G3083

Controlling Deer Damage In Wisconsin

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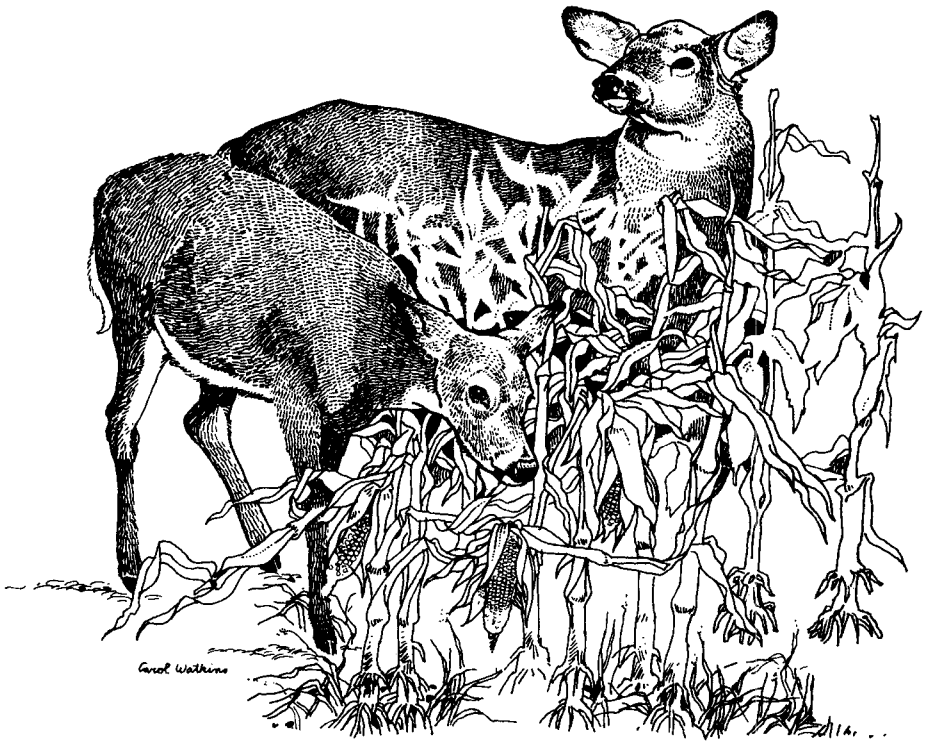
and Philip Peterson

The white-tailed deer is Wisconsin's official wildlife animal, and it is important to the state's economy. In 2000, bow and gun hunters puchased 1,038,000 licenses and killed in excess of 618,000 deer. Deer gun and bow license sales alone totalled about $25 million. The dollars generated from deer licenses support conservation efforts for many species. In 1992, the average gun hunter spent an estimated $375 on transportation, food, lodging, equipment and licenses, bolstering Wisconsin's economy by over $252 million. The estimated value of venison and buckskin from harvested deer is about $34 million. Landowners and vacationers enjoy viewing deer, although it is difficult to assign a dollar amount to aesthetic value.

On the other hand, deer have a negative economic impact—they damage crops and frequently cause automobile accidents. Crop damage is a major concern. In 1997, it is estimated that growers lost up to $28 million worth of crops in Wisconsin due to deer damage (Deer 2000 and Beyond Ag Damage Study Group). In 2000, liberalized deer harvests were necessary to reduce the deer herd from over 1.8 million to nearer the Wisconsin Department of Natural Resources' (DNR) management goal of 1 million. Deer damage is most abundant in southern and central Wisconsin, where farming activity is intensive.

Deer, and the damage they cause, are part of the larger problem of wildlife—a public resource—on private land. Wildlife cannot simply be eliminated when it conflicts with a landowner's use of land. Neither can landowners bear the entire burden of support for these public resources. The solution lies somewhere between these extremes.



Wisconsin must manage its deer herd to satisfy several interest groups. Most landowners enjoy having some deer on their property, despite real or potential damage. This fact, coupled with the economic and aesthetic values of deer, suggests that a combination of herd control through hunting and a conscientious and reasonable effort at damage control will serve everyone's needs.

