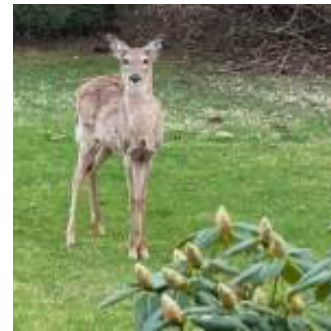




Zoom Lecture | Sunday, April 23, 2023 | 2 p.m.

Brad Roeller

Effective Solutions for Dealing with Deer



Handouts

- Brad Roeller Biography
- Recommendations for Protecting Plants from Deer Browsing
- Strategies for Protecting Your Landscape from Deer Browsing
- Woody Landscape Plants that Show Resistance to Deer Browsing
- Native Woody Landscape Plants that Show Resistance to Deer Browsing
- Deer Resistant Perennials
- Deer Resistant Native Perennials

Brad Roeller

Landscape Manager, Altamont Estate, Millbrook, New York.

1973 graduate of Cornell University; B.S. in Environmental Conservation.

Work experience: 1973 to 2009 worked at the Mary Flagler Cary Arboretum of the New York Botanical Garden. From 1984 to 2009 served as Manager of Grounds, Display Gardens & Visitation at the Cary Institute of Ecosystem Studies (formerly Mary Flagler Cary Arboretum). June 2009 until May, 2011, Manager of Outdoor Gardens at the New York Botanical Garden.

Areas of interest: Low maintenance perennials; investigating and evaluating environmentally sound gardening and landscaping practices; testing a wide range of landscape plants for Northern gardens; gardening with native plants; deer resistant plants and methods of minimizing deer damage; ecologically-driven and sustainable landscaping.

Supplemental information:

Brad has been a featured speaker at many large industry forums. He has presented at New England Grows annual conferences; the Perennial Plant Association's annual meetings; UConn's Perennial Plant Conferences; Vermont Association of Professional Horticulturists annual meeting; NYS Turf & Landscape Association annual conferences; UMaine's annual Garden Day conferences; NYS Turf & Landscape Association annual meetings; Empire State Green Industry Shows annual conferences; and Northeast Organic Farming Association annual conferences.

Brad's broad body of horticultural work and knowledge has made him one of the most popular lecturers with regional garden clubs. He has been a featured speaker at several GCA and Federated Garden Clubs zone conferences.

Brad has been published in several magazines including *Fine Gardening* and *Audubon* as well as dozens of newspapers, including the *NY times* and the *Wall Street Journal*, and other periodicals.

Brad has been an instructor at the New York Botanical Garden for 40 years; the Cary Institute of Ecosystem Studies since its inception in 1983; and the Berkshire Botanical Garden for the past several years. He has participated in numerous professional forums, especially with his work with whitetail deer, sustainable landscape care, ecological design and landscaping with native plants and his life-long work with perennials and trees and shrubs.

Recommendations for Protecting Plants from Deer Browsing

Early spring: To protect emerging bulbs and spring ephemerals, apply Milorganite, at $\frac{1}{2}$ the recommended rate for turf directly to garden beds. Alternatively, a couple of applications of liquid foliar fertilizers/repellents, like Bobbex or Coast of Maine's Fermented Salmon Food work equally well. I make a second (and final) application of Milorganite, again at $\frac{1}{2}$ rate, about a month later. (Do not fertilize these areas with your "regular" plant food as Milorganite is a fertilizer.) This technique not only feeds your plants at an optimum time, it also protects them. Some gardeners prefer making sachets of Milorganite placing them above ground level hanging them directly from branches or tied to stakes and placed as a perimeter barrier. This method reduces the tendency of the fertilizer to develop mold when applied directly to the ground.

Late spring/ summer: Once full leaf expansion and growth has occurred I switch to alternating a few different brands of spray repellents. I am pleased with Deer Solution, a systemic repellent derived from herbs. I can typically get about 10 days to 2 week's worth of protection from this product. Be aware that flower scapes or buds do not take up any product systemically, so be sure to spritz a different type of repellent when flower buds appear and begin to open. I recommend any of the egg-based products, such as Deer-Off. Deer-Stopper, which contains mint oil, rosemary, and salt, also has proven effective. It is important to "throw them a curve" by alternating products so they don't become too used to one. One home concoction which has proven very effective (and cheap!) is mixing 1 egg with $\frac{1}{2}$ cup of whole milk, adding 1 tbl. cooking oil and 1tbl. dish washing soap (I like the lemon-scented products) to a gallon of water and spraying vulnerable plants about every 10 days. For added effectiveness add a tablespoon of "hot" sauce and a couple drops of oil of rosemary. Finally, I like to give my plants monthly foliar sprays of the aforementioned fertilizers/repellents which afford additional protection.

