Dealing with deer

FIG 1 – *Cover is an essential part of deer habitat, so plantations near woodlots are likely to have high deer pressure. Photo: Dave Cappeart, bugwood.org.*

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Growing quality Christmas trees requires that growers manage a range of pests. While we typically think of pests as arthropods such as insects and mites, mammals can often cause significant damage and losses in Christmas tree plantations. Deer, in particular, can cause large losses for growers. Populations of white-tailed deer in the United States are higher than in pre-settlement days; this is due to reductions in predators and habitat fragmentation, resulting in increased deer pressure on Christmas trees and other horticultural operations.

Table 1. Deer population of states associated with the Great Lakes Christmas Tree Journal

State	2020 Deer Population	Deer Density (deer/ sq. mi.)
Michigan	1,700,000	17.6
Wisconsin	1,611,000	24.6
Pennsylvania	1,500,000	32.6
Minnesota	950,000	10.9
New York	950,000	17.4
Indiana	680,000	18.7
Ohio	680,000	15.2
Illinois	670,000	11.6
Maryland	207,000	16.7
Massachusetts	95,000	9.0
Total	**9,043,000**	**17.7**

Source: deerfriendly.com

In the Great Lakes region, the average deer density is nearly 18 deer per square mile (Table 1). Like all wildlife, deer require food, cover, and water. Many conifer plantations offer excellent deer habitat, especially if plantations are surrounded by woodlands or other dense vegetation that can provide cover (Fig. 1). Deer can be a frustrating problem for growers because deer damage trees not only by feeding on new transplants (Fig. 2) but bucks can also damage larger trees by rubbing their antlers (Fig. 3). Growers have a range of options for dealing with deer. The optimal solution will vary by the type and size of operation, the desired species mix, and the level of deer pressure. In this discussion, I will examine some of the factors growers should consider in developing a deer management plan.

Exclusion

The most reliable way to eliminate deer damage is to keep deer away from trees in the first place. Deer exclusion fencing is widely recognized as the most effective way to reduce deer damage. The two most common options of deer exclusion fences are standard wire fences and electric fences. Deer are excellent high jumpers, so standard wire fences need to be at least 8' tall (Fig. 4). Costs of fences vary but growers can expect to pay $4 to $7 per linear foot for deer fence, plus the cost of gates. Based on geometry, larger parcels are less expensive to fence than smaller ones. It costs around $0.35 per tree to fence a 100-acre block, versus $1.10 per tree for a 10-acre block, assuming square parcels of land, $5 per linear foot of fence and 1,200 trees per arce. Growers also need to consider the costs of maintaining their fence over time. Some growers are opting for fences with metal posts, which can have a longer life than standard treated wood. An important consideration in using fencing to exclude deer is managing access points and making sure that gates are closed when not in use. Once deer are locked inside a fence, they can do

FIG 2 – *Deer browse can disfigure or kill new transplants. Photo: John Ghent, bugwood.org.*

FIG 3 – *Buck rubbing on a balsam fir. Photo: Cathy Blumig, Wolgast Tree Farm & Apiary.*

considerable damage before they are detected and removed.

Electric fences can also be effective at excluding deer and may be more cost-effective for smaller growers. Two common approaches to electric deer fencing are two-tier fences and electric tape. Two-tiered fences take advantage of the fact that deer have poor depth perception (Fig. 5). As one grower put it, "Deer are excellent high jumpers but not good broad jumpers". Two-tiered electric fences can be installed as permanent fencing but can also be installed as temporary fences. Electric tape is a low-cost alternative that can be set up each winter and is a good option for small farms with light deer pressure. Baiting is important for single-tier electric fences. Deer can easily jump over low electric fences, so it is essential to get deer to test the fence – peanut butter is a common lure – to get the jolt and realize this is an area to stay out of. For growers that need to protect plantations in remote areas without access to electricity, electric fence chargers that are powered by solar panels start at around $300.

Deer deterrents

Deterrents are devices that are designed to startle and/or ward off deer. These are often motion-activated devices that set off noises, sprinklers, lights, or ultrasonic sounds when deer enter an area. Mechanical deterrents have several drawbacks: they are only effective over relatively small areas; noise-based deterrents are not practical if you have nearby neighbors; deterrents will require frequent checking and maintenance. Most importantly, deer are likely to become habituated to the deterrent and ultimately realize there is no consequence beyond the initial noise or other responses. In contrast, dogs are a deterrent that can be effective over the long term. Using dogs as deer deterrents usually will require fencing which can be standard or invisible fencing. An advantage of dogs is that their scent will help to repel deer, even when the dogs are not on patrol. Growers considering dogs to deter deer need to plan to maintain humane conditions for the dogs such as adequate food, water, and shelter. It is also important to remember that deer will normally avoid dogs, but bucks can become aggressive during the rut and could pose a danger to dogs.

