

By **Lance Gegner**, NCAT Agriculture Specialist
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INTRODUCTION

This publication suggests various management practices to help prevent or control damage by deer to field crops, orchards, landscapes and gardens. Because every field, orchard, landscape, and garden is different, there is no way any or all of these management practices will achieve perfect deer control, but they should help reduce the damage.

Usually, deer damage plants by browsing on new vegetation during the growing season. However, when food is scarce, deer will eat just about anything to survive. One of the reasons that deer are becoming more of a problem in many parts of the United States is that their numbers are increasing. An Associated Press article on October 15, 2000 stated:

The national deer population, now estimated at 25 million to 30 million, has been growing for decades. Not only have deer adapted to encroaching suburbia, but they have benefited from a series of mild winters, an increase in newly developed areas being declared off limits for hunters and a decline in hunting in some parts of the country...



Photo by USDA/NRCS

Some forecasters believe there could be a point when the deer population will become so large it just can't sustain itself. But no one knows when. "We're not certain when it will max out," Curtis [wildlife biologist Paul Curtis of Cornell University] said. "Deer populations are already at densities a biologist wouldn't have dreamed of 10 years ago." (Associated Press, 2000)

The cost of damage by deer will vary greatly, according to the crops and plants being grown in relation to the number of deer browsing. In the article "Oh, Deer" in the June-July 2002 *Farmer's Digest*, Jim Armstrong, associate professor and wildlife specialist with Auburn University, explained that it is not uncommon for some growers in the Southeast to have \$20,000 to \$30,000 in crop damage (peanuts and cotton) during a crop year. He says:

It's a widespread problem in agriculture. The problem is that it tends to be very site-specific. Depending on the habitat around the field, one person can have no damage and the next can have a lot

of problems. Deer prefer a fragmented habitat that consists of both woodland for cover and open cropland. Farmers may notice more feeding near the edges of the fields near woods, where the deer can feed without straying too far from cover. (Mullen, 2002)

The USDA estimates that total deer damage from auto collisions and crop and timber losses reaches at least \$1 billion a year (Mullen, 2002).

REGULATIONS AND ASSISTANCE

Because deer are protected by game regulations in all states, as well as all Canadian provinces, I strongly suggest you contact the specific wildlife, natural resource, or conservation agency that enforces your state's wildlife regulations before implementing any deer control practice. Some state agencies have specific programs for technical assistance or to compensate for deer damage. Other states, or even local municipalities, may have laws restricting some options for deer management. Producers need to keep current with their state laws and regulations, because they can change from year to year.

The Wildlife Services (WS), an arm of the Animal and Plant Health Inspection Service (APHIS) charged with helping to prevent or reduce wildlife damage, provides technical assistance or direct control. For more information about assistance, contact any state APHIS office. The address and phone number of each state's Wildlife Services State Director and the state's WS activity report is available at <<http://www.aphis.usda.gov/ws/statereportindex.html>>, or by calling the national Wildlife Services Operational Support staff at (301) 734-7921.



MANAGEMENT PRACTICES

There are five general methods for preventing or controlling deer damage to crops. These include exclusion, cultural methods, scare devices, repellents, and culling or harvest. The referenced and enclosed materials provide more detailed information on the use of these methods.

EXCLUSION

Several methods of exclusion are available. They can involve permanent or temporary fences, a wireless deer fence, or other methods of keeping deer from getting to the plants to browse.

Fencing

The most effective method for exclusion is a well-designed fence, and there are several designs available to meet specific needs. Temporary electrified fences are simple, inexpensive, and useful in protecting garden and field crops during snow-free periods. "Baiting" the fence with peanut butter, apples, etc. may enhance the effectiveness of electrified fences. Deer are attracted to these fences by their appearance or smell and are lured into contacting the fence with their noses. This causes an effective shock that trains deer (sometimes) to avoid the fenced area. Permanent, high-tensile, electric fences provide year-round protection from deer and are best suited to high-value specialty or orchard crops.

Permanent woven-wire fences provide the ultimate deer barrier. They require little maintenance but are very expensive to build. In fact, the cost of constructing effective fences often limits their use to areas of intensive agriculture, such as orchards or private gardens.

