Ohio Department of Natural Resources
DIVISION OF WILDLIFE

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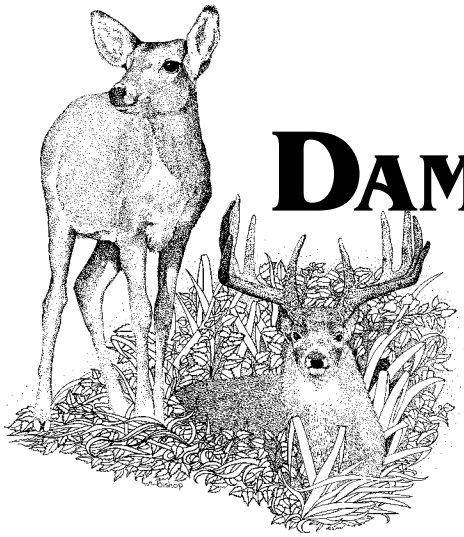
Deer Damage Control



White-tailed deer have long been enjoyed for their grace and beauty and respected for their wiles and cunning by nearly everyone. Rare is the individual who has not had the opportunity to stare in wonder and amazement as a majestic whitetail seemed to materialize out of thin air, either walk nonchalantly or run with its flag waving through a field, only to disappear as mysteriously as it first appeared.

However, expanding deer populations throughout the state, as well as the nation, have resulted in concern about the deer's negative impacts on man's activities. Because of the nature of their operation, farmers, orchardists, and nursery operators have had to contend with the negative aspects of deer for a long time, but relatively low deer populations tended to keep damage problems at tolerable levels. After all, they tend to enjoy the sight of deer as much, if not more than, anyone else. But deer populations have grown and they have adapted to our presence. Furthermore, we are continuing to manipulate the deer's habitat to suit our needs (i.e.,highways, shopping malls, housing developments, etc.). This can only result in greater interaction and problems in the future. This brochure provides landowners with the various currently available options, besides the obvious one of including less desirable plants in their landscape arrangements (Tables 1 and 2), that they can incorporate into their management plans for reducing deer damage problems.

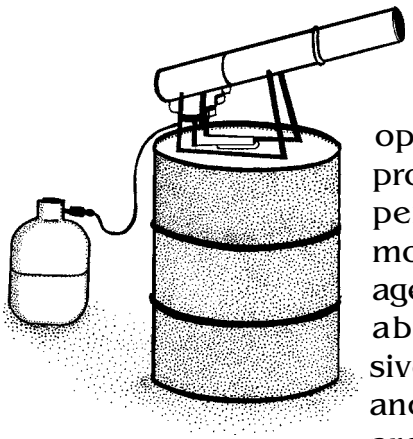
Deer Damage Control Options

Deer damage control options can generally be placed into one of the following categories: 1) a device or technique designed to scare intruders away; 2) some type of physical barrier to prevent entry; 3) chemical repellents; or 4) lethal measures. In determining which of these options best suits the needs of the person experiencing deer damage, one needs to consider the type, timing, and extent of damage, as well as the deer population in the area, availability of alternate deer foods and cover, the general characteristics of the site to be protected, and the material and labor costs of the various options. Obviously, where the pressure or amount of deer damage inflicted on the crop or planting is light, justifying costly or extremely labor-intensive techniques is difficult unless the value of the crop warrants the expense. On the other hand, methods best suited to light damage will not be effective if deer pressure on the specific planting is heavy. Regardless of the technique used, one should bear in mind that control measures tend to be most successful when implemented prior to or during the onset of problems. Behavior modification is easiest to achieve before a habit or dependency develops. A discussion of the various options follows.

Control Methods

Scare Devices and Techniques

Probably the simplest and least expensive method for deterring deer would involve the use of streamers, flags, aluminum pie pans, or any other device or material that either moves in the breeze or throws a reflection when illuminated by a natural or artificial light. When deer pressure is light and alternate foods and cover are readily available, the motion or reflection that is produced may be sufficient to reduce damage to tolerable levels. However, deer quickly become accustomed to the disturbance that these devices produce. Unless one is willing to move these devices every two or three days within the area to be protected, their effectiveness drops rapidly. Additionally, still, moonless nights render this technique useless. One should consider this technique only if the period of damage is of short duration and the value of the plants being protected is minimal.



Propane cannon.

