The 2007 Pest Management Survey

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Introduction. In 1995, Dr. Steve Toth, Pesticide Impact Assessment Specialist with North Carolina State University, conducted a survey of pesticide use for Christmas trees producers in western North Carolina. Growers were surveyed about their pesticide use and pest control practices the previous year. The data he collected was the basis for the Crop Profile on Christmas trees in western North Carolina. In 2001, I conducted a pest management survey of practices growers used in the mountains in the year 2000. Information from this survey was used to update the Crop Profile.

Now in 2007, I've conducted a third pest management survey of practices in 2006 to further track important changes to the industry. A total of 1,750 surveys were mailed to growers. A reminder card and reminder letter followed to get as great a return as possible. As of print time, a total of 341 growers filled out the survey and they reported producing 22,192 acres of Christmas trees.

This article will be the first of a 2-part series on results from the 2007 Pest Management Survey. In this first part, I will describe some of the changes to Christmas tree farms over the past 12 years. In the next article, I will discuss changes in pesticide use. While reading this article, remember that the pest management surveys asked questions about practices conducted the year before. Also remember that for most questions respondents were asked to check all answer that apply. That means that the percentages often don't always add up to 100%. Percentages are therefore the percentage of the 341 respondents that checked a certain response.

The typical grower. In 2006, the typical Christmas tree grower was growing Fraser fir. Of the acreage reported in the 2007 Pest Management Survey, 96% was Fraser fir. Other species of conifers grown included 303 acres of white pine, 213 acres of Norway spruce, 165 acres of blue spruce, 109 acres of Canaan fir, 35 acres of Concolor fir, 16 acres of Nordmann fir, and 11 acres of Turkish fir. This represents a slight increase in other fir species since 1994 when the first survey was conducted as growers contend with losing fields to Phytophthora root rot.

The typical grower is experienced with an average 21.6 years of producing Christmas trees. Though growers may be get-

ting older, they are also getting connected with 67.8% reporting having Internet access. Less than 1/3 of growers (28.4%) consider themselves full-time. Most growers have all their trees in one county, though17.2% produce trees in two or more counties. This can make it harder to scout and conduct other pest control practices in a timely manner. The majority (55.5%) only grow Christmas trees. Other agricultural commodities produced include nursery (21.6%), cattle (11.8%), pumpkins (4.0%), vegetables (3.7%), tomatoes (2.9%), small fruits (2.9%), tobacco (2.3%), apples (1.4%) and others that people wrote in (4.3%) including trout, herbs, perennials, greenhouse flowers, mushrooms, honey, hay, grapes, sheep and goats.

The majority of growers (74.1%) report setting trees on a 5 X 5 foot spacing. When asked do you cross check your trees (meaning the trees line up vertically and horizontally), 55.7% said they did which will make spraying trees with an insecticide easier. Though interplanting young trees with old trees can result in problems with such pests as balsam woolly adelgid and rosette bud mite, 46.6% of growers said they did interplant on at least one field. And 60.3% of growers reporting have a stream running through or bordering at least one field. This has implications on pesticide use – particularly the use of Thionex.

Farm size. Farm size can greatly affect pest management, both by affecting the pest management tools a grower has available as well as influencing the level of pest control desired. The average farm size for all counties in western North Carolina was estimated in the 1997 NCDA&CS survey as 15.6 acres. In this survey, all Christmas tree growers were contacted and most responded to the survey. In the pest management surveys, not all farms were surveyed or responded and estimates of farm size have been larger and continue to increase. It was estimated that the average Christmas tree farm in western North Carolina was 22.7 acres in the 1995 Pesticide Use Survey, 44.4 acres in the 2001 Pest Management Survey and now 63.6 acres in the 2007 Pest Management Survey. Still, even in 2006, almost 30% of Christmas tree farms have less than 5 acres (Table 1). Of all size classes, farms in the 50-99 acre size range increased the most the past 6 years.

