DEER CONTROL IN HORTICULTURE CROPS

Ontario's white-tailed deer population is estimated to be approximately 400,000 deer. Deer numbers have been steadily increasing since the 1980s when the selective harvesting system was introduced (protection of does and fawns). Milder winters and reduced fall tillage (crop residue provides a winter food source) have led to fewer winter deaths. There are also more private properties which prohibit hunting. These trends are similar to circumstances in the U.S. mid-west and northeast.

It is reasonable to expect that winter conditions for deer will remain generally favourable under most climate change predictions and that deer populations will either continue to increase or at least remain at their current high levels. This is a concern for the horticulture sector as deer cause significant damage to crops especially apple orchards.

Economic losses from deer damage cannot be recovered from the provincial crop insurance program because the system is geared towards providing relief from heavy or catastrophic loss in a single year rather than the regular, annual loss of a portion of the crop.

Apple twigs nipped by deer.
Photo: Alan R. Biggs, West Virginia University, www.extension.org

Deer will usually feed on the most nutritious forage they can find. In spring, this may include newly emerged seedlings and shoots. As crop growth proceeds, they will select the flowering parts of plants and then ripening crops. In winter, deer will also browse on the woody tips of fruit trees, which can damage the trees' production for years into the future. Other damage can include the trampling of crops (e.g., winter wheat) and antler rubbing on fruit and nursery trees.[1]

Deer feeding damage is different than gnaw marks from rabbits or rodents. Deer do not have upper incisors so leave a ragged, broken end on browsed branches whereas rabbits neatly clip branches with clean diagonal cuts. Another indication is the height of the damage from the ground (up to 6 feet).

Photo credit: Susan Fitzgerald

Site Characteristics and Management

Deer damage tends to be worst in fields near bush or tree cover. Mowing or removing brush in fields adjacent to crops may make the sites less attractive for deer and other problem wildlife. Some growers have experimented with lure crops to draw deer away from commercial crops but these efforts have had mixed success. The alternative crop must be equally or more palatable to the deer than the commercial crop and should be in place before a feeding pattern has been established in the protected crop. There is also the possibility that the lure crop would entice more deer to the area.

Visual and Auditory Devices

A variety of frightening devices including lights, whistles, loud noises, and scarecrows, can be used to scare off deer in an attempt to prevent feeding damage. However, research papers state that deer habituate to scare devices after a few days of exposure.

Repellents

Deer repellents work by being disagreeable in either taste or smell. The effectiveness of repellents

[1] Ontario Ministry of Natural Resources, Strategy for Preventing and Managing Human-Deer Conflicts in Southern Ontario, 2008, p.13.

depends on the number of deer, feeding habits, and environmental conditions. If deer are very hungry and other food supplies are limited, repellents may not work and some damage is likely to occur as long as there are deer in the area.

Most deer repellents can be applied as a spray to ornamental shrubs and non-bearing fruit trees. Thiram (tetramethylthiuram) is an effective repellent for use on non-food crops. It is available under the names TMTD, Cunite or Bonide Deer Repellent. Consult label for directions before using.

Hinder, an ammonium soap-based repellent, and Deer-Off, a product that incorporates putrescent egg solids, are the only repellents currently approved for use on garden vegetables and fruit-bearing trees during the growing season. A "do it yourself" repellent which mimics Deer-Off can be made from a mixture of a dozen eggs and five gallons of water applied to the ground using a pressure sprayer. The deer are repelled by the odor as the eggs rot in the ground, but humans will not detect it. This mixture will cover approximately one acre but reapplication is necessary after each rainfall. This is unlikely to be effective on winter browsing.

A number of the respondents to our grower survey indicated they used Plantskydd as a repellent. The active ingredient in Plantskydd is bloodmeal (dried pig or cattle blood) and acts as an odor repellent for deer, elk, moose, rabbits and possum. It is available as a soluble powder, pre-mix or granular formulation. A half-and-half mixture of bone meal plus blood meal is also noted in some literature. These materials are available at garden centers and can be hung in small bags around the field.

A commercially made hot pepper sauce is also available (Hot Sauce Animal Repellent) which will repel various animals. It is mixed with water and sprayed onto tree trunks, branches and foliage where feeding by deer is occurring or is expected to occur. An adjuvant such as Vapor Gard or Wilt-Pruf is recommended. The mixture must be applied before or at the first signs of feeding and reapplied every two to three weeks. It will not harm deer or other wildlife but the hot sensation in their mouth and throat discourages further feeding. Consult label for complete directions and restrictions before using.