Propane cannons or exploders are another option available to property owners experiencing light to moderate deer damage. While considerably more expensive than streamers and reflectors, they are an affordable tool (approximately $350 and available through various mail order nursery, forestry, and agricultural supply dealers) that will last for years when given proper care. Most operate on an adjustable timer so that the frequency of discharge can be varied, and some rotate so that the sound appears to move around or originate from different locations. Additionally, they operate regardless of the weather and light conditions to more effectively scare deer and other wildlife from the area being protected. As with streamers, however, they do require attention in that they must be moved periodically to remain effective. Despite their noise, wildlife will become accustomed to the disturbance, particularly if the disturbance is stationary. Frequency of equipment movement will vary depending on local conditions - type of crop being protected, rotating or stationary cannon, availability of alternate habitat, etc. - and is best determined by monitoring the crop for evidence of continued damage.

A relatively new and interesting scare technique involves the use of one or more guard dogs confined within the area to be protected by an electric wire buried just below the surface of the ground. This "invisible fence" operates like systems used by many homeowners desiring to keep the family pet in their yard. When the dog, which is wearing a receiver on its collar, approaches the wire, it first receives a warning sound. Further movement towards the wire results in the dog receiving a mild but attention grabbing electrical shock. To be effective, the dog must remain within the confines of the area needing protection during the time that protection is needed. This necessitates proper conditioning of the dog to the device. Costs for this protection will likely be higher than for other scare devices, but because the dog is mobile it is able to more effectively protect a larger area. Depending on the size of the area and the desirability of the crop being protected, more than one dog may be needed. Research evaluating a system manufactured and marketed by Off Limits® Crop Protection Systems (1-800-923-PEST) appears promising. Contact the company for additional information.

Physical Barriers

Properly constructed physical barriers, or fences, are intended to exclude deer from entering an area, thereby reducing damage to negligible levels. The vast variations in fence design, which are limited only by one's imagination, greatly influence their effectiveness in achieving this objective. Current fence designs vary from as simple as a single strand of electric wire to as elaborate as a woven, or livestock, wire fence eight feet or more

tall. Obviously, fence design has a tremendous impact on installation and maintenance costs, as well as its life expectancy.

For individuals desiring long-term protection of valuable crops such as a commercial orchard or nursery operation, the costs of an eight-foot woven wire fence may be justified. Fence construction involves setting 10- to 12-foot poles into the ground so that eight feet are above ground. Two courses of four-foot woven wire are then stapled to the poles so that the effective height of the fence is eight feet. Since this fence has considerable weight, use of the longer poles on the corners and interspersed along the sides is advised. This fence is extremely effective in excluding deer, however it is also quite expensive to construct and maintain. For this reason, it should only be considered when the crop is valuable and deer pressure is high.

On the other hand, the average homeowner trying to protect a small family garden or orchard may be satisfied with the results of a single strand of electric wire to which strips of aluminum foil covered with a thin layer of peanut butter have been attached. The strips are attached at approximately three-foot intervals. The peanut butter serves as an enticement to the deer and the foil is an excellent conductor of electricity. The end result is that the deer receives a noticeable jolt to the nose or tongue. Rarely does a deer need more than one or two experiences like that to discourage it from visiting the area. This barrier is not as effective as the woven wire fence because the barrier consists of one strand of wire, about 30 inches off the ground. If the palatability of the crop inside the wire is greater than the peanut butter, a deer has only to jump the fence, thereby reducing the fence's effectiveness. It is, however, much more affordable and requires considerably less effort to install and maintain.

For those interested in fencing, but whose needs fall somewhere between an elaborate eight-foot fence and a simple, single electric line, there are a variety of options available. The three-wire two-dimensional fence (Fig. 1) involves the construction of two separate fences, one 38 inches inside the other. As with the single wire fence, this and all successive fences are electrified. Vertical posts are set 120 feet apart with wire spacers set on 30-foot intervals between the posts. The outer fence consists of two wires, one set 15 inches off the ground, the other 43 inches from the ground. The inner fence has a single strand of wire set 30 inches from the ground. The idea is that the depth of the two fences will discourage deer from jumping the fence as they are too close for deer to easily jump each fence separately without making contact with one of the fences, and far enough apart that the deer are not able to easily jump both at the same time. Like the single strand with peanut butter enticements, this fence tends to be most successful in reducing deer damage when the deer pressure is low to moderate and the needed period of protection is short.

Another design that has received considerable attention is the Penn State Five-Wire Fence (Fig. 2). With this design, the area is enclosed by five separate strands of wire.