Table 1. Percentage of Christmas tree growers in different farm size classes in the 2007 Pest Management Survey as compared to the 2001 Pest Management Survey.

Size class of growers	2001 Pest Management Survey	2007 Pest Management Survey
< 5 acres	30.1%	29.3%
5-9 acres	20.8%	18.0%
10-19 acres	17.6%	14.5%
20-49 acres	16.1%	18.6%
50-99 acres	3.9%	7.2%
100-499 acres	9.0%	9.0%
>500 acres	2.4%	3.5%

Farm equipment The equipment a grower has to work with will also affect pest management. There have been changes in farm equipment owned by Christmas tree growers in the last six years, namely more people own airblast mistblowers and have tractors with enclosed cabs, allowing for the quicker and safer application of pesticides (Table 2).

Table 2. Percentage of Christmas tree growers owning different types of equipment in the 2007 Pest Management Survey as compared to the 2001 Pest Management Survey.

Equipment Type	2001 Pest Management Survey	2007 Pest Management Survey
Backpack sprayer	95.8%	96.5%
High pressure sprayer	53.5%	56.9%
Tractor	77.7%	80.2%
Tractor with enclosed cab	15.5%	26.4%
Air blast mistblower	17.1%	25.9%
Small tractor, four-wheeler or other equipment fixed with spray boom or nozzles that drive up and down rows to apply pesticides	18.1%	22.1%
Motor cycle mounted Di-Syston applicator	4.5%	2.0%
Backpack mistblower	12.9%	12.9%

What growers are planting One question asked in all three pest management surveys was what was the source of seedlings and transplants. One interesting trend over the past 12 years is that the number of people not setting trees has increased. In 1994, only 5% of growers reported not setting trees. In 2000 and 2006 the number was almost 1/3 of all growers. In handling the grower lists provided by county agents, I've noticed that many of the smaller growers in particular are getting out of the business.

Another trend is that through the 12-year period between these 3 surveys, fewer people are gathering seedlings on Roan Mountain or buying seedlings from the NC Forest Service. More and more people are buying seedlings and transplants from out of state.

Table 3. Percentage of Christmas tree growers using different sources of seedlings and transplants compared among the three pest management surveys conducted in 1995, 2001 and 2007.

Responses	1995 Pesticide Use Survey	2001 Pest Management Survey	2007 Pest Management Survey
	Percentage of total responses		
Didn't set Christmas trees this year in the field	5.3%	30.7%	28.2 %
Seedling source was Roan Mountain wildlings	14.0%	10.2%	6.3%
Seedlings grown by NC Forest Service	34.2%	19.0%	14.1%
Seedlings grown as greenhouse plugs	Not asked	7.5%	13.2%
I grew seedlings in outdoor beds	23.0%	24.4%	32.8%
Seedlings grown by NC Grower in outdoor beds	Not asked	27.4%	15.2%
Seedlings grown out of state in outdoor bed	Not asked	14.8%	25.0%
Don't know source of seedlings	Not asked	0.6%	16.4%
Commercial nursery	38.7%	Not asked	Not asked

Several years ago, Jeff Owen helped the NCCTA conduct a survey to determine the number of trees people were setting. In the 2007 Pest Management survey, growers were also asked how many trees they set in 2006. The number they reported was divided by the acreage they reported growing to determine what percentage of their acreage they reset in 2006. Growers reported setting a total of 3,694,120 seedlings which represents an estimated average of 9.7% of each grower's total acreage.

Disease losses. Most growers reported losses due to Phytophthora root rot in 2006 and those percentages were higher than they were in 2000 (Table 4). The number of trees lost was also greater per grower with the most trees lost in 2005 following the flooding of September 2004 (Table 5). Overall there were 431,839 trees lost in 2005 and 263,780 trees lost in 2006 to Phytophthora root rot. This represents an average of 4% of all growers' trees. Other disease problems included needle cast or discoloration, Botrytis shoot blight and other root rots (Table 4).