Deer damage compensation

In the interest of promoting landowners' tolerance for wildlife, Wisconsin has provided assistance to growers whose crops are damaged by wildlife since 1931. Wisconsin has operated various wildlife damage programs. Wisconsin Statute 29.889 authorizes the DNR to operate the Wildlife Damage Abatement and Claims Program (WDACP), as it is called today. This program provides assistance to commercial agricultural crop producers for damage sustained by wild deer, turkeys, black bear and Canada geese.

The WDACP is funded almost exclusively by hunters' dollars. A $1–$2 surcharge is included in the cost of deer, small game, black bear, turkey, sportsman and conservation patron licenses to pay for the program. The license surcharge generates approximately $1 million annually. In addition, revenues generated by bonus tag sales are utilized solely by the WDACP. Bonus tag ($12 resident and $20 non-resident) fees have generated millions of dollars for the WDACP, but remain inconsistent due to their fluctuating numbers. For example, in 1999, hunters purchased 438,868 bonus tags, but in 2000, they purchased only 98,038 due to free "Zone T" antlerless tags available throughout most of Wisconsin. The amount of funding from bonus tag sales varies depending on the status of the deer herd in the various deer management units.

The DNR regulates the WDACP and individual counties administer it. All costs incurred by the counties are reimbursed by the DNR. The United States Department of Agriculture Wildlife Services program (USDA-WS) also contributes funds to administer the WDACP in some counties throughout Wisconsin. The WDACP focus is on damage abatement, or the reduction of crop damage or loss. Abatement tools used in Wisconsin include repellents, scare devices, fences and herd management.

Both the state and the grower share the costs of implementing abatement practices for WDACP projects. The state pays 75% and the grower pays 25%. However, temporary abatement methods are provided at no cost, with the grower's installation/application of the abatement method constituting their 25% obligation. Permanent fence projects are cost-shared at 75/25 for the entire project, including site preparation, materials and installation. In situations were abatement has not reduced damage to acceptable levels, financial compensation is available for eligible growers. The maximum compensation payment is $15,000 annually for each claim with a $250 deductible. The WDACP is available to assist commercial growers of agricultural crops, orchards, Christmas trees, nurseries, stored crops, apiaries and livestock, with damage caused by wild deer, turkey, black bear and/or Canada geese.

The WDACP does not provide abatement or claims assistance for deer damage to landscaping, family/residential gardens or vehicle/property damage.

To be eligible for the program:

1. Land must be within a county that participates in the WDACP (69 of 72 counties in the state participate).
2. Crop owners must notify the county damage specialist within 14 days of the onset of the damage.
3. Crop owners must comply with administrative record keeping requirements and recommended abatement measures.
4. Crop owners must allow hunting access (a minimum of two hunters per 40 acres of huntable land) on all enrolled properties for the species causing damage. On leased land, the crop owner must obtain permission from the landowner to control hunting access.
5. All lands enrolled shall have been in production or in an approved USDA Natural Resource Conservation Service program for at least five years.
6. Crop owners must notify the county damage specialist at least ten days prior to harvest, to allow adequate time to assess damage.
7. Failure to comply with any WDACP eligibility conditions(s) may make an applicant ineligible for compensation.

The DNR and USDA–WS have entered into annual cooperative agreements since 1986, allowing the USDA–WS to act as agent on behalf of counties in implementing the WDACP. USDA–WS has grown from three cooperative agreements with counties in 1987 to 43 cooperative agreements in 2001.

Interested crop owners should contact their county Land Conservation Department, local DNR office or USDA–WS office for additional program details if they observe or anticipate wildlife damage.

Ways to reduce deer damage

Herd management

The DNR manages deer in Wisconsin on a management unit basis. There are now about 132 deer management units in the state. The DNR establishes an overwinter deer population goal for each unit. In northern Wisconsin, the goal is based on the biological carrying capacity of the range. In central and southern Wisconsin, deer population goals are based on hunter demand and public tolerance of crop damage and auto-deer collisions. Therefore, the southern herd is well below the biological carrying capacity. Every year, the DNR estimates the size of the deer herd in each management unit and recommends a harvest based on the unit's population goal.

In Wisconsin, there are three ways to legally remove deer from an area.

Removing live animals

In some urban areas, such as city parks, deer have been captured alive and moved. This is accomplished with rocket nets, drop-door box traps, drop nets or tranquilizer guns. These techniques are very expensive and require the expertise of professionals. Live trapping is not considered a practical or long-term solution. Special permits are necessary.

