testing and demonstrating the benefit of using traps for monitoring weevil populations;
- determining the reliability of current and potential plant phenological indicators (PPI) and the accepted growing degree days (GDD) emergence time;
- improving the economic benefit to growers by finding effective chemical, biological and insect growth regulator (IGR) control alternatives.