Late summer/fall: As the growing season winds down, I continue the above spray program, with the exception of any foliar fertilizers, and develop a plan for dormant season protection for susceptible perennials and woody plants. By the beginning of November I will decide if I will continue to rely on repellents or protect vulnerable plants with physical barriers.

Winter: In my opinion, two of the best commercially available repellants available for the homeowner for dormant season protection are the blood-derived repellent, Plantskydd and products containing the fungicide thiram (Deer Pro, Bonide Rabbit-Deer Repellent, Nott's chew-Not, and Gustafson 42-S). I've found that the number of subsequent reapplications is far less with these products than with other popular deer repellents. This is important as environmental conditions (principally temperature) are usually not conducive for the recommended monthly applications with most spray-on repellents.

Strategies for Protecting Your Landscape from Deer Browsing

Written by Brad Roeller

Proper Plant Selection

- Peruse the numerous lists of plants that show resistance to browsing. This will serve as a starting point for selecting trees and shrubs for your landscaping plans.
- Visit your neighbors and question them as to what deer select for food in their plantings. This will assist you in narrowing the list of plants that will most likely be the best choices for your area.
- Plan on protecting vulnerable plants, or plants that do not appear on any list or have no “track record” in your area.
- Front your beds with resistant plants. Site vulnerable plants in interior sections.

Become An “Environmental Forecaster”

- Access the size, health, and vigor of the local deer herd as fall approaches. Has it been a drought year where the quality and nutritional value of grass and herbaceous plants is poor? If so, the animals’ fat reserves are probably less than optimum for carrying them through the winter months. Is there an abundant mast (acorns and nuts) crop this fall? Mast is a prime, high-fat food source for whitetail deer during the late fall and early winter months. These factors will affect browsing pressure on your landscape plants come winter.
- Other biological and environmental factors that will likewise determine dormant season browsing pressure are: size of the local deer herd (did you notice lots of twins with the does this summer?); snow cover (are we due for a normal or above normal snow year?); and hunting pressure and success (is there a group of successful hunters harvesting adult does off your and neighboring properties?).

Know The Deer In Your Neighborhood

- When and where do you see deer on your property? Are they passing through, or do they seem to be around at all hours of the day and night? Deer may be passing through your property to access more desirable food sources, or they may hone in on your plantings as a primary browsing area. They may also be using your property as a site which affords them a degree of security and utilize it for bedding or “sanctuary” from hunting pressure.
- Are there “new” deer in the neighborhood? Instead of the familiar doe and fawn that you periodically observe, are there different deer now browsing in your landscape? Unfortunately, once deer, either “resident” or “new”, have found your landscape, your plantings will become a consistent stop on their nocturnal feeding forays. You must break this pattern through timely use of repellents and physical barriers to protect

vulnerable plants. If you are consistent in this area “your” deer may eventually give up browsing in your landscape. Be persistent!

Spray New Plantings

- With each new planting, regardless of the time of year that you are planting or the susceptibility of the plant to browsing, spray the plant with an odor-based repellent immediately after planting. Even though a wide range of woody plants, such as rhododendrons, yews, arborvitae, and other conifers, are not susceptible to browsing during the growing season, deer are curious by nature and will “check out” new features, such as plantings, in your landscape. If their first encounter is an unpleasant one, there are growing indications that deer will avoid this plant when they are actively foraging for food. Continue timed applications on new plantings throughout the growing season. Fertilizers such as Milorganite and Bobbex are very good warm-season repellents. It is important to track the amount of nitrogen you are applying when using Milorganite; don’t over apply.
- Remember that all bets are off when it comes to the success of repellents, or poorly constructed physical barriers, when deer are under stress and approaching starvation.

Persistence is Key to Success

- Initiate a year-round deterrence program. Utilize taste and/or odor-based spray repellants during the growing season and, depending on environmental and biological indicators, continue to spray or protect vulnerable plants during the winter months. If there are no “new” deer utilizing your landscape, you may be able to “pattern” these deer off your property.
- Set up odor deterrents and/or scare devices at your property’s edges or ideally outside your property lines. Scouting “deer runs” and setting up deterrents along frequently traveled routes can deter deer from coming onto your property.
- Be persistent! After a season or two, you may be able to “pattern” the deer which frequent your property to another area.
- This is an ideal “neighborhood” strategy.