Shooting permits

In cases of extreme loss (at least $1,000) or extraordinary circumstances, agricultural damage deer shooting permits may be issued by the DNR. These permits allow the crop owner to remove deer causing damage to crops. Shooting permits are also appropriate in places where there is no legal hunting season, such as airports, metropolitan areas, parks and arboretums. In these circumstances, skilled hunters or professional sharpshooters operating under a shooting permit can be effective at reducing the number of deer causing damage. While sometimes controversial, shooting permits often provide the most economical and long-term solution. Shooting permits have specific criteria that vary by situation. Contact your local county damage specialist or your local DNR biologist for further details.

Hunting seasons

Killing deer during the legal season is probably the best way to control deer populations. In response to recent large herds, the DNR continues to implement regulations including ‘‘antlerless only’’ permits, special ‘‘bonus deer’’ permits, extended seasons, and post-season hunts. Landowners can reduce the deer population in their area by soliciting hunters who have either-sex (hunter’s choice) deer permits and will shoot does. Hunters with buck tags contribute little to population reduction. By allowing hunting, landowners provide public access to a public resource while reducing deer damage.

If you don’t hunt, or don’t feel knowledgeable about hunting, consult a DNR wildlife manager. The solution often involves contacting a group of hunters, explaining the situation and letting them conduct the hunt. Many will accept some restrictions in return for a good place to hunt. Plans should include designating a specific location for each hunter. This makes for a safe hunt and allows you to determine how many hunters you can accommodate at one time.

Try to plan your hunting objective early. The application deadline for deer permits is in July.

Leasing your land for hunting privileges is another consideration. You might offset your crop damage losses with a hunting lease. Leases may be daily or for one or more years. For more information on leasing, contact the University of Wisconsin-Madison extension wildlife specialist.

Birth control

Research on the use of reproductive inhibitors is underway. However, delivering the reproductive inhibitor to the deer remains a problem. This technique for herd control will be best suited for urban parks or similar areas. It is unlikely that contraceptive techniques can or will be applied in rural or agricultural settings.

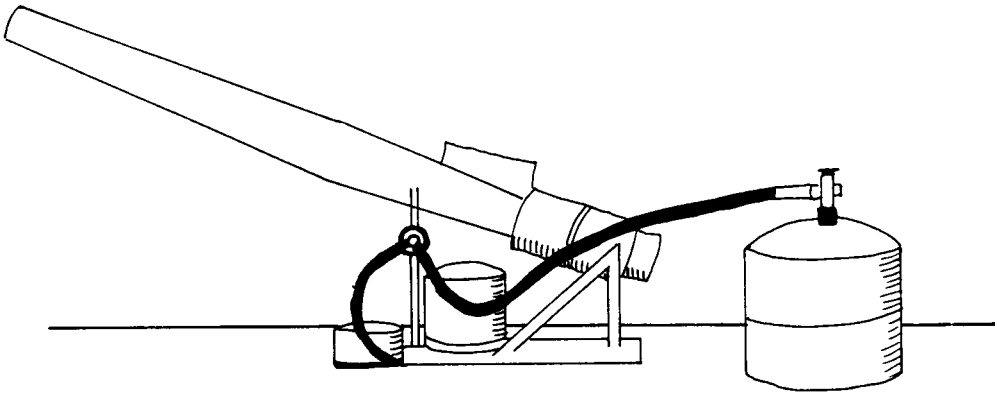


Figure 1. Propane exploders are a common scare device.

Scare devices

One of the keys to success with scare devices or repellents is to act at the first sign of damage. It is difficult to break a deer’s behavior pattern after it is established.

Gas exploders set to detonate at regular intervals are the most common scare devices (figure 1). They are effective for about one week and should be used only temporarily.

To maximize the effectiveness of exploders, move them every few days and stagger the firing sequence. Deer quickly become accustomed to a regular pattern. You can increase the noise level by raising the exploders off the ground. USDA–WS has exploders available for temporary use.

A dog on a long run can keep deer out of a limited area, but caring for and feeding a dog can be time consuming. Free-running dogs are not advisable unless you keep them in an enclosed area. Research on the application of electronic dog fences for controllinng deer damage is underway.

Pyrotechnics and gunfire may provide quick but temporary relief from deer damage. Therefore, don’t expect relief from such tactics for an entire growing season.