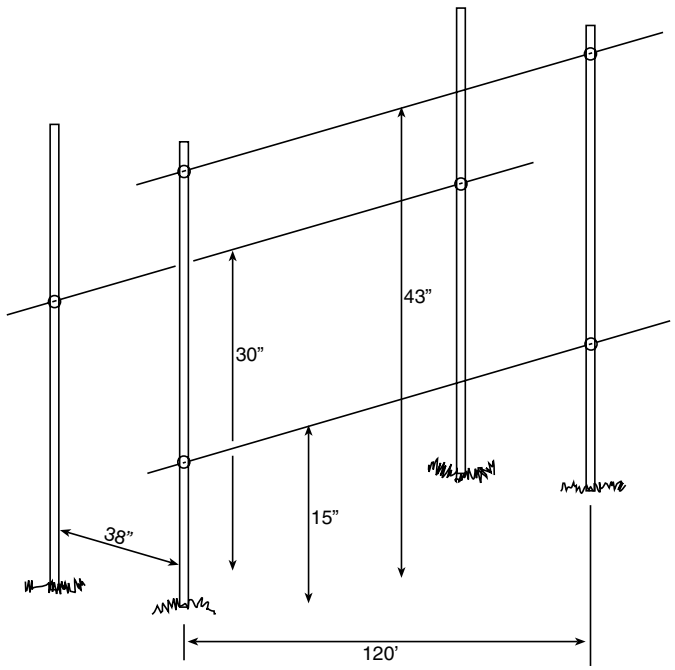


Fig. 1. Wire spacings for the 3-wire 2- dimensional fence are shown relative to the ground. Wire spacers every 30 feet help prevent wire sag.

The first wire is attached to a vertical pole at a height of 10 inches from the ground. Each successive wire is positioned 12 inches above the previous one. Total height on this fence is 58 inches. In an effort to provide additional security, some have added one or more additional wires. All wires are then moved closer so that the overall height remains the same. This is certainly acceptable, however reducing the number of electric strands while maintaining the same overall height, which is important, is not recommended as deer may be able to successfully squeeze through the larger openings.

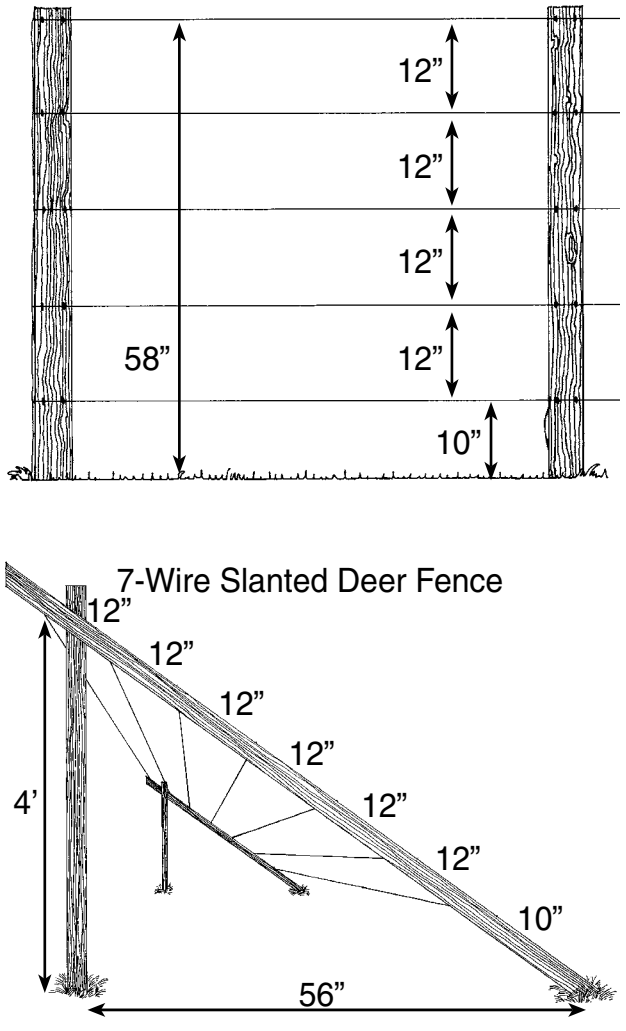


Fig. 2. Wires for the Penn State 5-wire Deer Fence (top) and the 7-wire Slanted Deer Fence (bottom) are located 10 inches from the ground for the bottom wire and then at 12-inch increments. Verticle posts are spaced 30 to 60 feet apart.