Plan On Protecting Vulnerable Plants

- Keep protection in mind when designing and siting new plantings that warrant protection. Utilize rectilinear designs which will facilitate the construction of physical barriers such as netting or burlap.
- Sink galvanized pipe to grade around the perimeter of beds or large specimen plants that you choose to protect with netting or burlap. Simply cork the open end when not in use. This will speed up and simplify the protection process.

- Cut burlap and netting to size for individual specimens or beds. Label and store these pieces for succeeding seasons when you dismantle your physical barriers in the spring.

Site Food Plots To Attract Deer Away From Landscape Plantings

- Under certain circumstances food plots can be effective in patterning deer away from plantings. In rural areas where large parcels are the norm, siting a food plot on the “back forty” can work. The primary factor for determining success of this technique is the amount of land involved. This method will not work in more residential areas where small lots are the norm. There is no lot size threshold to use when determining if food plots will be effective as there are so many variables which come into play; however, I would not advocate food plots unless the property involved has at least 50 or more acres. Siting food plots on smaller lots may actually attract more deer into the vicinity.
- Food plots or stations (typically employing one of the popular automatic deer feeders) must be utilized year-round to be effective.
- Site the food plot as far as possible from landscape plantings. In addition, try to select a location that has cover (i.e. brush) that will further encourage the deer to frequent this site.

Note: It is currently illegal to feed deer in New York State. Check with your local Department of Environmental Conservation or Natural Resources before feeding deer.

Encourage Neighborhood Strategies For Deer Protection

- If several contiguous landowners in medium to high residential settings adopt a unified approach to deer protection, it can be extremely successful. Perhaps neighbors can pool resources and construct a deer fence around their properties or set up a neighborhood program for applying repellants. A “sacrificial” planting plot may pattern the local deer to concentrate their feeding at that location. Be sure to check local zoning ordinances about fencing, especially electric fencing.

Utilize Physical Barriers When Conditions Warrant

- If the environmental and biological factors (summer drought, large deer herd, no or poor mast year, meteorological indicators of above average snow cover, etc.) point to the potential for substantial winter browsing, spray-on repellents most likely will not be effective. Properly erected physical barriers, such as boxing-in plants with burlap or netting, snow fencing, and deer fencing, can be 100% successful in protecting plants and beds.
- When utilizing netting make sure you purchase substantial netting such as poultry netting, not the flimsy type commonly sold as deer netting. Netting should be at least 6 feet in height; taller (typically 7.5’ or more) when protecting large areas. Secure the netting to the stakes or posts with good quality cable ties in addition to staples. Make sure the netting drapes

at least 6 inches past the bottom of the plant(s) as the whitetails first attempt at getting through barriers is usually from below. If boxing individual plants, cross-brace the tops of the stakes (common 1" x 1" x 6' oak stakes are available at most hardware stores or garden centers) with firing strips or lath to add rigidity to the structure.

- If utilizing burlap, the same techniques should be followed. Cable ties are typically not used with burlap, so make sure that the burlap is stapled securely (at least 3/8" staples stapling on 8" centers) to the stakes. We use pre-cut 45" x 45" good quality burlap squares for boxing in individual plants. If deer can't see the plant, chances are they will bypass it. (We have witnessed deer repeatedly trying to breach netting to get to plants). Do not wrap burlap directly onto plants, especially evergreens, as this will often lead to winter injury.
- Standard 4' high snow fencing is very good in affording protection for individual specimens too large to box and burlap. The "correct" distance for the perimeter of the snow fence to encircle the plant seems to be 18" to 20" from the longest branches. With greater distances you run the risk of having deer jump inside the barrier; with lesser, deer can often reach over the fence, especially if it is not rigid. We utilize 5' tall iron garden stakes (the heavy-duty ones), driven well into the ground, placed no more than 6' apart. The snow fencing is securely wired to the iron stakes with 14 or 16 gauge galvanized wire. Rigidity is key to success.
- Deer fencing, typically 7.5' or more in height, can be very successful in protecting large beds or even entire properties. Woven wire and heavy duty PVC plastic fencing are very effective if properly maintained. If the integrity of your fence is compromised due to power outages (in the case of electric fences), blow-downs on fences, or poor maintenance, it will cease to function as an effective barrier. Additionally, fences must be erected quickly to be effective. Prolonged construction projects, especially with the "short" fences (typically the popular 6' high electric fences), or poor maintenance of electric fences (i.e. allowing grass or weeds to grow up through the wires, thus reducing voltage) will certainly lead to failure. If the fence is not erected quickly, ideally in a day or two, deer will often simply jump over the short fences to enter the property. The all-important first contact with a new electric fence must be a good one (from your standpoint!). Once a deer has received a potent shock from an electric fence, it will develop a healthy respect for it and give it wide berth. The new generation of electric chargers, the "New Zealand" types, are very effective.
- "Double-perimeter" fencing is extremely effective. The concept for this experimental fencing draws from earlier work with "slant-type" fencing to deter deer from entering a landscape. Basically, encircle the area you wish to protect with an "inner" fence which consists of posts (anything will work: iron rebars, wooden stakes, plastic). Measure and cut to length non-synthetic rope (cotton clothesline, sisal or any absorbent rope). Soak this pre-measured rope in a bucket of odor-based deer repellent (I recommend