Repellents

Repellents that help prevent deer from feeding on crops are useful in damage control programs. Some materials are chemical formulations designed to repel deer; others are readily available materials that affect deer behavior.

Repellents are best for orchards, nurseries, Christmas trees, gardens and ornamental plants. Their value is limited on row crops, forages, and other large acreage crops because of high costs, use restrictions and variable results. Repellents are most valuable when integrated in a damage abatement program that includes several repellents, fencing, scare devices and herd management. It is important to anticipate deer-damage problems. Apply repellents at the first sign of damage to prevent deer from establishing a feeding pattern in your fields.

There are two kinds of repellents—contact and area. Apply contact repellents directly to plants; their taste repels deer. They are most effective on dormant trees and shrubs. In fall and winter, apply contact repellents on dry days when temperatures are above freezing. Treat young trees completely. On older trees, it is more economical to treat only terminal growth within reach of deer (6 feet above maximum snow depth). New growth that appears after treatment is unprotected. Contact repellents may reduce the palatability of forage crops and should not be used on plant parts destined for human consumption.

Area repellents repel deer by odor. Apply area repellents near plants you want to protect. Border applications of area repellents may protect large areas at relatively low cost. Also, crops grown for human consumption can be protected because area repellents aren't applied directly to plants.

Remember, measure success with repellents by the reduction, not total elimination, of damage. The effectiveness of repellents depends on several factors. Rainfall dissipates some repellents, so you may need to apply them again after a rain. Some repellents don't weather well—even without rainfall. Hunger and the availability of other, more palatable deer food dictates the effectiveness of repellents. When deer are very hungry, they may ignore both taste and odor repellents.

If you use repellents, don't overlook new preparations or imaginative ways to use old ones. New repellents constantly appear in the market place. The following discussion of common repellents may be incomplete, but it indicates the wide range of repellents available. The repellents are grouped by active ingredient and include a brief description of use, application rates and costs. Product labels provide all necessary information on use and must be followed to the letter, not only to meet legal requirements, but also to achieve maximum success. The active ingredients are shown in parentheses beneath the trade names. Cost estimates are provided for comparative purposes. "Home remedies" such as blood meal, feather meal, cat feces, mothballs, creosote and rotten eggs have been used with mixed success.

Deer-Away (37% putrescent egg solids)

This contact (odor/taste) repellent has been used extensively in western conifer plantations and is reported to be 85% to 100% effective in field studies. It is registered for use on ornamental and Christmas trees and fruit trees (before they flower). Apply it to all susceptible new growth and leaders. Deer-Away weathers well and remains effective for two to six months. One gallon of liquid or one pound of powder costs about $32 and covers 400 three-inch saplings or 75 four-foot evergreen shrubs.

Hinder (Ammonium soaps of higher fatty acids)

This area repellent is one of the few registered for use on edible crops. You can apply it directly to vegetable and field crops, forages, ornamentals, and fruit trees. Its effectiveness usually lasts from two to four weeks, but can vary due to weather and application techniques. Reapplication may be necessary after heavy rains. For fields less than 30 acres, you can treat the entire field; for fields greater than 30 acres, apply an 8- to 15-foot strip around the perimeter of the field. Apply at temperatures above 32°F. Four gallons of liquid cost about $80, and when mixed with 100 gallons of water, will cover one acre. Hinder can be used with most pesticides.

Thiram (11% to 42% tetramethylthiuram disulfide)

Thiram, a fungicide that acts as a contact (taste) deer repellent, is sold under several trade names. It is most often used on dormant trees and shrubs. A liquid formulation is sprayed or painted on individual trees. Although Thiram itself does not weather well, adhesives can be added to the mixture to increase its resistance to weathering. Thiram-based repellents also protect trees against rabbit and mouse damage. Two gallons of 42% Thiram cost about $56, and when mixed with 100 gallons of water, will cover one acre.

Miller's Hot Sauce Animal Repellent (2.5% capsaicin)

This contact (taste) repellent is registered for use on ornamental, Christmas and fruit trees. Apply the repellent with a backpack or trigger sprayer to all susceptible new growth, such as leaders and young leaves. Do not apply to fruit-bearing plants after fruit set. Vegetable crops also can be protected if sprayed before edible parts develop. Weatherability can be improved by adding an anti-transpirant such as Wilt-Pruf or Vapor Gard. Hot Sauce and Vapor Gard cost about $80 and $30 per gallon respectively. Eight ounces of Hot Sauce and two quarts of anti-transpirant mixed with 100 gallons of water will cover one acre.

