



Ornamental and Garden Plants: Controlling Deer Damage

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Oklahoma's white-tailed deer (*Odocoileus virginianus*) population has increased from 40,000 to more than 250,000 since the 1960s. As the deer population expanded, deer moved into peripheral suburban areas. Increasingly, homeowners at the rural/urban interface must deal with damage to ornamental and garden plants. Land use patterns often change in areas adjacent to rural subdivisions or where a number of homes are being built. Land taken out of agricultural production will generally become good deer habitat in several years if it isn't already. As deer begin moving into an area, homeowners initially enjoy seeing them and may actually encourage deer to come into their yard by feeding them. Rural subdivisions may ban hunting or place restrictions on firearm use to protect their deer or for safety reasons. Homeowner attitudes begin changing after deer numbers increase to the extent that shrubbery shows heavy browsing and gardens become difficult to grow because of continued depredation. In addition to browsing, damage may occur in the fall when bucks begin rubbing antlers on small trees or young nursery stock.

Commonly Used Control Methods

The problem of damage control is not an easy one to solve. Trapping and moving excess deer is often suggested by homeowners as a humane alternative to hunting with guns or even limited hunting with archery tackle. However, at \$200 to \$500 per animal, the cost to move enough deer to lower damage to tolerable levels is definitely prohibitive. It should be recognized that most areas of Oklahoma are well populated with deer. Any deer moved to another area will only shorten food supplies for both resident and transplanted animals. Nature will then control the excess through starvation or decreased reproductive success because of chronic malnutrition. At best, trapping and relocating problem deer is only a short term solution.



Deer damage control methods fit into six categories:

- 1) exclusion—by electric fence or eight-foot high, deer-proof fence (Figures 1 and 2),
- 2) scare or frightening tactics—with tethered dogs, gas exploders, fireworks or discharging firearms,
- 3) habitat modification,
- 4) population reduction through sport hunting,
- 5) repellents—area repellents repel by smell and contact repellents repel by taste, and
- 6) alternative plantings.

Control methods other than an eight-foot high, deer-proof fence or an electric fence (e.g., Figures 1 and 2) reduce damage by 50 to 75 percent at best, and often much less. A deer-proof fence does not fit well with most landscaping plans and can be expensive if large areas are to be protected. For small gardens, a deer-proof fence can be cost effective. They are easily constructed using standard hog wire fence and 12-foot posts. Electric fences are less expensive and can be just as effective; however, they do require greater maintenance. For best results they should be constructed before serious damage occurs and electrified at all times. Researchers have had some success with a three-wire electric fence ("New Hampshire" spacing) when baited aluminum foil strips are attached at 5- to

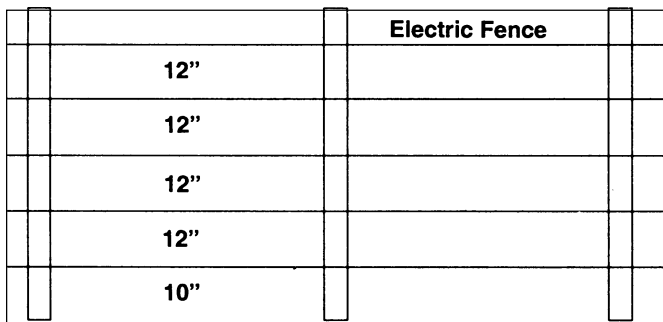


Figure 1. The “Penn State” five-wire electric deer fence.

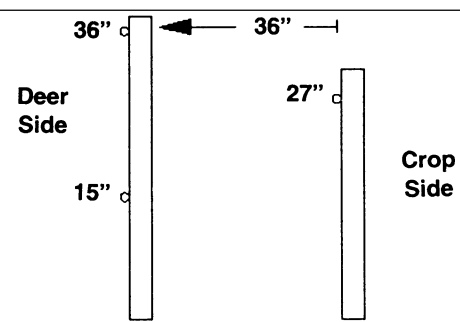


Figure 2. A “New Hampshire” three-wire electric deer fence.

10-foot intervals. The ends of the strips are smeared with peanut butter for “bait.” Deer may learn to jump electric fences if incorrectly installed or maintenance is lacking.