any of the egg-based repellants or the blood-based ones such as Plantskydd®). Wearing rubber or latex gloves “string” this rope around your posts at 26 inches above grade (mark each post with a “Sharpie” beforehand). For additional deterrence, you can tie soaked cloth strips (18 inches long x 1 – 2 inches wide) onto the rope at 6 – 8 foot intervals. If the environmental and biological indicators are forcing deer to select non-traditional winter food sources, I advise re-soaking the rope and/or cloth strips a couple of times during the winter season. The “outer” fence should be 5 feet outside the “inner” fence as measured from each of the inner fence posts. On this fence, instead of rope, I use 30 lb. (test) monofilament fishing line as the fencing. I typically affix the line to the posts at 3 heights: 12, 24, and 36 inches above grade (again, pre-measure each post for ease of stringing the monofilament at the recommended heights). It may not be necessary to string monofilament at all 3 heights to be effective. I’ve had success in previous trials utilizing a single strand of monofilament (at 26 inches above grade) for the outer fence. As deer cannot see the monofilament, when they come in contact with it they become very cautious and unsure. For visual deterrence, I attach a couple of “flags” to the top strand of the monofilament to simulate the flagging response, a visual “cue” that deer use to signal potential danger. I cut white-colored rip-stop nylon cloth in the shape of a deer’s tail and affix them to the monofilament with staples or small binder clips. A couple of these on opposing sides of the fence will suffice. Any variation of the double-perimeter fence will work. Utilizing monofilament or soaked rope as the outer fence and combining it with an existing landscape fence (split rail, picket-type, stone wall, etc.) can work. Other landscape designers are utilizing “traditional” low fencing as double fencing (again with a 4 – 5 foot separation). Innovative designs of this type can serve both the functional need (pedestrian access and circulation) as well as achieve the desired deterrence for deer.

Develop A Year-Round Strategy

- Deer’s diet and food selection slowly change over the course of the year from graze during the growing season to browse during the dormant season. There is no fixed timetable for this event, rather it’s a slow transition meant to maximize the available food sources as dictated by the season. However, even when the grass is green and succulent, deer may still select the tender new growth of woody plants for food during the growing season. Plants such as hydrangeas, weigelas, deutzias and diervillas, mock oranges and others are all susceptible to “warm weather” browsing. You must plan on protecting certain plants during the warm months, typically with repellents, as physical barriers are not aesthetically appropriate for use during the growing season. Broad-leaved evergreens and conifers are almost never selected for food except during the winter season.

- Have your physical barriers up and functioning after the first few killing frosts. If you are relying on repellents for dormant season protection, your spray program should likewise begin soon after the first killing frosts. As mentioned above, as the quality and availability of herbaceous graze declines in the late fall deer will begin selecting a greater amount of woody plants for food. Once the grass has “greened up” in the spring, deer will once again concentrate on it as their primary food source. You are typically safe in removing your physical barriers and halting your dormant season spray program once you have mowed your lawn a time or two in the spring.
- In drought years, remember that there will be more pressure on selected shrubs in your landscape during the summer months as deer can easily digest the succulent new growth of woody landscape plants which are often superior in nutritional value compared to the dried up grasses and forbs.