Ro-pel (benzyl diethyl [(2,6 xylylcarbamoyl) methyl] ammonium saccharide (0.065%), thymol (0.035%)

Ro-pel repels deer with its extremely bitter taste. Apply Ro-pel once each year to new growth. It is not recommended for use on edible crops. Spray at full strength on nursery and Christmas trees, ornamentals and flowers. One gallon costs $50 and covers about one acre of 8- to 10-foot trees.

Hair bags (human hair)

Human hair is an odor (area) repellent that costs very little but does not consistently repel deer. Place two handfuls of hair in fine-mesh bags (onion bags, nylon stockings). Where severe damage occurs, hang hair bags on the outer branches of individual trees with no more than three feet between individual bags. For larger areas, hang several bags, three feet apart, from a fence or cord around the perimeter of the area to be protected. Attach the bags early in spring and replace them monthly through the growing season. You can get hair at local barber shops or salons.

Bar soap

Several studies and numerous testimonials have shown that ordinary bars of soap applied like hair bags can reduce deer damage. Drill a hole in each bar and suspend with a twist tie or string. Each bar appears to protect a radius of about one yard. Any inexpensive brand of bar soap will work.

Deer fencing

Where deer are abundant or crops are particularly valuable, fencing may be the only way to effectively minimize deer damage. Several fencing designs are available to meet specific needs. Temporary, electrified fences are simple, inexpensive fences useful in protecting garden and field crops during snow-free periods. Deer are curious and 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 to avoid the fenced area. Permanent, high-tensile, electric fences provide year-round protection from deer and are best suited to high-valued specialty or orchard crops. The electric shocking power and unique fence designs present both psychological and physical barriers to deer. Permanent woven-wire fences provide the ultimate deer barrier. They require little maintenance but are expensive to build. Fencing in general is expensive. Before constructing a fence, consider:

- The damage history of the area. Assemble information on past claims, field histories, deer numbers and movements to help you decide on an abatement method.
- Deer pressure. This reflects both the number of deer and their level of dependence on agricultural crops. If deer pressure in your area is high, you probably need fences.
- Crop value. Crops with high market values and perennial crops where damage affects future yields and growth often need the protection fencing can provide.
- Field size. In general, fencing is practical for areas of 40 acres or less. However, the cost per acre for fencing usually decreases as the acreage protected increases.
- Cost-benefit analysis. To determine the cost effectiveness of fencing and the type of fence to install, weigh the value of the crop to be protected against the acreage involved, the cost of fence construction and maintenance, and the fence's life expectancy.
- Rapidly changing fence technology. If you intend to build a fence yourself, consult an expert, such as a USDA-WS technician or County Damage specialist. Detailed fencing manuals are also available from most fencing manufacturers.
- Previous versions of this bulletin described a technique for baiting fence wire with a peanut butter mixture. Recent field experience suggests that such baiting is not necessary.

Temporary electric fencing

Temporary electric fences provide inexpensive protection for many crops during periods without snow. They are easy to construct, do not require rigid corners, and materials are readily available. Install fences at the first sign of damage to prevent deer from establishing feeding patterns in your crops. Weekly inspection and maintenance are required.

Polytape fences. Visible Grazing Systems (VGS), Baygard, and other types of poly wire ribbon or braided wire are similar and used in the same way. These materials are very strong and portable. You can use polytape fences to protect up to 40 acres of vegetable and field crops under moderate deer pressure. Deer receive shocks through nose-to-fence contact and they learn to avoid fenced areas.

To build a polytape fence (figure 2), follow these steps.

(1) Drive ⅝-inch round fiberglass posts 2 feet into the ground at the corners.

(2) String two strands of polytape around the corners and apply light tension (more strands can be used).

(3) Use square knots or half-hitches to make splices or to secure the polytape to corner posts.