With the Slanted Deer Fence, the electric wires are attached to a slanted seven-foot rail which in turn is attached to a vertical post (Fig. 2). To construct this fence, vertical posts are placed no more than 60 feet apart. A rail is then attached to each post four feet from the ground so that the horizontal distance from the pole to the long end of the rail is 56 inches. The high side of the rail should be on the side furthest from the area being protected. At this point, the structure has the appearance of a right triangle with the rail serving as the hypotenuse. Wires are run from rail to rail with the first wire placed 10 inches from the ground end of the hypotenuse. Successive wires are spaced along the hypotenuse at one-foot intervals.

The last two fence designs described above and shown in Figure 2 have been used quite successfully to exclude deer from airports, where deer on the runway are an aviation hazard, and commercial orchards. Reported deer intrusions have been rare and have generally been the result of a power failure or a gate having been left open. All fences require maintenance to ensure that they continue to function satisfactorily, however annual maintenance costs after initial construction tend to be low and some have rather long life expectancies. Additionally, the more elaborate fences work well even where deer pressure is high.

Chemical Repellents

Chemical repellents, which are as varied as fence designs, act on a deer’s senses of smell and taste to reduce, rather than eliminate, plant damage. Repellents range from homemade remedies such as soap, tankage, or human hair to commercially available preparations that impart a foul taste or odor to the crop. Exercise care when applying any odor or taste repellent to edible plants as it can render them unfit for human consumption if applied at the wrong time. Be certain to follow manufacturer’s guidelines and established procedures closely. That warning aside, repellents can be an economical and effective technique for achieving dam-

age reduction, particularly if started before noticeable damage occurs. Chemical re-application is frequently needed during the growing season as any growth occurring after treatment is not protected. Additionally, rain often removes the residual repellent from the plant, thereby leaving it unprotected.

Where deer pressure is light, individuals may receive satisfactory results by hanging bags of human hair, particularly if fragrant additives such as cologne or after shave lotion have been included, from trees or stakes around and within the area to be treated. Bags of tankage and bars of soap have also been used with varying degrees of success. Heavier deer pressure typically requires the use of stronger medicine to achieve satisfactory results. The products shown in Table 3 provide the reader with an idea of the products that are commercially available. It is not intended as an endorsement of any product to the exclusion of others on the market. Increased demand for products that reduce wildlife damage has resulted in a tremendous growth in the number of products available. Home and garden centers, as well as agricultural and supply businesses that handle seed and fertilizer, frequently carry a wide assortment of chemical repellents. Sales representatives should be capable of recommending a product that properly meets one's needs.

Lethal Measures

The Division of Wildlife recognizes the value of hunting as an important management tool and advocates its use wherever possible. Property owners, especially those in prime deer habitat, should anticipate the possibility of damage and utilize hunting, where possible, as a preventative management technique that permits the wise and responsible use of the deer resource and reduces the potential for future problems. To provide for an increased harvest in areas where deer are a problem, the Division provides landowners with permits allowing for the harvest of additional deer during any of the regular deer seasons. In many problem situations, the harvest of a relatively few deer, in addition to the regular harvest, reduces the population to a level that allows for sufficient deer for people to see and enjoy while reducing crop depredation to tolerable levels, particularly when other damage reduction techniques are utilized.

When other techniques are ineffective or impractical and the need to remove deer is urgent, the Division has a program that permits the lethal removal of deer from the problem area. After an examination of the situation, the wildlife officer may issue a permit that allows for the out-of-season culling of a limited number of deer. Landowners experiencing crop damage should consult with their county wildlife officer or contact the nearest district office for assistance.

Wildlife District One
1500 Dublin Road
Columbus, Ohio 43215
(614) 644-3925

Wildlife District Two
952 Lima Ave.
Findlay, Ohio 45840
(419) 424-5000

Wildlife District Three
912 Portage Lakes Drive
Akron, Ohio 44319
(330) 644-2293

Wildlife District 4
360 East State Street
Athens, Ohio 45701
(740) 589-9930

Wildlife District Five
1076 Old Springfield Pike
Xenia, Ohio 45385
(937) 372-9261

Table 1. A Guide for Annuals, Biennials, Perennials, Groundcovers and Vines Damaged by Deer (courtesy of Cornell Cooperative Extension, Westchester County, New York).