Scare tactics work for only short periods of time, but may be useful by providing enough protection to allow the crop to be harvested. Habitat modification is expensive and may actually attract deer if misapplied. A professional wildlife biologist should be consulted if this is the desired course of action. Population reduction by

Table 1. Comparison of damage reduction with commonly used area or contact repellents.^a

Class of Repellents	Percent Reduction of Damage
Area	
Magic Circle (bone tar oil)	15-34
Hinder (ammonia soaps of higher fatty acids)	43
human hair	15-34
bar soap	38
blood meal	NE ^b
cat/dog feces	NE ^b
moth balls	NE ^b
putrefied meat scraps	NE ^b
Contact	
Big Game Repellent (BGR) (putrescent egg solids)	30-46
Ro-pel (Benzyl diethyl ammonium saccharide)	<15
Hot Sauce	15-34
Thiram based (e.g., Chaperone, Spotrete-F)	43-78

^a Use of a trade name does not imply an endorsement, other products with the same active ingredients will generally have similar results.

^b NE—generally considered not effective.

sport hunting is the most cost effective, long-term solution and should be seriously considered if damage is wide spread.

Repellents which provide an unpleasant taste or odor can be used, but damage will not be entirely eliminated. Effectiveness will vary with deer density, season, and availability of alternate foods. To be effective, repellents must be applied before deer begin actively browsing in the affected area. Area repellents are generally less effective than contact repellents. Table 1 summarizes recent research results on the relative effectiveness of area and contact repellents from several sources. Bear in mind that repellents will not completely eliminate damage and that a given method’s effectiveness will change seasonally, based on what natural foods are available to deer. Many repellents do not weather well and will need to be reapplied after a rain.

Using Deer Feeding Behavior

Deer forage or feed selectively on different plants or plant parts. Feeding habits change with the seasonal availability of plants. Deer choose different plants and plant parts based on nutritional needs, palatability, and past experience. Deer demonstrate preference for new plantings and fertilized and cultivated domestic varieties. In Oklahoma, damage to ornamentals may occur at any time of the year. However, most complaints occur in late spring, in August during dry years, and after the first cold spell in fall. Damage may occur on plants that deer are not prone to use under circumstances of high population density or low food availability. Deer also may exhibit some regionalized taste preferences.

Like humans, deer consume a wide variety of plants to meet their nutritional requirements. Dietary and browse research in Oklahoma have documented more than 100 different species of plants comprising a deer’s diet in a given locale. However, deer do tend to avoid certain plants and this knowledge can be used to

determine which plants to use for landscaping and gardening. The following list details many plants used in landscaping and in gardening by relative deer use. From this list, you should be able to choose plants that will lower chances of damage occurring, or at least identify plants that may require some type of protection if they are to be grown successfully.

Judicious selection of plants in combination with various control methods should provide the rural or suburban homeowner with some realistic means of damage reduction. Remember to begin control measures before significant damage occurs. Garden plants that suffer rare or occasional damage when mature may suffer frequent damage at transplanting time (e.g., peppers, corn, okra, squash). The same may be true with garden plants that are planted early in season and again in fall.

In areas with severe problems, select only ornamental plants that are less frequently browsed by deer. Even if a combination of plants prone to browsing and those less prone to browsing are used, damage may still occur because deer are selective feeders. Realize that new plantings of less preferred plants may sustain damage in an area where extensive damage has previously occurred, and that younger plants frequently sustain damage because they are more palatable.

For additional information on any of the above control measures contact your local county office of the Cooperative Extension Service.

Garden Plants—Severely Damaged

Common name	Botanical name
Beans	<i>Phaseolus</i> spp.
Broccoli	<i>Brassica oleracea italica</i>
Cabbage	<i>Brassica oleracea capitata</i>
Carrot	<i>Daucus carota sativa</i>
Cauliflower	<i>Brassica oleracea botrytis</i>
Kohlrabi	<i>Brassica oleracea</i>
Lettuce	<i>Lactuca sativa</i>
Peas	<i>Pisum sativum</i>
Spinach	<i>Spinacia oleracea</i>
Turnip	<i>Brassica rapa</i>

Garden Plants—Frequently Damaged

Common name	Botanical name
Beets	<i>Beta vulgaris</i>
Corn, sweet	<i>Zea mays</i>
Potatoes, sweet	<i>Ipomoea batatas</i>
Strawberries	<i>Fragaria</i> spp.