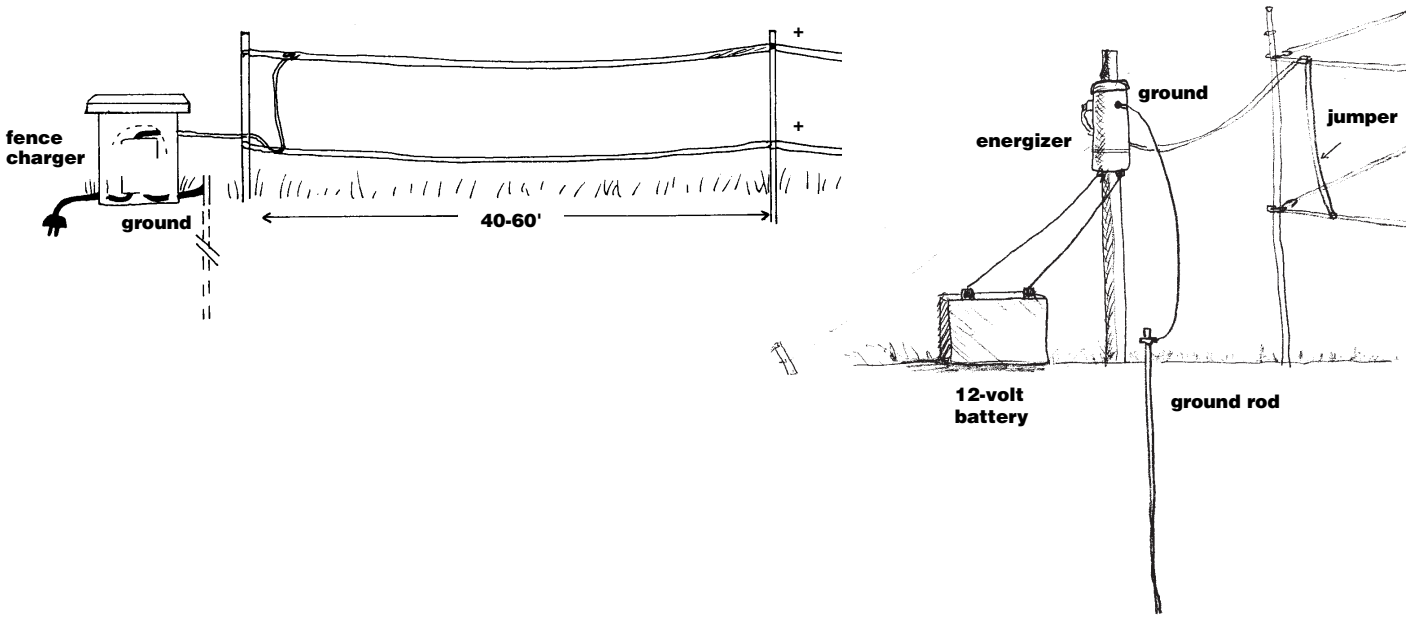
(4) Set 4-foot fiberglass rods along the wires at 30-40 foot intervals.

(5) Attach the two strands of polytape to insulators on the rods at one and three feet above ground level and apply 50 pounds of tension.

(6) Connect the polytape to the positive (+) post of a well-grounded fence charger.

To maintain the fence, check it regularly for damage by deer and grounding by vegetation.

Figure 2. The polytape fence.



Permanent high-tensile electric fencing

High-tensile vertical fencing can provide year-round protection from deer damage. Many designs are available to fit specific needs, but slanted fences or other non-vertical designs are no longer used. All require strict adherence to construction guidelines concerning rigid corner assemblies and fence configurations. Frequent inspection and maintenance are necessary. High-tensile fences have a 10- to 20-year life expectancy.

Vertical fences are effective at protecting large truck gardens, orchards and other fields from moderate to high deer pressures. Because of the prescribed wire spacing, deer attempt to go through the fence and are effectively shocked. There is a wide variety of fence materials and specific designs, including the number of wires (5, 7, 9 or more) you can use. We recommend that you consult a USDA-WS office or employ a local fence contractor.

To build a nine-wire vertical deer fence (figure 3), follow the steps below.

(1) Install rigid corner assemblies where necessary.

(2) String a 12½-gauge, high-tensile wire around the corner assemblies and apply light tension.

(3) Set 8-foot line posts along the wire at 33-foot intervals.

(4) Attach the wire to insulators at 2 inches above ground level and apply 150 to 250 pounds of tension.

(5) Attach the remaining wires to insulators at the spacing indicated in figure 5 and apply 150 to 250 pounds of tension.

(6) Connect the second, fourth, sixth and eighth wires from the top to the positive (+) post of a well-grounded, low-impedence fence charger.