PLANTS RARELY OR NEVER EATEN

Annuals and Biennials

BOTANICAL NAME	COMMON NAME
Ageratum houstonaianum	Ageratum
Antirrhinum majus	Snapdragon
Begonia x semperflorenscultorum	Begonia
Cleome hasslerana	Cleome
Dahlia spp.	Dahlia
Datura spp.	Thorn Apple
Digitalis spp.	Foxglove
Gaillardia pulchella	Blanket Flower
Heliotropium arborecens	Heliotrope
Hypoestes phyllostachya	Polka-Dot Plant
Ipomoea spp.	Morning Glory
Lobelia erinus	Edging Lobelia
Lobularia maritima	Sweet Alyssum
Mirabalis jalapa	Four-O-Clock
Myosotis sylvatica	Forget-Me-Not
Ocimum basilicum	Sweet Basil
Papaver spp.	Poppy
Pelargonium x hortorum	Zonal Geranium
Petroselinum crispum	Parsley
Salvia farinacea	Blue Salvia
Senecio cineraria	Dusty Miller
Silybum spp.	Thistle
Tagetes spp.	Marigold
Verbena x hybrida	Verbena

Herbaceous Perennials

BOTANICAL NAME	COMMON NAME
Achillea spp.	Yarrow
Allium schoenoprasum	Chives
Allium spp.	Ornamental Onion
Allium tuerosum	Garlic Chives
Alyssum saxatile	Basket of Gold
Amsonia tabernaemontana	Amsonia
Anemone spp.	Anemones
Angelica archangelica	Angelica
Aquilegia canadensis	Wild Columbine
Arisaema triphyllum	Jack-in-the-Pulpit
Artemisia spp.	Wormwood
Aruncus dioicus	Goatsbeard
Asclepias tuberosa	Butterfly Weed
Astilbe spp.	Astilbe
Baptisia spp.	False Indigo
Bergenia spp.	Bergenia
Boltonia asteroides	Boltonia
Buddleia davidii	Butterfly Bush
Calluna spp.	Heather
Campanula carpatica	Tussock Bellflower
Centaurea spp.	Knapweed
Ceratostigma plumbaginoides	Plumbago
Chelone spp.	Turtlehead
Chrysanthemum coccineum	Painted Daisy
Chrysanthemum x superbum	Shasta Daisy
Chrysanthemum parthenium	Feverfew
Cimicifuga racemosa	Bugbane
Coreospsis spp.	Coreopsis
Dennstaedtia punctilobula	Hay-scented Fern
Dianthus spp.	Sweet William, Pinks
Dicentra exima	Bleeding Heart
Dictamnus albus	Gas Plant
Echinacea purpurea	Purple Coneflower
Echinops spp.	Globe Thistle
Erica spp.	Heath
Eupatorium spp.	Joe-Pye Weed
Euphorbia spp.	Spurge
Filipendula spp.	Queen-of-the-Prairie
Fritallaria imperialis	Crown Imperial
Geum spp.	Avens
Gypsophila paniculata	Baby's Breath
Helleborus spp.	Hellebore
Iberis sepervirens	Candytuft
Kirengeshoma palmata	Kirengeshoma
Lavandula spp.	Lavender
Liatris spicata	Spike Gayfeather
Lilium lancifolium	Tiger Lily
Limonium latifolium	Statice
Linaria spp.	Toadflax
Linum perenne	Perennial Blue Flax
Lupinus spp.	Lupine
Lythrum spp.	Loosestrife
Matteuccia struthiopteris	Ostrich Fern
Mentha pulegium	Pennyroyal
Mentha spp.	Mint
Mitchella repens	Partridgeberry
Monarda didyma	Beebalm
Myosotis scorpiodes	Forget-Me-Not
Myrrhis odorata	Sweet Cicely
Narcissus spp.	Daffodil
Nepeta spp.	Catmint
Oenothera tetragona	Sundrops
Oenothera spp.	Evening Primrose
Onoclea sensibilis	Sensitive Fern
Origanum spp.	Oregano
Osmunda cinnamomea	Cinnamon Fern
Osmunda claytoniana	Interrupted Fern
Osmunda regalis	Royal Fern
Papaver orientale	Oriental Poppy
Phalaris arundinacea 'Picta'	Ribbon Grass
Platycodon grandiflorus	Balloon Flower
Polemonium caeruleum	Jacob's Ladder
Polystichum acrostichoides	Christmas Fern
Potentilla spp.	Cinquefoil
Primula spp.	Primrose
Pulmonaria spp.	Lungwort
Ranunculus spp.	Buttercup
Rheum spp.	Rhubarb
Rosmarinus officinalis	Rosemary
Salvia spp	Sage
Saponaria spp.	Soapwort
Scilla spp.	Scilla
Solidago spp.	Goldenrod
Stachys byzantina	Lamb's Ear
Thelypteris noveboracensis	New York Fern
Tanacetum spp.	Tansy
Verbascum spp.	Mullein
Veronica latifolia	Hungarian Speedwell
Vinca major	Greater Periwinkle
Viola labridorica	Labrador Violet
Yucca spp.	Yucca