The Cornell publication *Managing White-Tailed Deer in Suburban Environments: A Technical Guide* states:

For a given deer density, the potential for damage will often be greater on large plantings than smaller ones (Caslick and Decker, 1979; McAninch et al., 1983). Consequently, large areas often require more substantial fencing designs to achieve a level of protection similar to small areas. Based on anecdotal reports and research experiences in New York, vertical electric fence designs seldom provide reliable protection for plantings larger than five acres under intense deer foraging pressure. Slant-wire, electric-fencing systems can protect plantings approximately 50 acres in size. Blocks larger than 50 acres usually require eight-foot-high, woven-wire fencing to reliably prevent deer from entering the area if feeding pressure is high. (DeNicola et al., 2000)

The same publication suggests that fencing systems such as the baited electric wire, fences with three-dimensional outriggers, and slanted and vertical fences up to 11-foot high have kept deer out under some conditions. However, it continues:

Often simple designs are effective only under light deer pressure (Brenneman, 1983; McAninch et al., 1983) or for relatively small areas. Low-cost, easily constructed fences may perform quite well for small areas (less than ten acres) during the growing season when alternative foods are available to deer. Low-profile fences, however, are seldom satisfactory for protecting commercial orchards or ornamental plantings in winter, especially if snow restricts deer from using alternative food sources. Landowners must also check local ordinances and covenants to determine if electric fences can be used, or if fences of any kind can be constructed on their property. (DeNicola et al., 2000)

This 52-page publication discusses many other methods to reduce deer problems, including repellents, scare tactics, and some experimental techniques. It includes an excellent 10-page appendix listing many deer damage control suppliers and materials. The publication (147IB245) can be ordered for \$10.50 postpaid in the U.S. (NY residents add 8% sales tax) from:

Cornell University Media Resource Center
7 Business & Technology Park
Ithaca, NY 14850
(607) 255-2090

The enclosed publication *Controlling Deer Damage in Missouri* contains information and illustrations on constructing and using electric, high-tension, and woven-wire fencing, including the peanut-butter electric fence, the polytape electric fence, the offset electric fence, the vertical electric fence, the slanted electric fence, the electric spider fence, and the wire or plastic mesh fence. It is also available at <<http://muextension.missouri.edu/xplor/miscpubs/mp0685.htm>>.

Wireless Deer Fence

A new, patented Wireless Deer Fence consists of just a post less than 2 feet high, a deer-attractant reservoir, and a battery-powered high-voltage shocker. It is recommended that 3 to 6 posts be used for one-third acre, or 15 to 18 per acre (Williams and Williams, 2002). For information on price, maintenance, and installation for the Wireless Deer Fence posts, visit their website at <<http://www.wirelessdeerfence.com>>, or contact the distributor at:

Wireless Deer Fence
P.O. Box 5604
Bloomington, IN 47407-5604
(866) 468-3337 or (812) 333-5307

Other Exclusion Methods

Another way to exclude deer from small garden areas is to use floating polyester row covers over the crops to be protected. The floating row covers need to be put on each evening and removed in the morning. This method of exclusion was reported to have worked very well by a gardener in Massachusetts (Bye, 2000).

Tree protectors or shelters are used to prevent deer from browsing on young trees. The protectors can be made of polypropylene tubing, plastic tree wrap, or even woven-wire cylinders. Polypropylene tubes are commercially available and come in different diameters for trees or seedlings. Four- or 5-foot shelters are generally needed in areas of heavy deer pressure (Pierce and Wiggers, 1997).

Anecdotal reports suggest that fencing a few pigs in a pen surrounding the garden will keep deer out. It was reported that the deer didn't like something about the pigs (smell, size, or sound) and avoided the garden and pig pen until the pigs were removed.

CULTURAL METHODS

Deer damage to landscape plants and flowers usually occurs when the deer's natural browse is low, generally in the late fall through early spring. By choosing species that are undesirable to deer, you can reduce the amount of damage to these plants. Plants with a bitter or spicy taste, milky sap, or thorny, hairy, or tough leaves and stems are unpalatable to deer. However, the presence of undesirable plants does not deter deer from feeding on other nearby plants that they do find palatable. If there is intensive feeding pressure caused by drought or snow or a high deer density, deer will browse even the most undesirable plants, and other methods will be necessary to control damage.