(7) Connect the top, third, fifth, seventh and bottom wires directly to ground. The top wire should be negative for lightning protection.

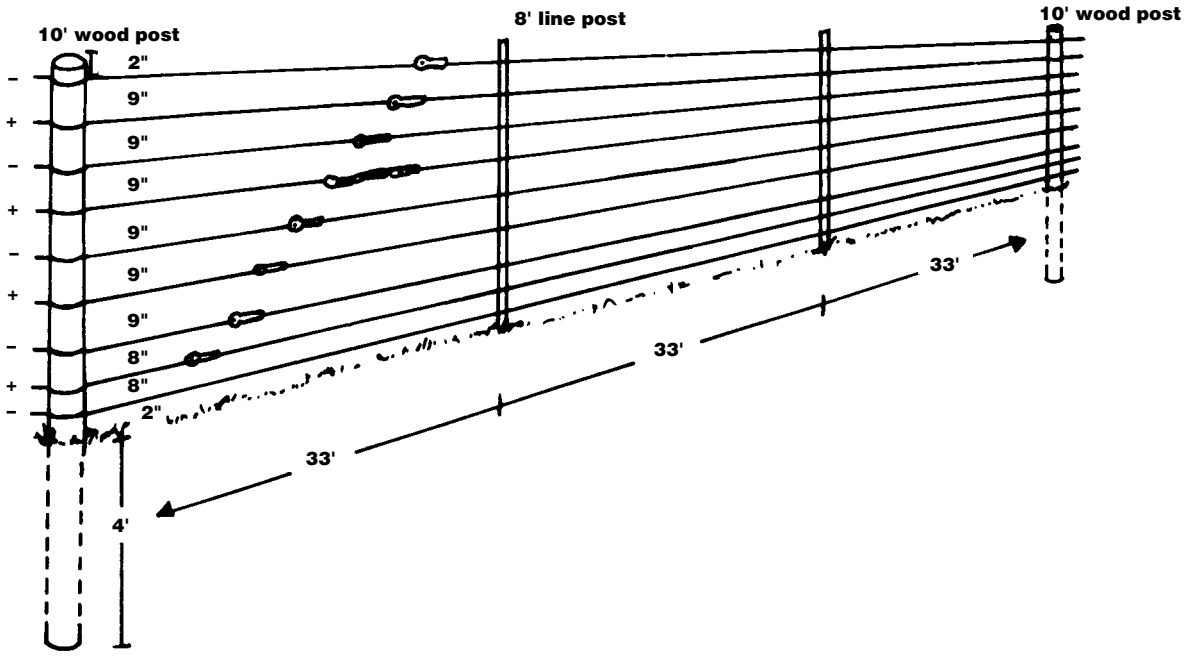
(8) Clear and maintain a 6- to 12-foot open area outside the fence so deer can see it.

Maintenance includes weekly fence inspection and voltage checks.

Permanent woven wire fencing

Woven wire fences have long been the most effective deer abatement available. In the past, the high cost of these systems made them prohibitive for most deer damage situations. New product developments have improved their life spans, cost and effectiveness. Modern woven wire fences are made of high tensile steel wire eight feet in height. The mesh size of this product is variable, but most deer barrier fences installed today have 17–20 horizontal strands and 6"–12" of vertical strands. Eight-foot high tensile woven wire fence projects generally cost under $4 per linear foot for installation and materials, making this system economically feasible for high value crops. Installation of modern woven wire fences requires specialized equipment and expertise. For detailed information regarding installation specifications and/or a list of fence installation contractors, contact your county damage specialist or USDA-WS office. The eight-foot high tensile woven wire fence is the standard permanent deer fence used by the WDACP.

Figure 3. The nine-wire vertical deer fence. Note: the seven-wire fence described in previous editions of this bulletin has been expanded to nine wires to prevent reported deer penetration of the previous 12" spacing. The low 2" wire (strung very tightly) prevents deer from squeezing under the fence**.**



Barrier fencing

The protection of crops from deer damage using barriers has become more common and necessary. This method provides an artificial barrier installed to protect the crop from deer damage (figure 4). This can be as simple as wrapping snow fences around evergreen trees/shrubs in the winter. Farmers located in areas with high deer numbers have commonly installed barriers around corn cribs and other stored crop facilities. Most home gardens can be protected with some type of barrier at a reasonable cost. Common products used for artificial barriers include tree trunk guards, snow fences, plastic hazard fences, welded wire fences, plastic erosion control fences and commercially available plastic fences designed specifically for controlling deer damage. Barrier fence height generally must be higher as larger areas are protected. A home garden may only require a 5-foot barrier while a deer-proof barrier fence around a game farm may be 10-14 feet high. Materials are available at most garden centers, nurseries and farm supply outlets. Many types of barriers can be aesthetically appealing.