Garden Plants—Occasionally Damaged

Common name	Botanical name
Asparagus	<i>Asparagus officinalis</i>
Okra	<i>Abelmoschus esculentus</i>
Potatoes, Irish	<i>Solanum tuberosum</i>
Radish	<i>Raphanus sativus</i>
Squash	<i>Cucurbita pepo</i>

Garden Plants—Rarely Damaged

Common name	Botanical name
Cantaloupe	<i>Cucumis melo cantalupensis</i>
Cucumber	<i>Cucumis sativus</i>
Eggplant	<i>Solanum melongena</i>
Hot peppers	<i>Capsicum annuum</i>
Onion	<i>Allium</i> spp.
Sweet peppers	<i>Capsicum frutescens</i>
Tomato	<i>Lycopersicon esculentum</i>
Watermelon	<i>Citrullus lanatus</i>

Herbaceous Plants—Annual Flowers Rarely Damaged

Common name	Botanical name
Ageratum	<i>Ageratum houstonianum</i>
Amaranth	<i>Amaranthus tricolor</i>
Castor bean	<i>Ricinus communis</i>
Cosmos	<i>Cosmos bipinnatus</i>
Chinese forget-me-not	<i>Cynoglossum amabile</i>
Cuplower	<i>Nierembergia hippomanica</i>
Dusty Miller	<i>Senecio cineraria</i>
Globe amaranth	<i>Gomphrena globosa</i>
French marigold	<i>Tagetes patula</i>
Lantana	<i>Lantana</i> spp.
Ornamental pepper	<i>Capsicum annuum</i>
Periwinkle	<i>Catharanthus roseus</i>
Polygonum	<i>Polygonum capitatum</i>
Salvia	<i>Salvia viridis</i>
Sanvitalia	<i>Sanvitalia procumbens</i>
Signet marigold	<i>Tagetes tenuifolia</i>
Snapdragon	<i>Antirrhinum majus</i>
Snow-on-the-mountain	<i>Euphorbia marginata</i>
Spider flower	<i>Cleome hasslerana</i>
Stock	<i>Matthiola incana</i>
Sweet alyssum	<i>Lobularia maritima</i>
Wax begonia	<i>Begonia semperflorens</i>
Zinnia	<i>Zinnia angustifolia</i>
Zinnia	<i>Zinnia elegans</i>

**Herbaceous Plants—Perennial Flowers
Rarely Damaged**

Common name	Botanical name
Allium	<i>Allium</i> spp.
Amsonia	<i>Amsonia tabernaemontana</i>
Baby's-breath	<i>Gypsophila paniculata</i>
Bleeding-heart	<i>Dicentra eximia</i>
Bleeding-heart	<i>Dicentra spectabilis</i>
Butterfly weed	<i>Asclepias tuberosa</i>
Chrysanthemum	<i>Dendranthema</i> spp.
Columbine	<i>Aquilegia</i> spp.
Coralbells	<i>Heuchera sanguinea</i>
Coreopsis	<i>Coreopsis lanceolata</i>
Coreopsis	<i>Coreopsis verticilla</i>
Flax	<i>Linum perenne</i>
Foxglove	<i>Digitalis grandiflora</i>
Foxglove	<i>Digitalis purpurea</i>
Gas Plant	<i>Dictamnus albus</i>
Gay-feather	<i>Liatris spicata</i>
Globe thistle	<i>Echinops exaltatus</i>
Golden marguerite	<i>Anthemis tinctoria</i>
Grasses	many genera and species
Iris	<i>Iris</i> spp.
Lamb's ears	<i>Stachys byzantia</i>
Lavender	<i>Lavandula angustifolia</i>
Lavender cotton	<i>Santolina chamaecyparissus</i>
Lily-of-the-valley	<i>Convallaria majalis</i>
Lupine	<i>Lupinus polyphyllus</i>
Narcissus	<i>Narcissus</i> spp.
Oriental poppy	<i>Papaver orientale</i>
Rose campion	<i>Lychnis coronaria</i>
Sage	<i>Salvia farinacea</i>
Sage	<i>Salvia officinalis</i>
Sage	<i>Salvia sclarea</i>
Sage	<i>Salvia splendens</i>
Speedwell	<i>Veronica</i> spp.
Wormwood	<i>Artemisia species</i>
Yarrow	
'Coronation Gold'	<i>Achillea filipendulina</i> 'C.G.'