Relying On Repellents Is Chancy At Best

- Test repellents that you plan to use during the growing season. We have witnessed considerable tissue damage on new, tender growth with certain repellents, especially ones which employ “hot sauces” and blood derivatives. Soap and egg-based repellents seem to be the least damaging to plants.
- Do not believe what you read on the repellent label: the duration of effectiveness of virtually all repellents is not what is advertised. Some labels claim 120 days or more protection; some even boast all winter protection with a single application. In years of studying the efficacy and duration of virtually all commercially available repellents, most all have failed in as little as 1 month when extreme environmental and biological conditions were present. Conversely, if we have a mild winter with minimal snow cover, coupled with a good mast crop and low to moderate deer densities, typically every repellent will prove effective.
- Reapply repellents on a 3-week interval. Conditions must be optimum for spray applications. The temperature must be 40 F. or above for the complete drying time of the product, which can be all day in the “dead” of winter. If you apply repellents when the temperature is not optimum, or if it drops below freezing before the product dries, you will encounter winter injury on certain plants, especially broad-leaved evergreens. Once growth is initiated the following spring, plants that suffered from spray freezing on their leaves will brown up and desiccate, often leading to the death of the plant. The further north you are the greater the risk of not having optimum spraying conditions. We have tracked temperatures for years here at IES and it is not uncommon to go 6 or more weeks without breaking 40 F. in the mid and late winter months.
- Alternate repellents to enhance effectiveness. You don’t want to habituate “your” deer to one repellent.

- The new combinations of odor and scent-based repellents are very effective in deterring deer. Likewise, systemic repellents seem to be effective, but not for as long as the label would lead you to believe.

WOODY LANDSCAPE PLANTS THAT SHOW RESISTANCE TO DEER BROWSING

Winter 2006

Deciduous Trees:

- Beech (*Fagus*)
- Birch (*Betula*)
- Black Locust and Thornless Honeylocust (*Robinia pseudoacacia* and *Gleditsia tiacanthos* var. *inermis*)
- Elms (*Ulmus*) and Zelkova (*Zelkova*)
- Hickories and Walnuts (*Carya* and *Juglans*)
- Horsechestnut (*Aesculus hippocastanum*)
- Kentucky Coffeetree (*Gymnocladus dioica*)
- Maples (*Acer*)
- Maackia (*Maackia*)
- Osage-orange (*Maclura pomifera*)
- Scholar-tree (*Sophora japonica*)
- Yellowwood (*Cladrastis kentuckea*)

Deciduous and Evergreen Shrubs:

- Glossy Abelia (*Abelia x grandiflora*) Note: treat this plant as a herbaceous perennial in zone 5.
- Barberry (*Berberis*) Note: select cultivars of Japanese barberry that have low fruiting potential (Longwood Gardens trials) or species and hybrids such as the William Penn Barberry (*B. x gladwynensis* "William Penn") which do not set fruit in our hardiness zone.
- Bayberry (*Myrica*)
- Beautybush (*Kolkwitzia amabilis*)
- Blue-mist Shrub (*Caryopteris x clandonensis*)
- Bottlebrush and Red Buckeyes (*Aesculus parviflora* and *A. pavia*)
- Boxwood (*Buxus*)
- Broom (*Cytisus*) Note: can be invasive.
- Buffaloberries (*Shepherdia*)
- Bush Cinquefoil (*Potentilla fruticosa* and cultivars)
- Butterfly-Bush (*Buddleja*)
- Castor-aralia (*Kalopanax septemlobus*)
- Cutleaf Stephanandra (*Stephanandra incisa*)
- Dahurian Rhododendron (*Rhododendron dauricum*) and P.J.M. hybrids
- Elaeagnus (*Elaeagnus*) Note: avoid the invasive Autumn and Russian Olives, instead try our native Silverberry (*E. commutata*)
- Fiveleaf Aralia (*Eleutherococcus sieboldianus*)
- Japanese and Mountain Pieris (*Pieris japonica* and *P. floribunda*)
- Lilacs (*Syringa*)
- Magnolias (*Magnolia*)
- Pfitzer Juniper (*Juniperus pfitzeriana*)

NATIVE WOODY LANDSCAPE PLANTS THAT SHOW RESISTANCE TO DEER BROWSING

Winter 2006

Deciduous Trees:

- Beech (*Fagus*)
- Birch (*Betula*)
- Black Locust and Thornless Honeylocust (*Robinia pseudoacacia* and *Gleditsia tiacanthos* var. *inermis*)
- Elms (*Ulmus*)
- Hickories and Walnuts (*Carya* and *Juglans*)
- Horsechestnut (*Aesculus hippocastanum*)
- Kentucky Coffeetree (*Gymnocladus dioicus*)
- Maples (*Acer*)
- Osage-orange (*Maclura pomifera*)
- Yellowwood (*Cladrastis kentukea*)

Deciduous and Evergreen Shrubs:

- Hercules-club (*Aralia spinosa*)
- Bayberry (*Myrica*)
- Bottlebrush and Red Buckeyes (*Aesculus parviflora* and *A. pavia*)
- Buffaloberries (*Shepherdia*)
- Bush Cinquefoil (*Potentilla fruticosa* and cultivars)
- Elaeagnus (*Elaeagnus*) Note: avoid the invasive Autumn and Russian Olives, instead try our native Silverberry (*E. commutata*)
- Mountain Pieris (*Pieris floribunda*)
- Magnolias (*Magnolia*)
- Shrubby St. Johnswort (*Hypericum*)
- Spicebush (*Lindera benzoin*)
- Snowberry, Coralberry (*Symphoricarpos*)
- Summersweet (*Clethra alnifolia*)
- Sweetfern (*Comptonia peregrina*)
- Viburnums (evaluated *Viburnum acerifolium*, *V. alnifolium*, *V. cassinoides*, *V. dentatum*, *V. prunifolium*, *V. trilobum* and cultivars)
- Yellowroot (*Xanthorrhiza simplicissima*)

Evergreen Trees:

- California Incensecedar (*Calocedrus decurrens*)
- Spruce (*Picea*)
- Western Arborvitae (*Thuja plicata*)

Note: Virtually all of these plants may be selected for food during times of harsh winters and high deer populations when deer are approaching starvation.

Deer Resistant Perennials

Acaena spp. (New Zealand Burrs)
Acanthus spp. (Bears Breeches)
Achillea spp. (Yarrows)
Aconitum spp. (Monkshoods)
Adenophora lilifolia (Ladybells)
Agastache spp. (Giant Hyssop)
Ajuga reptans (Bugleweed)
Alcea rosea (Hollyhock)
Alyssum spp. (Madworts)
Amsonia tabernaemontana (Blue Star)
Anemone spp. (Anemones)
Angelica spp. (Archangel)
Antennaria spp. (Pusseytoes)
Anthemis tinctoria (perennial Marguerite)
Aquilegia spp. (Columbine)
Arabis spp. (Rockcresses)
Arenaria montana (Sandwort)
Arisaema spp. (Jack-in-the-Pulpits)
Armeria maritima (Sea Thrift)
Artemisia spp. (Mugworts)
Aruncus spp. (Goatsbeards)
Asarum spp. (Wild Gingers)
Asclepias spp. (Milkweeds)
Astilbe spp. (Astilbe)
Astrantia major (Masterwort)
Aurinia saxatilis (Basket of Gold Alyssum)
Baptisia spp. (False Indigo)
Bergenia spp. (Bergenia)
Boltonia asteroides (Boltonia)
Brunnera macrophylla (Siberian Bugloss)
Campanula rotundifolia (Harebell), *C. carpatica* (Carpathian Harebell)
Centaurea spp. (Knapweeds)
Centranthus ruber (Jupiter's Beard)
Cerastium tomentosum (Snow-in-Summer)
Ceratostigma plumbaginoides (Leadwort)
Chelone spp. (Turtleheads)
Chrysanthemum spp. (Chrysanthemums)
Cimicifuga spp. (Bugbanes)
Convallaria majalis (Lily-of-the-Valley)
Coreopsis spp. (Tickseeds)
Corydalis lutea (Gold Bleeding Heart)
Crocosmia x crocosmiflora (Montbretia)
Delosperma cooperi (Ice Plant)
Dianthus spp. (Pinks)

Compiled by Brad Roeller, 2002
Manager of Display Gardens
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website: www.ecostudies.org

Note: Underlined plants have proven particularly resistant in IES trials.