Perennial Groundcovers

BOTANICAL NAME	COMMON NAME
Aegopodium podagraria	Bishop's Weed
Ajuga reptans	Buggleweed
Asperula oderata	Sweet Woodruff
Convallaria majalis	Lily-of-the-Valley
Epimedium spp.	Barrenwort
Lamium spp.	Dead Nettle
Pachysandra terminalis	Japanese Pachysandra
Vinca minor	Periwinkle

Perennial Vines

BOTANICAL NAME	COMMON NAME
Celastrus spp.	Bittersweet
Clematis spp.	Clematis
Lonicera spp.	Honeysuckle
Wisteria spp.	Wisteria

PLANTS OCCASIONALLY EATEN

Annuals and Biennials

BOTANICAL NAME	COMMON NAME
Achimenes spp.	Pansy
Helianthus annuus	Sunflower

Herbaceous Perennials & Perennial Vines

BOTANICAL NAME	COMMON NAME
Endymion spp.	Wood Hyacinth
Geranium maculatum	Cranesbill Geranium
Hedera helix.	English Ivy
Iris spp.	Iris
Paeonia spp.	Peony
Rudbeckia spp.	Coneflower
Sedum purpureum 'Autumn Joy'	Sedum
Thalictrum spp.	Meadow Rue

PLANTS OFTEN EATEN

Annuals and Biennials

BOTANICAL NAME	COMMON NAME
Alcea rosea	Hollyhocks
Impatiens spp.	Impatiens
Tithonia rotundifolia	Mexican Sunflower

Herbaceous Perennials

BOTANICAL NAME	COMMON NAME
Crocus spp.	Crocus
Hemerocallis spp.	Daylily
Hosta spp.	Hosta
Lobelia cardinalis	Cardinal Flower
Phlox spp.	Phlox
Rosa spp.	Rose
Tulipa spp.	Tulips

Table 2. A Guide to Trees, Shrubs, and Woody Plants Damaged by Deer (courtesy of Cornell Cooperative Extension, Westchester County, New York).

Plants Rarely Damaged

BOTANICAL NAME	COMMON NAME
Berberis spp.	Barberry
Berberis vulgaris	Common Barberry
Betula papyrifera	Paper Birch
Buxus sempervirens	Common Boxwood
Elaeagnus angustifolia	Russian Olive
Ilex opaca	American Holly
Leucothoe fontanesiana	Drooping Leucothoe
Picea pungens	Colorado Blue Spruce
Pieris japonica	Japanese Pieris

Plants Seldom Severely Damaged

BOTANICAL NAME	COMMON NAME
Betula pendula	European White Birch
Celastrus scandens	American Bittersweet
Cornus sericea	Red Osier Dogwood
Cornus florida	Flowering Dogwood
Cornus kousa	Kousa Dogwood
Crataegus laevigata	English Hawthorn
Enkianthus campanulatus	Redvein Enkianthus
Fagus sylvatica	European Beech
Forsythia spp.	Forsythia
Gleditsia triacanthos	Honey Locust
Ilex cornuta	Chinese Holly
Ilex glabra	Inkberry
Juniperus chinensis	Chinese Junipers (blue)
Juniperus chinensis	Chinese Junipers (green)
Kalmia latifolia	Mountain Laurel
Kolkwitzia amabilis	Beautybush
Picea abies	Norway Spruce
Picea glauca	White Spruce
Pinus nigra	Austrian Pine
Pinus rigida	Pitch Pine
Pinus mugo	Mugo Pine
Pinus resinosa	Red Pine
Pinus sylvestris	Scotch Pine
Prunus serrulata	Japanese Flowering Cherry
Salix matsudana tortuosa	Corkscrew Willow
Sassafras albidum	Common Sassafras
Syringa vulgaris	Common Lilac
Wisteria floribunda	Japanese Wisteria