Young trees should be treated completely with whichever repellent is used. On older trees, treat only terminal growth that is within reach of deer (up to 6 feet above ground). Growth that appears after treatment may need to be sprayed again. Repellents should be applied when precipitation is not expected for 24 hours and temperatures will remain between 40° and 80° F for that period. Research trials have shown that odor-based products usually outperform taste-based materials.

No commercial repellent is 100% effective and under heavy deer browsing pressure the best materials must be reapplied about every five weeks. This may limit their use in areas that have deep snow and below freezing temperatures during winter.[2]

Other commonly promoted repellents include:

- Bars of fragrant soap. The best soap to use is the small, heavily perfumed, and individually wrapped bars. Leave the wrapper on the bar, drill a small hole through the soap and hang from stakes or plants around the perimeter of the field. The repellent is short-lived as deer become accustomed to fragrances.
- Human hair, placed in nylon stockings or plastic bags with holes punched in them and hung from stakes or plants around the field. Results have been unreliable in field tests.
- Rancid grease, meat scraps or feather meal (often called meat meal or tankage) can be placed in mesh bags or tin cans without lids and hung around the perimeter of the field. Puncture holes in the bottom of cans to allow rain to drain out and hang high enough off the ground to keep dogs and other animals from pulling them down. These materials are effective only during warm weather and durability is from two to six weeks.

Measures for preventing deer damage include: fencing to keep them out of orchards; frightening them with loud sounds; repelling them through different compounds, some as common as soap; and reducing the herd through hunting.

[2] Curtis, P.D., Sullivan K.L., White-Tailed Deer, Wildlife Damage Management Fact Sheet Series, Cornell Cooperative Extension, 2001.

Many of these methods only work for short periods of time because deer adjust to them. Combinations of methods may provide better long-term results.

Exclusion

Plastic tree wrap or woven-wire cylinders, at least four feet long, will protect young trees from deer rubbing tree trunks with their antlers but not from browsing.

Apple tree trunk damaged by a deer rubbing its antlers against it. Photo: Alan R. Biggs, West Virginia University, www.extension.org

The Off Limits Crop Protection System is an invisible fence design that combines wire, a power unit, and receiver collars with highly active, properly trained dogs that are able to live outdoors during winter. Two dogs per 12 to 15 acres of orchard are recommended. The breed of dog used must be very active and prone to chase deer. Basically, the dogs chase the deer from the property but are prevented from leaving the property by their collars which will shock if they cross the boundary. The system was field-tested in apple orchards in central New York and also by at least one grower in Ontario. The system is not a complete barrier so some browsing will occur.

Various types of fencing to keep deer out of crops have been tested with varying degrees of success. Temporary electric fences may protect smaller acreages during the growing season if installed prior to or at the first sign of deer feeding. They can be more effective if used along with an attractant or repellent. One suggestion is to spread peanut butter on foil strips attached to the fence at three foot intervals using cloth adhesive tape. Deer are attracted to the peanut butter, which encourages them to make nose-to-fence contact. After being shocked, they learn to avoid fenced areas. The peanut butter fence is promoted as being effective for small orchards up to three or four acres with moderate deer pressure. Repellent, sprayed on cloth strips and tied to electric fencing reinforces the physical shock of the fence and has been found to be even more effective than peanut butter.

Permanent high-tensile fencing can provide year round protection from deer damage. A seven-wire design with the first strand 8" above the ground and rigid corner assemblies is recommended. High-tensile fences are reported to have a 20 to 30 year life expectancy.

The literature suggests that permanent woven-wire fences are the best deer barrier (see diagram on the following page). They will provide year-round protection even for areas experiencing intense deer feeding pressure. Barrier fences should be at least eight feet high and can be increased to 10 feet using larger poles and two strands of smooth wire. These fences are expensive and difficult to construct. However, once erected they are easy to maintain and the 20-year life span and success rate justify the initial cost.

Whenever fencing is used, it is important to incorporate functional gates or cattle guards (aka Texas gates) to prevent deer from entering fenced areas via roadways. Gates should be closed following each entry and exit. To avoid the inconvenience of opening and closing gates, cattle guards may be installed at gate entrances. In a study conducted in Ohio, researchers found that cattle guards reduced deer crossings by at least 95%. Fencing should be extended along each side of the cattle guard to prevent deer from crossing along the sides.