**Herbaceous Plants—Perennial Flowers
Frequently Damaged**

Common name	Botanical name
Tulip	<i>Tulipa</i> spp.

Woody Plants—Rarely Damaged

Common name	Botanical name
American Holly	<i>Ilex opaca</i>
Barberry	<i>Berberis</i> spp.
Common Barberry	<i>Berberis vulgaris</i>

Colorado Blue Spruce	<i>Picea pungens glauca</i>
Common Boxwood	<i>Buxus sempervirens</i>
Loblolly Pine	<i>Pinus taeda</i>
Shortleaf Pine	<i>Pinus echinata</i>
Paper Birch	<i>Betula papyrifera</i>
Russian Olive	<i>Elaeagnus angustifolia</i>

Woody Plants—Seldom Damaged

Common name	Botanical name
American Bittersweet	<i>Celastrus scandens</i>
Beautybush	<i>Kolkwitzia amabilis</i>
Chinese Junipers (green)	<i>Juniperus chinensis</i> 'Pfitzerana'
Chinese Junipers (blue)	<i>Juniperus chinensis</i> 'Hetzi'
Common Sassafras	<i>Sassafras albidum</i>
Common Lilac	<i>Syringa vulgaris</i>
Corkscrew Willow	<i>Salix matsudana</i> 'Tortuosa'
Dogwoods	
Red Osier Dogwood	<i>Cornus sericea</i>
Flowering Dogwood	<i>Cornus florida</i>
Chinese Kousa Dogwood	<i>Cornus kousa</i>
Eastern Red Cedar	<i>Juniperus virginiana</i> 'Canaertii'
English Hawthorn	<i>Crataegus laevigata</i>
European White Birch	<i>Betula pendula</i>
Forsythia	<i>Forsythia</i> spp.
Hollies	
Chinese Holly	<i>Ilex cornuta</i>
Inkberry	<i>Ilex galbra</i>
Honey Locust	<i>Gleditsia triacanthos</i>
Japanese Flowering Cherry	<i>Prunus serrulata</i>
Japanese Wisteria	<i>Wisteria floribunda</i>
Norway Spruce	<i>Picea abies</i>
Pines	
Austrian Pine	<i>Pinus nigra</i>
Mugo Pine	<i>Pinus mugo</i>
Red Pine	<i>Pinus resinosa</i>
Scots Pine	<i>Pinus sylvestris</i>

Woody Plants—Occasionally Damaged

Common name	Botanical name
Basswood	
American Basswood	<i>Tilia americana</i>
Greenspire Linden	<i>Tilia cordata</i> 'Greenspire'
Border Forsythia	<i>Forsythia x intermedia</i> 'Lynwood'
Common Witchhazel	<i>Hamamelis virginiana</i>
Cotoneaster	<i>Cotoneaster</i> spp.