Repellents

A wide array of deer repellents are available through garden centers and grower supply catalogs. Repellents can be grouped into two general categories: scent-based and taste-based. Scent-based repellents take advantage of the deer's keen sense of smell. Scents that can repel deer include urine of predators, rotting smells such us putrescent eggs or blood, and human-related scents such as soap or dryer sheets. Jeff Owen, Christmas tree specialist with North

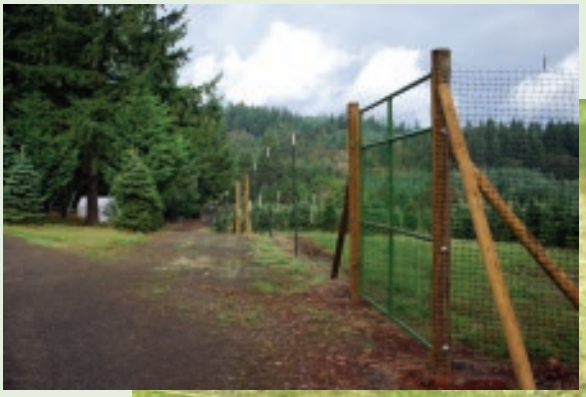

FIG 4 – *Standard deer fence should be at least 8' tall to exclude deer. Photo: Chal Landgren, Oregon State University Extension.*

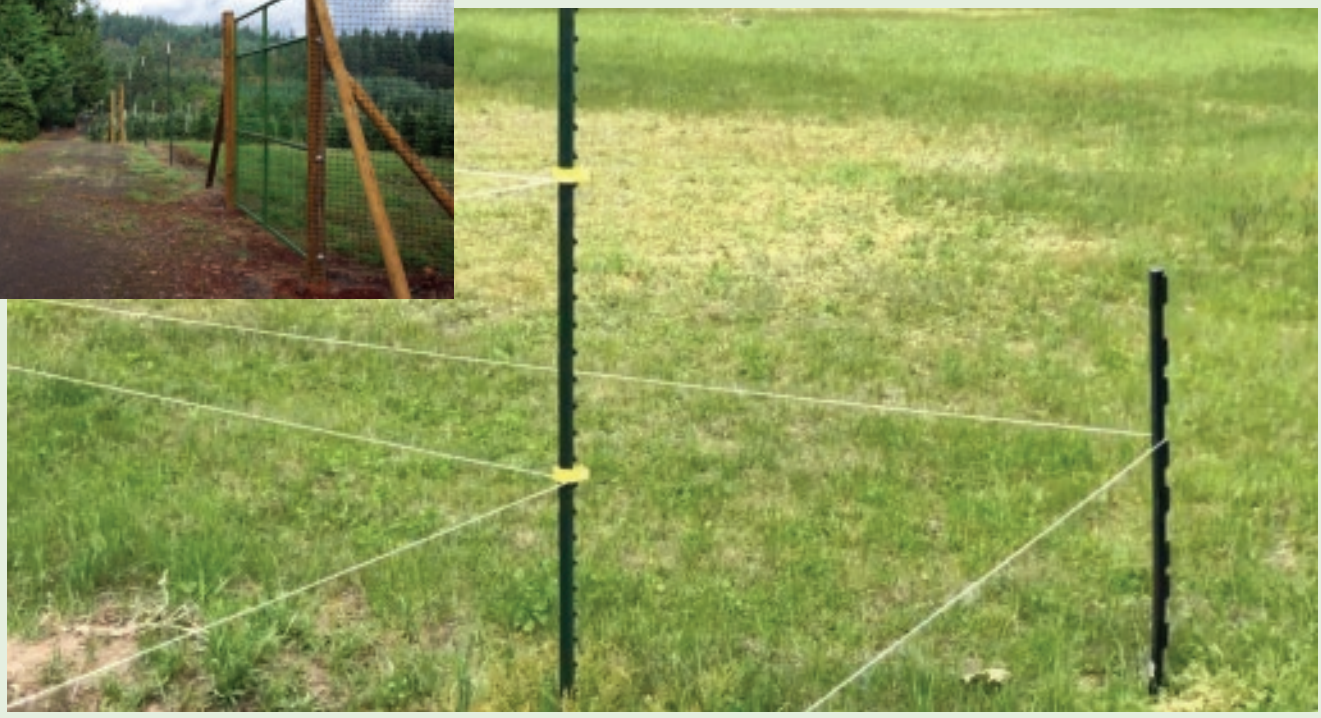

FIG 5 – *Two-tiered (or 3-D) electric deer fences exploit deer's poor depth perception to exclude deer. Photo: Brian Dooley, dooleyhomestead.com.*