Table 4. Responses to the question "Did you have damage from any of the following disease that resulted in tree loss, decrease in grade or prevented the harvest of trees?" in the 2001 and 2007 Pest Management Surveys.

Responses	2001 Pest Management Survey	2007 Pest Management Survey
Phytophthora root rot	59.5%	72.4%
Needle cast	14.6%	11.2%
Botrytis shoot blight	1.2%	2.6%
Annosum root rot	2.1%	2.0%
Armillaria root rot	Not asked	0.6%
No response	36.3%	23.9%

Table 5. Percentage of growers reporting losses due to Phytophthora root rot and an average estimate of the actual number of field trees lost in 2000 vs. 2005 and 2006.

County	2001 Pest Management Survey		2007 Pest Management Survey		
	% growers with root rot	Average # trees lost in 2000	% growers with root rot	Average # trees lost in 2005	Average # trees lost in 2006
Alleghany	57.4%	2,565	81.4%	2,900	1,689
Ashe	58.0%	393	70.0%	1,183	883
Avery	65.0%	301	76.5%	2,445	884
Jackson & Swain	59.3%	149	86.4%	1,411	997
Mitchell	61.5%	282	71.0%	624	336
Watauga	41.5%	153	65.0%	704	879
Yancey	25.5%	446	66.7%	192	140

Animal damage. Growers also reported more deer damage in 2006 than in 2000 (Table 6). The counties with the greatest increases in deer damage include Avery, Mitchell and Yancey Counties. Jackson County still reports little deer damage. Other types of animal damage reported for 2006 includes groundhogs (20.1% of growers), birds (12.1%), rabbits (3.4%), moles (3.4%), and voles (3.2%). Almost 1/3 of all growers (32.5%) reported having no damage due to wildlife in their Christmas trees in 2006.

Table 6. Percentage of growers reporting deer damage in 2000 vs. 2006.

County	2001 Pest Management Survey	2007 Pest Management Survey
Alleghany	82.5%	90.7%
Ashe	68.5%	67.9%
Avery	26.3%	35.3%
Jackson & Swain	7.4%	4.5%
Mitchell	23.1%	67.7%
Watauga	65.9%	60.0%
Yancey	25.0%	61.1%
Overall average	47.6%	54.9%

In the 2007 Pest Management Survey, growers were asked if they attempted to control deer browse. Most did not try to with only 23.9% saying they did. The different methods used included hunting (19.8%), deer repellents (7.8%) and deer fence (5.2%). Most growers used Plantskyd if they used a repellant with other products being Deer Stopper, Deer Off, Deer Away and garlic oil. If a grower used a deer repellant it was applied an average of 1.5 times on an average of 25% of their farm. A little more than half (51.8%) considered their efforts successful. A few growers also reported planting food plots.

Accessing Extension's information. And how did growers learn to do what they needed to do? Many turn to Cooperative Extension. When asked how they accessed extension growers reported the following: 86.8% read newsletters sent out by the County Extension Agents, 62.6% called their County Agent, 58.6% attended a pesticide recertification class, 36.8% attended some type of extension workshop conducted indoors, 35.9% of growers had an Agent, Specialist or Technician make a visit to their farm, 34.2% attended an extension sponsored farm tour, 29.5% had someone from Extension email them information, 24.1% viewed information on the Internet, 20.4% considered themselves part of an Extension IPM program and11.8% of growers emailed questions to someone in Extension. There were only 4% who reported having no contact with Extension at all. Surprisingly, these percentages are very similar to percentages from 2000 except that the percentages for emailing and viewing web based information have increased dramatically. People continue to get help through Extension.

Next issue. In the next issue I will discuss results of insect and mite damage, insecticide use, herbicide use, and overall problems growers are facing. If you have any questions about these results, please give me a call.