Cranberry	
Cotoneaster	<i>Cotoneaster apiculatus</i>
Rockspray	
Cotoneaster	<i>Cotoneaster horizontalis</i>
Dawn Redwood	<i>Metasequoia glyptostroboides</i>
Eastern White Pine	<i>Pinus strobus</i>
Firethorn	<i>Pyracantha coccinea</i>
Goldflame Honeysuckle	<i>Lonicera x heckrottii</i>
Hollies	
Japanese Holly	<i>Ilex crenata</i>
China Boy Holly	<i>Ilex x meserveae</i> 'China Boy'
China Girl Holly	<i>Ilex x meserveae</i> 'China Girl'
Hydrangeas	
Smooth Hydrangea	<i>Hydrangea aborescens</i>
Climbing Hydrangea	<i>Hydrangea anomala petiolaris</i>
Paniculated	
Hydrangea	<i>Hydrangea paniculata</i>
Japanese Cedar	<i>Cryptomeria japonica</i>
Japanese Flowering	
Quince	<i>Chaenomeles japonica</i>
Lilacs	
Japanese Tree Lilac	<i>Syringa x reticulata</i>
Late Lilac	<i>Syringa villosa</i>
Persian Lilac	<i>Syringa x persica</i>
Maples	
Paperbark Maple	<i>Acer griseum</i>
Red Maple	<i>Acer rubrum</i>
Silver Maple	<i>Acer saccharinum</i>
Sugar Maple	<i>Acer saccharum</i>
Panicked Dogwood	<i>Cornus racemosa</i>
Pears	<i>Pyrus</i> spp.
Bradford Pear	<i>Pyrus calleryana</i> 'Bradford'
Common Pear	<i>Pyrus communis</i>
Privet	<i>Ligustrum</i> spp.
Rhododendrons	
Deciduous Azaleas	<i>Rhododendron</i> spp.
Carolina	
Rhododendron	<i>Rhododendron carolinianum</i>
Rosebay	
Rhododendron	<i>Rhododendron maximum</i>
Rose of Sharon	<i>Hibiscus syriacus</i>
Roses	<i>Rosa</i> spp.
Multiflora Rose	<i>Rosa multiflora</i>
Rugosa Rose	<i>Rosa rugosa</i>
Saucer Magnolia	<i>Magnolia x soulangiana</i>
Serviceberries	
Downy Serviceberry	<i>Amelanchier arborea</i>
Allegheny	
Serviceberry	<i>Amelanchier laevis</i>
Smokebush	<i>Cotinus coggygria</i>

Oaks	<i>Quercus</i> spp.
Northern Red Oak	<i>Quercus rubra</i>
White Oak	<i>Quercus alba</i>
Spiraea	
Anthony Waterer	
Spiraea	<i>Spiraea x bumalda</i> 'Anthony Waterer'
Bridalwreath Spiraea	<i>Spiraea prunifolia</i>
Staghorn Sumac	<i>Rhus typhina</i>
Sweet Cherry	<i>Prunus avium</i>
Sweet Mock Orange	<i>Philadelphus coronarius</i>
Trumpet Creeper	<i>Campsis radicans</i>
Viburnums	
Judd Viburnum	<i>Viburnum x juddi</i>
Leather leaf	
Viburnum	<i>Viburnum rhytidophyllum</i>
Doublefile Viburnum	<i>Viburnum plicatum tomentosum</i>
Koreanspice	
Viburnum	<i>Viburnum carlesii</i>
Virginia Creeper	<i>Parthenocissus quinquefolia</i>
Weigela	<i>Weigela florida</i>
White Fir	<i>Abies concolor</i>
Willows	<i>Salix</i> spp.

Woody Plants—Frequently Damaged

Common name	Botanical name
Apples	<i>Malus</i> spp.
American Arborvitae	<i>Thuja occidentalis</i>
Cherries	<i>Prunus</i> spp.
Clematis	<i>Clematis</i> spp.
Cornelian Dogwood	<i>Cornus mas</i>
Eastern Redbud	<i>Cercis canadensis</i>
English Ivy	<i>Hedera helix</i>
Hybrid Tea Rose	<i>Rosa x hybrida</i>
Norway Maple	<i>Acer platanoides</i>
Peaches	<i>Prunus persica</i>
Plums	<i>Prunus</i> spp.
Rhododendrons	<i>Rhododendron</i> spp.
Catawba	
Rhododendron	<i>Rhododendron catawbiense</i>
Evergreen Azaleas	<i>Rhododendron</i> spp.
Winged Euonymus	<i>Euonymus alatus</i>
Wintercreeper	<i>Euonymus fortunei radicans</i>
Yews	<i>Taxus</i> spp.
English Yew	<i>Taxus baccata</i>
Western Yew	<i>Taxus brevifolia</i>
Japanese Yew	<i>Taxus cuspidata</i>
English/Japanese	
Hybrid Yew	<i>Taxus x media</i>

Acknowledgements

This fact sheet relied extensively on materials from Cornell Cooperative Extension, Wildlife Damage Management Program, Kentucky Cooperative Extension Service, *Horticulture Magazine*, February 1991, re-

search from Penn State University, Connecticut Agricultural Experiment Station, and personal observations and experiences of the authors in dealing with damage complaints in Oklahoma. Mike Shaw, Research Supervisor, Oklahoma Department of Wildlife Conservation, provided numerous comments and suggestions.

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