

How to Speak Christmas Tree: Integrated Pest Management



Dealing with pests and other agents that can damage trees is one of the most challenging aspects of producing quality Christmas trees. In this edition of How to Speak Christmas Tree, I discuss the concept of Integrated Pest Management or IPM. Integrated pest management is a fundamental concept that drives management decisions in all forms of plant agriculture. I will discuss what IPM is – and isn't – and the general principles that go into an IPM approach to pest management. In subsequent 'How to Speak' articles, I will consider management of individual types of pests (i.e., insects, weeds, diseases, and abiotic factors) within an IPM framework.

Photo 1 – From an IPM perspective, insects, diseases, mammals, and weeds can be considered pests. Photo credits (clockwise from top-left): Neil Thompson, University of Maine at Fort Kent, Bugwood.org; William Jacobi, Colorado State University, Bugwood.org; Bert Cregg, MSU; USDA Forest Service - Southern Research Station, USDA Forest Service, SRS, Bugwood.org.



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What is a pest?

Before we dive into IPM it is useful to take a step back and consider, what is a pest? When we discuss IPM, a pest is essentially anything that can damage a tree. In general, we group Christmas tree pests into insects, diseases, weeds, and abiotic problems (Photo 1). A wide array of insects can damage Christmas trees and damage can range from minor shoot curling to rapid tree decline and death. The list of insect pests includes mites and spiders, even though these are technically arachnids, not insects. For Christmas trees, as with most plants, diseases refers to fungal pathogens, but can also include water molds, nematodes, and diseases caused by bacteria. While the term ‘pest’ often conjures up an image of a caterpillar munching on a plant, weeds are also a major cause of losses in Christmas trees. Worldwide, weeds are usually cited as the largest cause of crop losses, and this is often true with Christmas trees, particularly at plantation establishment. Abiotic issues is a catch-all term that is used to describe damage to tree crops that is not associated with insects, diseases, or weeds. Common examples

of abiotic problems include freezing injury, drought stress, and herbicide injury. Damage caused by animals besides insects, such as mammal damage or damage caused by birds, is usually grouped with abiotic issues as well.

What is IPM?

Integrated pest management is a systems approach to managing the health of a plantation. Adopting an IPM-based approach to crop health involves four steps:

Prevention – The old adage ‘An ounce of prevention is worth a pound of cure’ has stayed with us through the years because it’s true, and it is particularly true in managing Christmas tree health. Many tree health issues are difficult to effectively treat once they occur. And even for problems for which a spray program may be effective, in many cases the cost of treating the pest will be more expensive in terms of labor, chemicals, and potential environmental impact than taking steps to prevent the problem in the first place. An obvious example of where prevention is simpler and more effective than treatment is Phytophthora root rot in Fraser fir.

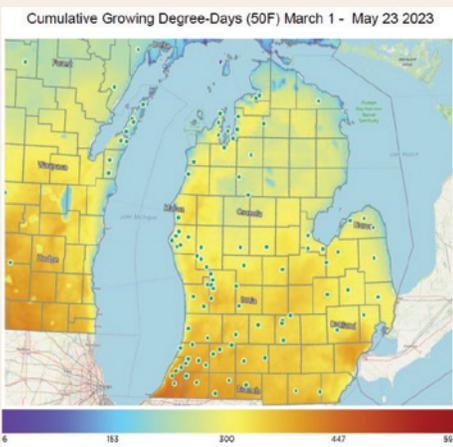


Photo 2 – Tracking growing degree-days is one of the key functions of the MSU Enviroweather site.



Photo 3 – The MSUChristmasTrees YouTube channel includes videos on IPM in Christmas trees.

Phytophthora is a water mold that produces spores (oospores) that have tails and are able to 'swim' to its host and infect the roots. Once roots are infected the disease spreads quickly and trees may die in a matter of weeks. Soil drenches can sometimes eliminate the disease, but a simple prevention strategy – avoiding planting Fraser fir on wet sites that are conducive to Phytophthora – is much more likely to be successful.