There is an excellent online deer-resistant-plant encyclopedia that provides plant characteristics and pictures of many species and is searchable by common or botanical names, by plant characteristics, and by hardiness zones. It is located at <http://www.mydeergarden.com/Plant_DB/plant_db.htm>.

For more information on deer-resistant plants, see the enclosed publications: *Controlling Deer Damage in Missouri* at <<http://muextension.missouri.edu/xplor/miscpubs/mp0685.htm>>, and *Resistance of Ornamentals to Deer Damage* at <<http://www.agnr.umd.edu/MCE/publications/PDFs/FS655.pdf>>.

Many other states have publications listing additional deer resistant plants that are more adaptable to the region. Three of these sites are Texas's *Deer in the Urban Landscape* at <<http://aggiehorticulture.tamu.edu/PLANTanswers/publications/deer.html>>, Montana's *Deer-resistant Ornamental Plants for Your Garden* at <<http://www.montana.edu/wwwpb/pubs/mt9521.pdf>>, and Colorado's *Preventing Deer Damage* at <<http://www.ext.colostate.edu/Pubs/NATRES/06520.html>>.

SCARE DEVICES

Methods for frightening or hazing deer may be effective and economical in some situations, especially at the first sign of a problem. Once deer establish a pattern of movement, it is difficult to get them to change. Propane cannons or gas exploders set to detonate at irregular intervals are the most common scare devices, and they are sometimes available for loan from wildlife refuges or wildlife agencies. Strobe lights and sirens can also be effective; even fireworks and gunfire can be used as a temporary method. Playing a radio that goes on and off during the night will work for a short time, as will attaching a sprinkler system or lights to motion detectors. The problem with all scare devices is that deer become accustomed to them within a week or two, even when the devices are moved occasionally. Varying the scare devices every week may extend the protection for a longer period. Scare devices are usually a great short-term solution, but don't depend on them for a whole growing season.



Dogs

Another scare option is the use of dogs that are kept behind an “invisible” fence by the use of a radio transmitter, an underground copper wire, and a special dog collar with receivers. Stationed inside the invisible fence, the dogs chase the deer out of the dogs’ territory. The collar, when activated by the underground wire, first gives an audible signal, and if the dogs don’t stop they receive a mild, harmless shock. The dogs must be trained to heed the signals. Placing the dogs’ kennel and water in one area and the food in another area may help keep the dogs moving around their territory.

The Cornell publication *Managing White-Tailed Deer in Suburban Environments: A Technical Guide* suggests that the effective area covered by 2 dogs behind invisible fence is about 60 acres or 500 yards from their kennel during the summer. The area is reduced to about 10 acres during winter, when snow restricts the movement of the dogs, though snowfall doesn’t affect operation of the electronics (DeNicola et al., 2000).

The same publication cautions that care and feeding of the dogs can be time-consuming and that a family pet may not provide adequate protection, because it is not patrolling all the time. The authors explain: “The breed and disposition of the dog will influence effectiveness of this technique. Large dogs that aggressively patrol the area appear to work best. The complete protection of plant materials should not be expected, as deer react to dogs similar to other scare devices or repellents” (DeNicola et al., 2000). (Ordering information for this publication is provided above in the [Exclusion](#) section.)

REPELLENTS

Repellents are best suited for high-value crops in orchards, nurseries, and gardens. High cost, limitations on use, and variable effectiveness make most repellents impractical on row crops, pasture, or other large areas. There are two kinds of repellents: *contact* and *area*. Contact repellents are applied directly to the crop plants and repel by taste. Some of these contact repellents use inedible egg solids to repel deer, while others are derived from cayenne pepper extract and cannot be applied to the edible portion of the crop because they will leave a hot taste. Repellents made from rotten eggs have worked better than several other products in an Alabama Experiment Station test (Anon., 2000). Area repellents are applied near the plants to be protected and repel deer by smell alone. Some area repellents use ammonium soaps of fatty acids, bone tar oil, and/or putrefied meat scraps. Bags of human hair and suspended bars of ordinary hand soap can also be used as area repellents for deer.

The deer’s learning ability causes many repellents to fail over time. A good way to counter such acclimation is to switch repellents periodically and to alter their positions near the crop. But as with planting unpalatable ornamentals, remember that *hungry* deer will ignore both taste and odor repellents.