There is an excellent factsheet put out by the University of Nebraska – Lincoln on deer damage prevention which provides detailed instructions

regarding the construction of proper deer exclusion fencing.[3]

Removal

Deer populations can double in size every two to three years if mortality is low and food is abundant. Ontario uses a selective harvest system to manage and allocate deer tags in each Wildlife Management Unit across the province. This limits the number of does and fawns taken to ensure long-term population sustainability. Allowable antlerless and total deer tags issued are calculated by considering past harvest levels from the results of annual provincial surveys and by monitoring trend indicators such as deer-vehicle collisions, human-deer conflicts, the capability/quality of the land/habitat to provide for deer, and the effects of severe winter conditions on deer survival.

Farmers who experience heavy deer damage may apply to the Ontario Ministry of Natural Resources for approval under the Deer Removal Authorization (DRA) to hunt problem deer out of season. However, growers who responded to our crop predation survey noted that they find it frustrating to get out of season hunting approvals. There appears to be a considerable delay between the time a request is made and a decision is given.

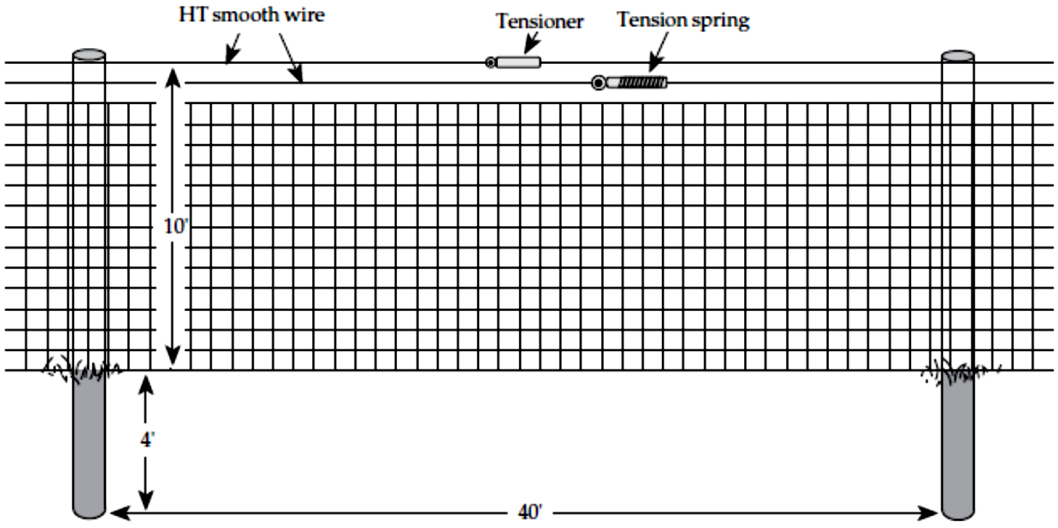
In summary, permanent fencing appears to offer the highest efficacy but also the highest cost. The best approach continues to be early intervention before feeding begins and using multiple wildlife predation prevention tools. Both birds and animals are afraid of and will avoid offensive smells, tastes, sounds, etc. as long as they are novel so devices have to be moved and changed up regularly. Collaborating with adjacent farms and landowners may also help reduce the pest pressure rather than simply moving them from one property to another or allowing them to take shelter on neighboring lands.

Additional Resources:

Ministry of Natural Resources
Look under the Wildlife Management, Living with Wildlife, and related links pages www.mnr.gov.on.ca

Ontario Federation of Anglers and Hunters can advise on hunting regulations or how to locate a hunter in your area. 705-748-6324, ofah@ofah.org
www.ofah.org

S. Fitzgerald, Ontario Fruit and Vegetable Growers Association, May 2013.



Deer Proof Woven-Wire Fence, Internet Center for Wildlife Damage Management, http://icwdm.org/handbook/mammals/Deer.asp. A fencing handbook for 10' woven wire deer exclusion fence is available from files.dnr.state.mn.us/recreation/hunting/deer/bovine-tb/fencing_guide.pdf

[3] Factsheet is available for downloading at http://icwdm.org/handbook/mammals/mam_d25.pdf