Scouting – In IPM systems, scouting is a program of regular and systematic inspections of trees in your plantations. One of the primary goals of scouting is to discover insect pests or diseases before they become major problems. Scouting also allows growers to monitor the development of pests, and in some cases, growers may determine that populations are below levels that require treatment. This can save growers the time and expense of unnecessary sprays. Fields should be scouted on a regular basis, usually weekly, beginning in early

spring. To scout a field, walk the field in a zig-zag pattern and inspect a subset of trees. Trees should be inspected from top to bottom, paying particular attention to the underside of needles, stems, and the root collar. Tools that are essential for scouting include a notebook, 10x hand lens, a scouting board or white or black cloth, pruners, and plastic bags or vials to collect samples.

Action thresholds – Action thresholds refer to pest populations levels or rates of infection or infestation that will warrant control action – usually a pesticide application. The concept of an action threshold reflects the IPM philosophy that low levels of pest activity may be tolerated, and, in some cases, the cost of control may be more than the economic injury the pest might inflict on the crop. This is particularly true when growers apply broad-spectrum insecticides to stop a small pest outbreak. Since broad-

spectrum products will also take out beneficial insects, such as ladybird beetles, that prey on pests, growers can find themselves on the 'pesticide treadmill' – increasingly reliant on spraying to fend off pests, instead of allowing insect predators to maintain control. Lastly, action thresholds demonstrate the integration in Integrated Pest Management – the only way for growers to know if populations are approaching threshold levels is to have a current and active scouting program.

Control – Once a scouting program has indicated that pest populations have reached a level where the economic damage threshold has been reached, growers should take control steps. Often, this will involve spraying an appropriate pesticide, but control can also include pruning infected trees or removing infested or diseased trees from the plantation. The goal of IPM is to improve a farm's overall sustainability



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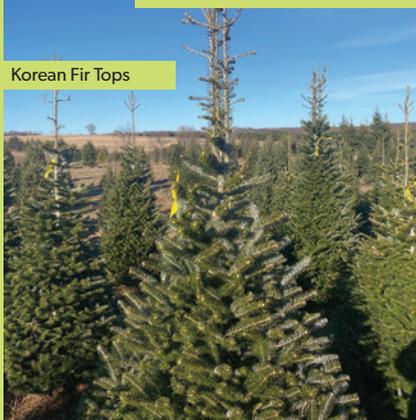
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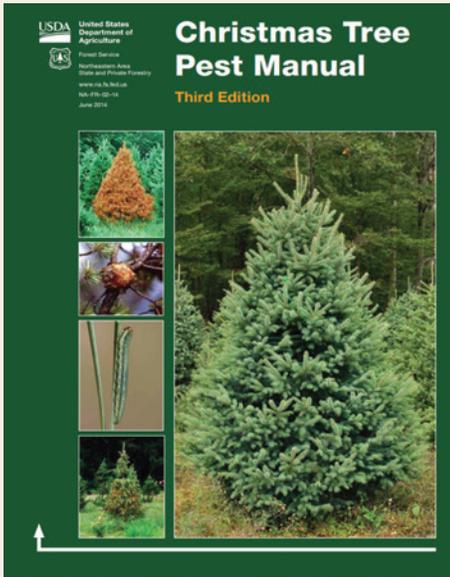


Photo 4 – The Christmas Tree Pest Manual is an essential resource for all Christmas tree growers.

by reducing costs (economic sustainability), reducing the amount of pesticides in the environment (environmental sustainability), and minimizing worker exposure (social sustainability).

IPM vs Organic

A common misperception of IPM is that it is a form of organic production. There are considerable areas of overlap between the two and organic producers certainly apply IPM principles in their production practices. The key difference is that organic producers cannot use synthetic pesticides or fertilizers, whereas growers that apply IPM to manage pests can apply conventional pesticides registered and labeled for their crop. However, by actively taking

steps to prevent pests and scouting to monitor pest levels, conventional growers that apply IPM can reduce the amount of pesticides they apply as well as the labor and equipment that goes into spraying.