CULLING OR HARVEST

Culling the animals is another management option. Some states issue permits to landowners to shoot deer outside the normal sport hunting season. Only those animals that are damaging crops can be removed, and such permits are often publicly controversial.

Sport hunting can reduce deer populations and damage over larger regional areas. To be effective over the long term, does (female deer) must be removed from the deer population. A “bucks-only” deer hunt does little to reduce the deer population or the damage done by overpopulated deer herds. Landowners can reduce the deer population in their area by soliciting hunters who have “either-sex” deer permits and who will shoot does. By allowing hunting, landowners can provide controlled public access to a recreational resource while reducing deer damage.

DEER FEEDING

A 36-page educational booklet entitled *Feeding Wildlife...Just Say No!* is available from the Wildlife Management Institute. This publication helps explain why supplemental feeding of big game is costly and rarely beneficial to wildlife in the short or long run. It helps explain to the public why wildlife should not be fed, particularly during winter and other times of stress (Anon., 2001). The booklet is available for \$3.25 per copy postpaid from:

WMI Publications
P.O. Box 34646
Washington, DC 20043
(202) 371-1808; Fax: (202) 408-5059

CONCLUSION

The value of the crop, the amount of deer pressure, and other variables will affect the suitability and cost effectiveness of various deer control practices. Check with your state's appropriate wildlife or natural resource agency on any game regulations that may restrict your deer management choices.

REFERENCES

- Anon. 2000. Rotten deer repellents. *Organic Gardening*. July-August. p. 15.
- Anon. 2001. Wildlife feeding booklet a huge hit. *Outdoor News Bulletin*. July 16. p. 4.
- Associated Press. 2000. Deer population posing problems. *Environmental News Network Web site*. <<http://www.enm.com/news>>. October 15. 2 p.
- Brennemen, R. 1983. Use of electric fencing to prevent deer browsing in Allegheny hardwood forests. *Eastern Wildlife Damage Control Conference*. Vol. 1. p. 97-98.
- Bye, Muriel. 2000. Easy, effective deer control. *Organic Gardening*. May-June. p. 66.
- Caslick, J. W., and D. J. Decker. 1979. Economic feasibility of a deer-proof fence for apple orchards. *Wildlife Society Bulletin*. Vol. 7. p. 173-175.
- DeNicola, Anthony J., Kurt C. VerCauteren, Paul D. Curtis, and Scott E. Hygnstrom. 2000. *Managing White-Tailed Deer in Suburban Environments: A Technical Guide*. Cornell University. 147IB245. 52 p.
- McAninch, J. B., M. R. Ellingwood, and R. J. Winchcombe. 1983. Deer damage control in New York agriculture. *New York State Department of Agriculture and Markets, Division of Plant Industry*, Albany, N.Y.
- Mullen, Matt. 2002. Oh, deer. *Farmer's Digest*. June-July. p. 84-87.
- Pierce II, Robert A., and Ernie P. Wiggers. 1997. Controlling deer damage in Missouri. *University of Missouri-Columbia*. MP685. November 1. 21 p. <<http://muextension.missouri.edu/xplor/miscpubs/mp0685.htm>>.
- Williams, Greg, and Pat Williams. 2002. Fenceless deer fencing? *HortIdeas*. March. p. 32.

ENCLOSURES

- Kays, Jonathan S., Lisa Curtis, and Michael V. Bartlett. No date. Resistance of ornamentals to deer damage. *Maryland Cooperative Extension*. Fact Sheet 655. 8 p. <<http://www.agnr.umd.edu/MCE/publications/PDFs/FS655.pdf>>.

Pierce II, Robert A., and Ernie P. Wiggers. 1997. Controlling deer damage in Missouri. University of Missouri-Columbia. MP685. 21 p. <<http://muextension.missouri.edu/xplor/miscpubs/mp0685.htm>>.

By **Lance Gegner**, NCAT Agriculture Specialist

Edited by Paul Williams

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The Electronic version of Deer Control Options is located at:

HTML:

<http://www.attra.ncat.org/attra-pub/deercontrol.html>

PDF

<http://www.attra.ncat.org/attra-pub/PDF/deercontrol.pdf>