Dicentra spp. (Bleeding-Hearts)

Dictamnus albus (Gas Plant)

Digitalis spp. (perennial Foxgloves)

Dodecatheon meadia (Shooting Star)

Doronicum spp. (Leopard's Baner)

Echinacea purpurea (Purple Coneflower)

Echniops spp. (Globe Thistles)

Epimedium spp. (Barrenworts)

Eremurus spp. (Foxtail Lily)

Erigeron spp. (Fleabanes)

Eryngium spp. (Sea Hollies)

Erysimum asperum (Siberian Wallflower)

Erythronium americanum (Trout-Lily)

Eupatorium spp. (Joe-Pye Weeds)

Euphorbia spp. (Spurges)

Ferns

Filipendula spp. (Queen-of-the-Prairies)

Foeniculum vulgare (Fennel)

Gaillardia aristata, G. x grandiflora (perennial Blanket Flowers)

Galium odoratum (Sweet Woodruff)

Gaultheria (Wintergreen)

Gaura lindheimeri (White Gaura)

Geranium macrorrhizum (Bigroot Geranium)

Geum spp. (Avens)

Glaucium flavum (Horned Poppy)

Goniolimon tataricum (German Statice)

Gypsophila paniculata, G. repens (Baby's Breath)

Helenium autumnale (Sneezeweed)

Helianthus spp. (perennial Sunflowers)

Helleborus spp. (Hellebores)

Hepatica spp. (Hepaticas)

Hesperis matronalis (Dame's Rocket)

Heuchera spp. (Alumroots)

Hibicus spp (Rose Mallows)

Hydrastis canadensis (Goldenseal)

Hypericum calycinum (Aaron's Beard)

Iberis sempervirens (perennial Candytuft)

Inula spp. (Inula)

Iris germanica, I. cristata, I. sibirica, I. ensata, I. pseudocorus, I. tectorum (Iris)

Kirengeshoma palmata (Yellow Waxbells)

Knautia macedonia (Field-Scabious)

Kniphofia uvaria and hybrids (Red Hot Pokers)

Lamium spp. (Dead Nettles)

Lamiastrum galeobdolon (Yellow Archangel)

Lavandula angustifolia (English Lavender)

Liatris spp. (Blazing Stars)

Lychnis chalconica (Maltese Cross)
Ligularia spp. (Golden Groundsel)
Limonium latifolium (Statice)
Linaria spp. (Toadflaxes)
Linum perenne (perennial Blue Flax)
Liriope spicata (Lilyturf)
Lobelia spp. (Lobelias)
Lupinus spp. and hybrids (Lupines)
Lychnis spp. (Campions)
Lythrum spp. (Loosestrifes)
Macleaya spp. (Plume Poppies)
Malva alcea (Hollyhock Mallow)
Marrubium vulgare (Horehound)
Melissa officinalis (Lemon Balm)
Mentha spp. (Mints)
Mertensia virginica (Virginia Bluebells)
Mitchella repens (Partridgeberry)
Monarda spp. (Beebalm)
Myrrhis odorata (Sweet Cicely)
Nepeta spp. (Catmints)
Oenothera spp. (Evening Primroses)
Ophiopogon japonicus (Mondo Grass)
Opuntia humifusa (Prickly Pear)
Origanum vulgare (Oregano)
 Ornamental Grasses
Pachysandra terminalis (Japanese Pachysandra), *P. procumbens* (Allegheny Spurge)
Paeonia spp. (Peonies)
Papaver orientale (Oriental Poppy)
Penstemon spp. (Beard-Tongues)
Perovskia atriplicifolia (Russian Sage)
Phlomis spp. (Greek Jerusalem Sage)
Phlox subulata (Moss Pink), *P. stolonifera* (Creeping Phlox), *P. divaricata* (Wild Blue
 Phlox)
Physostegia virginiana (Obedient Plant)
Platycodon grandiflorus (Balloon Flower)
Podophyllum peltatum (Mayapple)
Polemonium caeruleum (Jacob's Ladder)
Potentilla spp. (Cinquefoils)
Primula spp. (Primroses)
Pulmonaria spp. (Lungworts)
Pycnanthemum spp. (Mountain-Mints)
Ranunculus spp. (Buttercups)
Ratibida spp. (Prairie Coneflowers)
Rheum spp. (ornamental Rhubarbs)
Rodgersia spp. (Rodgerflowers)
Rudbeckia spp. (Coneflowers)

