PENNSTATE
The Pennsylvania
INTEGRATED PEST
MANAGEMENT PROGRAM
Pennsylvania Department of AGRICULTURE

Specification for Basic Integrated Pest Management in Christmas Trees

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The 'Green Industry' in Pennsylvania comprises over 25% of the state's total agriculture sales. As a part of the 'green industry,' conifer production in PA is ranked fifth in the nation, with a total of $41,763,000 in conifer and Christmas tree sales for 2003 (USDA, 2003). These sales come from over 1,200 farms across the state. Pennsylvania is first in the nation for number of Christmas tree farms, and has 44,905 acres in Christmas tree production. (PASS, 2002) This commodity makes up a significant part of the agricultural economy that is so important to the state.

Each growing season, Pennsylvania Christmas tree growers face a substantial number of pest problems in their operations. On the Penn State University Christmas tree website (http://ctrees.cas.psu.edu/), researchers list 23 insect pests and 19 disease pests, not to mention the multiple links listed for sites devoted to weeds. In Pennsylvania farms, some of the insects that growers will face include: white pine weevil, Cooley spruce gall adelgid, spruce spider mite, eryophyid mites, elongate hemlock scale, balsam twig aphid and Douglas fir needle midge. Traditionally, growers of Christmas trees use considerable amounts of pesticide to control this multitude of pests on their farms. According to a USDA/NASS 2000 survey of chemical usage in Pennsylvania nursery and floriculture operations, Christmas tree operations used 71,000 pounds of chemical active ingredient (ai) in a single season, the second highest amount for all the nursery/ floriculture categories. This means Christmas tree growers are using an average of 1.58 lbs. ai/acre, mostly of broadspectrum organophosphate and carbamate classes.

Using Integrated Pest Management (IPM) tactics on Pennsylvania Christmas tree farms can reduce this amount of pesticide use, and yet help growers gain even better control. The IPM approach manages pests in a sustainable, environmentally sound, and more efficient manner. IPM does not eliminate all pests, but reduces them below established economically important levels and promotes populations of other insects/mites that are biological control agents. This process can require more time and monitoring than a traditional pesticide spray program, but there are many benefits. For example, Cathy Thomas, PA Department of Agriculture IPM Coordinator, demonstrated dramatic improvements in Christmas tree production with an IPM scouting and monitoring program for the white pine weevil. Three growers were able to reduce their pesticide use by 50 percent and recorded a 20% reduction in tree damage (http://paipm.cas.psu.edu/NewsReleases/ChrisTreeIPM.htm). With IPM, the number of pesticide applications is generally reduced and the use of selective pesticides that are safer to the environment and other organisms is promoted. Overall, this slows the development of pesticide resistance, and allows natural enemy populations to increase, eventually bringing the pest complex of a farm into more of an ecological balance.

Integrated pest management begins with an understanding of local pests. For beginning growers, it is recommended that they start by consulting the Pennsylvania Christmas Tree Growers Association (http://www.christmastrees.org/), the Pennsylvania Department of Agriculture, their

county Penn State extension office, and the Penn State University Christmas Tree website (http://ctrees.cas.psu.edu/). It is required that they obtain a copy of the excellent Michigan State University Christmas Tree Pest Manual (available online at: http://www.na.fs.fed.us/spfo/pubs/misc/xmastree/) to gain an understanding of the needs of the various species of trees they will grow as well as the pests they will likely face. Through the educational programs provided by Penn State University, the Pennsylvania Department of Agriculture and the Pennsylvania Christmas Tree Growers Association, they will have opportunity to learn more about good management practices and about pests and their life cycles. Understanding the nutrient, water and climate needs of the tree species will help growers select trees that will grow best in the environment of their farms. Equally important is an understanding of pest biology, which prepares growers for when pests will emerge and allows growers to recognize the signs of a pest problem.

With this basic understanding of Christmas tree pests, growers can have a general idea of when they may face an infestation problem. However, in order to truly know the condition of their trees, growers must be closely monitoring their fields. This involves walking the rows and observing trees for discoloration, disruption of growth, defoliation and other symptoms of damage or disease. A hand lens is a necessary tool when monitoring. After finding these symptomatic plants, growers use a hand lens to look more closely at the problem. The hand lens (available at any pest management suppliers, most notably Gempler's [http://www.gemplers.com/] and Great Lakes IPM [http://www.greatlakesipm.com/]), preferably 16x magnification or better, makes it easier to identify pest by allowing growers to see the pests themselves, as well as the specific nature of the damage.

Scouting in Christmas trees can be broken down by tree category. In each group of trees, there is a varying group of pests. The following list represents the pests growers should be concerned about for each group of trees.

- Douglas Fir: Cooley spruce gall adelgid, Douglas fir needle midge, elongate hemlock scale, spruce spider mite and white pine weevil
- Pines: bagworm, eryophyid mite, Pales weevil and white pine weevil
- Spruces: bagworm, Cooley spruce gall adelgid, cryptomeria scale, eastern spruce gall adelgid, elongate hemlock scale, eryophyid mite, spruce spider mite, and white pine weevil
- True Firs: balsam twig aphid, bagworm, cryptomeria scale, elongate hemlock scale and spruce spider mite

Along with field monitoring, it is important to maintain a record of what is being observed in the fields. Through review of the recorded data, it is easier to assess the extent of the infestation.

Growers can also receive Pennsylvania's Weekly Christmas tree scouting report. This free report is recorded on the IPM Hotline (1-800-PENN IPM), posted on the Penn State Christmas tree website.

Another valuable resource provided by the Department of Agriculture is a yearly report of Insecticides and Miticides for Christmas Tree Pests. This report lists the various Pennsylvania insect and mite pests and the pesticides available to treat each pest (See attachment for 2006 report). Growers can receive this list at the Penn State Christmas tree short course (for more info:

http://hortweb.cas.psu.edu/news/news.html), from their regional PDA Plant Inspector. An annual event, the Penn State Christmas tree management short course is a two-day program that will highlight many of the cultural and pest management aspects associated with operating a Christmas tree farm. It is recommended that growers participating in NRCS IPM programs such as this should participate. Growers can obtain more information about this course at the Penn State Horticulture web site (for more info: http://hortweb.cas.psu.edu/news/news.html).

Checklist:

Basic IPM:

~ Do they own the Michigan State *Christmas Tree Pest Manual*? (If no, disqualify)

~ Do they receive the PDA Christmas Tree Scouting reports or check the PA 1PM Hotline for the Scouting report? (If no, disqualify)

~ Do they have a hand lens for scouting? (If no, disqualify)

~ Did they keep records of monitoring, trap catching and pesticide usage? (If no, disqualify)

~ Did they conduct the monitoring and sampling? (If no, disqualify)

~ Are they familiar with pesticide chemistries and modes of action and their effectiveness on key pests? Do they rotate pesticides for resistance management? (If no, disqualify)

~ What have they done to encourage biological control agents? (If nothing, disqualify)