Plants Occasionally Severely Damaged

BOTANICAL NAME	COMMON NAME
Abies concolor	White Fir
Acer griseum	Paperbark Maple
Acer rubrum	Red Maple
Acer saccharinum	Silver Maple
Acer saccharum	Sugar Maple
Aesculus hippocastanum	Common Horsechestnut
Amelanchier arborea	Downy Serviceberry
Amelanchier laevis	Allegheny Serviceberry
Campsis radicans	Trumpet Creeper
Chaenomeles speciosa	Japanese Flowering Quince
Cornus racemosa	Panicled Dogwood
Cotinus coggygria	Smokebush
Cotoneaster spp.	Cotoneaster
Cotoneaster apiculatus	Cranberry Cotoneaster
Cotoneaster horizontalis	Rockspray Cotoneaster
Cryptomeria japonica	Japanese Cedar
Forsythia (x) intermedia	Border Forsythia
Hamamelis virginiana	Common Witchhazel
Hibiscus syriacus	Rose of Sharon
Hydrangea arborescens	Smooth Hydrangea
Hydrangea anomala petiolaris	Climbing Hydrangea
Hydrangea paniculata	Panicle Hydrangea
Ilex crenata	Japanese Holly
Ilex (x) meserveae	China Girl/Boy Holly
Juniperus virginiana	Eastern Redcedar
Larix decidua	European Larch
Lonicera (x) heckrottii	Goldflame Honeysuckle
Ligustrum spp.	Privet
Magnolia (x) soulangiana	Saucer Magnolia
Metasequoia glyptostroboides	Dawn Redwood
Parthenocissus quinquefolia	Virginia Creeper
Philadelphus coronarius	Sweet Mock Orange
Pinus strobus	Eastern White Pine
Potentilla fruticosa	Bush or Shrubbby Cinquefoil
Prunus avium	Sweet Cherry
Pseudotsuga menziesii	Douglas Fir
Pyracantha coccinea	Firethorn
Pyrus calleryana 'Bradford'	Bradford Callery Pear
Pyrus communis	Common Pear
Quercus alba	White Oak
Quercus prinus	Chestnut Oak
Quercus rubra	Northern Red Oak
Rhododendron spp.	Deciduous Azaleas
Rhododendron carolinianum	Carolina Rhododendron
Rhododendron maximum	Rosebay Rhododendron
Rhus typhina	Staghorn Sumac
Rosa multiflora	Multiflora Rose
Rosa rugosa	Rugosa Rose
Salix spp.	Willows
Spiraea (x) brumalda	Anthony Waterer Spiraea
Spiraea prunifolia	Bridalwreath Spiraea
Syringa (x) persica	Persian Lilac
Syringa reticulata	Japanese Tree Lilac
Syringa villosa	Late Lilac
Tilia americana	Basswood
Tilia cordata Greenspire'	Greenspire Littleleaf Linden
Tsuga canadensis	Eastern Hemlock
Tsuga caroliniana	Carolina Hemlock
Viburnum (x) juddii	Judd Viburnum
Viburnum rhytidophyllum	Leatherleaf Viburnum
Viburnum plicatum tomemtosum	Doublefile Viburnum
Viburnum carlesii	Koreanspice Viburnum
Weigela florida	Oldfashion Weigela

Plants Frequently Severely Damaged

BOTANICAL NAME	COMMON NAME
Abies balsamea	Balsam Fir
Abies fraseri	Fraser Fir
Acer platanoides	Norway Maple
Cercis canadensis	Eastern Redbud
Chamaecyparis thyoides	Atlantic White Cedar
Clematis spp.	Clematis
Cornus mas	Cornelian Dogwood
Euonymus alatus	Winged Euonymus
Euonymus fortunei	Winter Creeper
Hedera helix	English Ivy
Malus spp.	Apples
Prunus spp.	Cherries
Prunus spp.	Plums
Rhododendron spp.	Rhododendrons
Rhododendron spp.	Evergreen Azaleas
Rhododendron catawbiense	Catawba Rhododendron
Rhododendron periclymenoides	Pinxterbloom Azalea
Rosa (x) hybrid	Hybrid Tea Rose
Sorbus aucuparia	European Mountain Ash
Taxus spp.	Yews
Taxus baccata	English Yew
Taxus brevifolia	Western or Pacific Yew
Taxus cuspidata	Japanese Yew
Taxus (x) media	English/Japanese Hybrid Yew
Thuja occidentalis	American Arborvitae
Thuja occidentalis	Northern White Cedar

Table 3. Sources of repellents for most agricultural products. (Check labels for specific use directions.)