IPM Resources for Christmas Tree Growers

Michigan State University Extension and other university extension services provide a range of resources and services that can aid growers in utilizing IPM strategies on their farm. Many of the MSU resources listed below can apply to other states in the Great Lakes region. Growers can also contact their local University Extension service or Department of Agriculture for additional information and resources.



Photo 5 – The MSU Christmas Tree Pest Management Guide provides critical details on managing insect pests and diseases in Christmas tree plantations.

Michigan State University

Enviroweather Weather, especially temperature, plays a critical role in the development of many Christmas tree pests and diseases. Keeping track of Growing Degree Days (GDD), which indicates the accumulation of temperatures above a base temperature (commonly 50 deg. F), is essential for monitoring the development of many insects and diseases and identifying optimal periods for control, if warranted. MSU's Enviroweather site continuously tracks and predicts GDD for Michigan and parts of Wisconsin based on a series of automated weather stations (Photo

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2). The site also tracks activity for several insect pests specific to Christmas trees. *How to find:* Google 'MSU Enviroweather' and select Christmas trees on the Crops menu.

MSU Extension News MSU Extension Educators and Specialists provide updates throughout the year on the MSU Extension News. These short articles highlight emerging pests, anticipate spray windows, and discuss significant weather events. Growers can also subscribe to the MSU Extension newsletter to get updates and notifications of recently posted articles. *How to find:* Google 'MSU Extension News Christmas trees'.

MSU Christmas Tree YouTube Channel This YouTube channel contains a series of short videos related to various aspects of Christmas tree production including several videos focused on IPM,

including details on scouting for pests (Photo 3) and management of several important pests. *How to find:* Search 'MSUChristmasTrees' in YouTube.

Christmas Tree Pest Manual This 164-page full-color guide provides information on identification, monitoring, and control of dozens of common Christmas tree pests and diseases. A .pdf version of the Manual is available for free on-line (Photo 4). *How to find:* Google 'Christmas Tree Pest Manual'. Hardcopies of the Pest Manual are available for \$5 from MSU Extension. *How to find:* 'Google Christmas tree manual shop.msu.edu'.

MSU Christmas Tree Pest Management Guide This guide includes a calendar indicating when Christmas tree pests are active and provides information on timing and products to control numerous insect

An IPM Pocket Guide for Weed Identification in Christmas Trees



Steven A. Gower
Robert J. Richardson

Photo 6 – Proper identification is an essential step in successful weed management. The MSU IPM Pocket Guide for Weed Identification in Christmas Trees is available as an on-line document.



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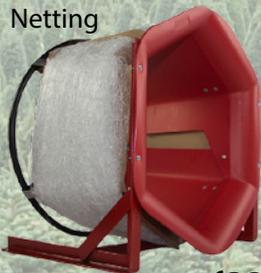
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pests and diseases commonly found in Christmas tree plantations in Michigan and surrounding states (Photo 5). *How to find: Google 'Christmas tree pest management guide'.*

MSU Weed Control in Christmas Trees This bulletin provides a comprehensive list of pre-emergence and post-emergence herbicides that are labeled for use in Michigan. The guide also provides information on the relative effectiveness of various herbicides on specific weeds. *How to find: Google 'MSU weed control in Christmas trees'.*

MSU IPM Weed Identification for Christmas Trees This publication was originally produced as a pocket guide. Hardcopies are no longer available from the MSU bookstore, but the .pdf of the weed ID guide is available on-line (Photo 6). The bulletin provides color photos and key identifying characteristics of weeds commonly found in Christmas tree plantations in Michigan and the Great Lakes region. *How to find: Google 'pocket guide for weed identification in Christmas trees'.* 🌲



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