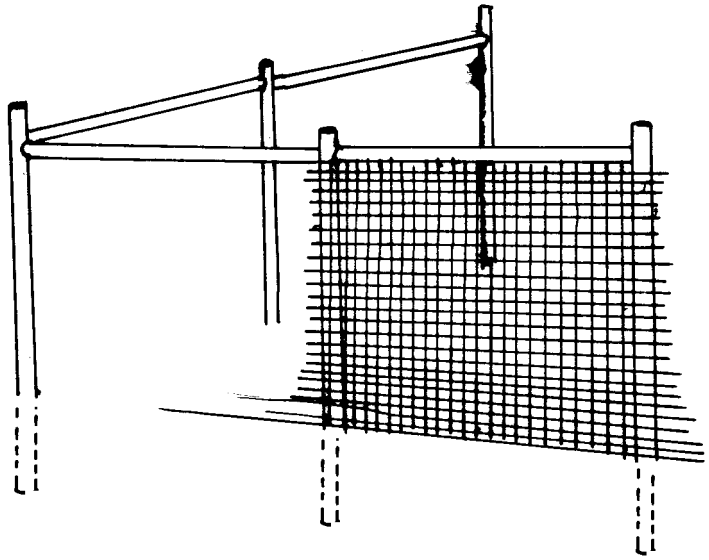
Fencing tips

Most fencing, except temporary electric and barrier fencing, is difficult to install by yourself and requires specialized equipment. We recommend you contract with a professional fence installer for such projects. You can easily install temporary electric and barrier fences. Do not buy cheap materials to reduce costs. This will only reduce the fence's effectiveness and life span. Fences must be properly installed. Do not deviate from construction guidelines and/or manufacturer's instruction. Prepare fence lines prior to construction. It is easier and less expensive to install and maintain fences on clear, level runs. Minimize corners to increase fence strength and reduce costs. Keep electric fences at maximum voltage. Make gates as strong and effective as the rest of the fence, individual modification may be necessary. Control vegetation near fences by mowing or applying herbicides to avoid problems. On slopes or highly erodible soils, maintain a good sod cover beneath fences to avoid fence line erosion. Regular inspection and maintenance are necessary to ensure the effective operation and longevity of most fences.

Sources of supply

Most nurseries, garden centers, hardware stores, farm supply stores and farm cooperatives sell commercial repellents and fencing materials. Locating other materials like human hair may require some ingenuity. If you have difficulty finding these products, please contact USDA-WS for further information.

Figure 4. The deer barrier woven-wire fence.



Additional reading

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Big Game of North America: Ecology and Management, 1978, Wildlife Management Institute, Stackpole Books, Harrisburg, PA.

A Century of Wisconsin Deer, 1966, Otis S. Bersing, Wisconsin Conservation Department (now DNR), Madison, WI,.

The White-Tailed Deer in Wisconsin, 1956, Burton L. Dahlberg and Ralph C. Guettinger, Technical Bulletin No. 14, Wisconsin Conservation Department (now DNR), Madison, WI.

The Deer of North America, 1956, edited by Walter P. Taylor, Wildlife Management Institute, Stackpole Books, Harrisburg, PA.

The Journal of Wildlife Management and The Wildlife Society Bulletin, published by The Wildlife Society, includes numerous scientific articles on deer.

For more information

- USDA–WS Rhinelander: 1-800-228-1368
- USDA–WS Waupun: 1-800-433-0688
- DNR Wildlife Damage Abatement and Claims Program, GEF II, WM-4, 101 S. Webster St., Madison, WI 53707
- Extension wildlife specialist, Department of Wildlife Ecology, 1650 Linden Drive, Madison, WI 53706
- DNR Urban Wildlife Biologist, 2300 N. Martin Luther King Blvd., Milwaukee, WI 53212
- Internet Center for Wildlife Damage Management: http://wildlifedamage.unl.edu/

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