Carolina State University Extension, examined a range of repellents and found that putrescent smells were the most effective at deterring deer. Taste-based repellents work by making tree foliage unpalatable to deer. One theory of managing deer holds that repellents are more effective if coupled with a technique that offends another of the deer's senses such as a visual deterrent. For example, we were successful in keeping deer away from a fir species trial at the MSU Clarksville Station using a combination of scent (soap) and visual deterrent (mylar flagging). The principal drawback to most repellents is that they wear off with rain and snow and need to be reapplied throughout the winter. Taste-based repellents may prevent deer from eating trees but will not prevent deer-rub damage.

Deer removal

Michigan and other states provide nuisance permits to remove deer that are causing damage in agricultural or horticultural operations. This approach can be effective in reducing deer numbers and deer damage in the short term or in specific areas, but is probably best considered a stop-gap method. In some cases, deer processors in your area may be able to assist in getting venison from deer that are harvested to local food banks. Check with your state wildlife management agency for details and limitations on nuisance permits.

Species preferences

As most growers are acutely aware, deer prefer to browse on some tree species more than others. In the MSU fir species trial at the Kellogg Research

Figure 6. Mmmm… Candy… Deer heavily browsed two rows of Turkish fir while leaving adjacent fir species untouched in the MSU exotic fir trial at Kellogg Forest. Photo: Grant Jones.

Forest, 100% of the Turkish fir, Ernst fir, and Fraser fir trees were heavily browsed by deer, while more than 20 other fir species and hybrids had little to no browse damage (Fig. 6). On the other end of the spectrum, spruces, especially blue spruce, are rated as 'starvation' food, and deer will browse on these only under the harshest winters when no other browse is available. In some instances, growers may be able to reduce deer damage by shifting to species that are less preferred by deer. For example, Ed Carpenter of Peacock Road Tree Farm in Laingsburg, MI has shifted much of his new plantings to concolor fir due to heavy deer browsing on Fraser firs. "We have a lot of woodlands and excellent deer habitat around us," Ed noted. "It's just getting harder and harder to grow Frasers." When discussing deer preferences, it is important to note that bucks can still damage trees by rubbing, even if they don't feed on them (Fig. 7).

Summary

Dealing with deer is a never-ending battle for most Christmas tree growers in the Great Lakes region (Fig. 7). The most effective and appropriate techniques for minimizing losses due to deer feeding and deer rub will depend on the size of the farm, the level of deer pressure, proximity to neighbors, and species being grown. Well-maintained deer exclusion fencing is the most effective and reliable means to reduce tree losses to deer. For large plantations, permanent deer fencing is often the most cost-effective option. For smaller blocks, electric fencing may be the best choice. Repellents and deterrents can prevent some deer damage to trees but often lose effectiveness over time due to wearing off or deer becoming habituated. Growers that are not able to commit resources to deer fencing but are interested in non-lethal means to control deer should consider using multiple approaches to ward off deer such as combining deterrents with scent-based or taste-based repellents.

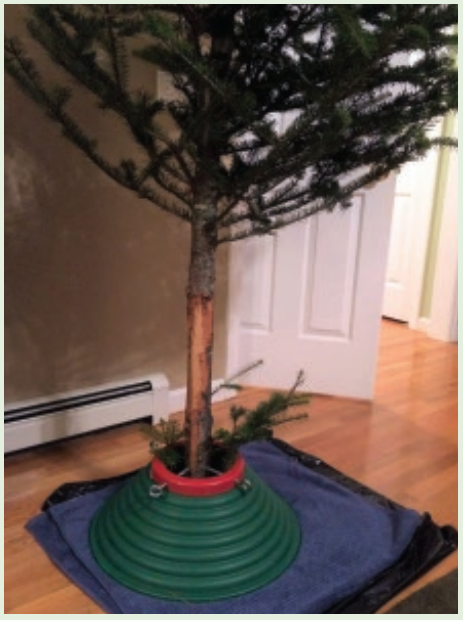

Figure 7. The final phase of the deer damage cycle in Christmas tree plantations: Acceptance. Photo: bowsite.com.