Product	Manufacturer/ Distributor	Mode of Action	Active Ingredient	Application Method	Restrictions	Registered Use
Shot-Gun Deer and Rabbit Repellent®	Bonide Products, Inc. 2 Wurz Ave. Yorkville, NY 13495 (315) 736-8231	Taste	Thiram 11.0%	Spray/brush	For fruit trees, limit application to nonbearing or dormant stages.	Ornamental shrubs, trees, nursery stock, and fruit trees.
Bulb Saver®	Bonide Products, Inc. 2 Wurz Ave. Yorkville, NY 13495 (315) 736-8231	Taste	Thiram 11.0%	Dip	Do not use on edible tubers and bulbs.	Flower bulbs and tubers.
Plant Pro-Tec (Garlic) Units®	Plant Pro-Tec, Inc. P.O. Box 902 Palo Cedro, CA 96073 (800) 572-0055	Odor, and taste if repellent unit is eaten	Garlic and chili pepper	Repellent units can be attached to plants or fencing, or placed in ground.	None	Requires no registration.
Tree Guard®	Norteck	Taste	Bitrex 0.2%	Spray		Non-food crops
Deerbuster's Deer Repellent Spray 5®	Trident Enterprises 9735A Bethel Road Frederick, MD 21702	Taste	Putrescent egg solids 25% White pepper 1.9% Garlic oil 1.9%	Spray		Non-food crops
Hot Sauce Animal Repellent®	Miller Chemical and Fertilizer Corp. P.O. Box 333 Hanover, PA 17331 (717) 632-8921	Taste	Capsaicin 2.5%	Spray	Do not use on food crops after fruit appearance.	Ornamental trees and shrubs, fruit and nut trees, nursery stock; deer, rabbit, meadow and pine mice.
Deer-A-Way® Big Game Repellent®	Intagra, Inc. 8906 Wentworth Ave. S. Minneapolis, MN 55420 (612) 881-5535	Odor/taste	Putrescent whole egg solids 37%	Spray ready-to-apply powder	Apply to conifers and ornamental trees only.	Conifer seedlings (spray only); dormant ornamental shrubs (powder only).
Hinder® Deer and Rabbit Repellent	Pace International 1011 Western Ave. Suite 505 Seattle, WA 98104 (800) 247-8711	Taste/odor	Ammonia 1.5% Mixed rosin and fatty acids 13.0%			
Dr. T's Deer Blocker® (Deer, Rabbit, and Squirrel Repellent)	Nature Products P.O. Box 682 Pelham, GA 31799 (800) 299-8485	Taste/odor	Putrescent whole eggs 6.25% Capsaicin 0.0045% Garlic 0.005%			Approved for use on food crops, bulbs, and vegetable gardens.
Deer-Off®	Deer-Off 1492 High Ridge Road Stamford, CT 06903 (203) 968-8485	Taste/odor	Putrescent whole eggs 6.25% Capsaicin and related capsaicinoids 0.0045% Garlic 0.005%			Approved for use on edible crops, flowers, grass, bulbs, shrubs, plants, seedlings, and trees.
Gustafson 42-S® Repellent	Gustafson LLC 1400 Preston Road Suite 400 Plano, TX 75093	Taste	Thiram 42%	Spray, brush, or dip	Do not apply to fruit trees or other edible fruit that will bear within one year of application.	Fruit trees, shrubs, ornamentals, nursery stock.
Magic Circle® Rabbit Repellent	J.C. Erlich Chemical Co. 500 Spring Ridge Road Reading, PA 19612 (610) 372-9700	Taste	Thiram 20%	Spray	Do not use on plant parts that are to be used for food.	For use on lawns, trees, flowers, and shrubs. Product will not harm sensitive flowers, trees, and shrubs.
Repel® and Rabbit/Deer Repellent®	Farnam Companies, Inc. 301 West Osborn P.O. Box 34820 Phoenix, AZ 85067-4820 (602) 285-1660	Taste	Thiram	Spray	Do not use on edible crops.	Ornamentals, flowers, dormant fruit trees.