Ruta graveolens (Rue)
Sagina subulata (Irish Moss)
Salvia spp. (perennial Sages)
Sanguinaria canadensis (Bloodroot)
Santolina chamaecyparissus (Lavender Cotton)
Saponaria spp. (Soapworts)
Scabiosa caucasica (Pincushion Flower)
Scutellaria incana (Skullcap)
Sedum kamtschaticum, *S. spurium* (Stonecrops)
Sempervivum tectorum (Hens-and-Chickens)
Senecio spp. (perennial Groundsels)
Sidalcea malviflora (Miniature Hollyhock)
Silphium spp. (Rosinweed)
Sisyrinchium angustifolium (Blue-Eyed Grass)
Solidago spp. (Goldenrods)
Stachys byzantina (Lamb's-Ears), *S. officinalis* (Betony)
Stylophorum diphyllum (Celedine-Poppy)
Symphytum spp. (Comfreys)
Tanacetum vulgare (Common Tansy)
Telekia speciosa (Oxeye Daisy)
Teucrium chamaedrys, *T. canadense* (Germander)
Thalictrum spp. (Rues)
Thymus spp. (Thymes)
Tiarella spp. (Foamflowers)
Tradescantia virginiana (Spiderwort)
Trillium spp. (Wake-Robins)
Trollius europaeus (Common Globeflower)
Valeriana spp. (Valerians)
Verbascum spp. (Mulleins)
Verbena spp. (Vervains)
Vernonia noveboracensis (NY Ironweed)
Veronica austriaca, *V. spicata* (Speedwells)
Veronicastrum virginicum (Culver's Root)
Vinca minor (Periwinkle)
Viola labradorica (Labrador Violet)
Yucca filamentosa (Yucca)

Bulbs/Corms:

<u><i>Allium</i> spp.</u> (ornamental Onions)	<u><i>Galanthus nivalis</i></u> (Common Snowdrop)
<u><i>Arum italicum</i></u> (Arum)	<u><i>Ipheion uniflorum</i></u> (Ipheion)
<u><i>Camassia</i> spp.</u> (Quamash)	<u><i>Leucojum aestivum</i></u> (Snowflake)
<u><i>Colchicum autumnale</i></u> (Colchicum)	<u><i>Narcissus</i> spp.</u> (Daffodils)
<u><i>Crocus tomassinianus</i></u> (Dalmatia Crocus)	<u><i>Scilla</i> spp.</u> (Squills)
<u><i>Eranthis hyemalis</i></u> (Winter Aconite)	
<u><i>Fritillaria</i> spp.</u> (Fritillary)	

Deer Resistant Native Perennials

Aconitum spp. (Monkshoods)
Agastache spp. (Giant Hyssop)
Amsonia tabernaemontana (Blue Star)
Anaphalis margaritacea (Pearly Everlasting)
Anemone spp. (Anemones)
Angelica spp. (Archangel)
Antennaria spp. (Pusseystoes)
Aquilegia spp. (Columbine)
Arabis spp. (Rockcresses)
Arenaria montana (Sandwort)
Arisaema spp. (Jack-in-the-Pulpits)
Artemisia spp. (Mugworts)
Aruncus spp. (Goatsbeards)
Asarum spp. (Wild Gingers)
Asclepias spp. (Milkweeds)
Astilbe **bitermata** (American Astilbe)
Baptisia spp. (False Indigo)
Boltonia asteroides (Boltonia)
Campanula rotundifolia (Harebell)
Cassia spp. (Senna)
Chelone spp. (Turtleheads)
Chrysogonum virginianum (Goldenstar)
Cimicifuga spp. (Bugbanes)
Coreopsis spp. (Tickseeds)
Corydalis spp. (Corydalis)
Dicentra spp. (Bleeding-Hearts)
Dodecatheon meadia (Shooting Star)
Echinacea purpurea (Purple Coneflower)
Erigeron spp. (Fleabanes)
Eryngium spp. (Rattlesnake-Masters)
Erythronium americanum (Trout-Lily)
Eupatorium spp. (Joe-Pye Weeds)
Euphorbia spp. (Spurges)
Ferns
Filipendula spp. (Queen-of-the-Prairies)
Gaillardia aristata, G. x grandiflora (perennial Blanket Flowers)
Galium odoratum (Sweet Woodruff)
Gaultheria (Wintergreen)
Gaura lindheimeri (White Gaura)
Geranium macrorrhizum (Bigroot Geranium)
Geum spp. (Avens)
Glaucium flavum (Horned Poppy)
Helenium autumnale (Sneezeweed)
Helianthus spp. (perennial Sunflowers)

Hepatica spp. (Hepaticas)
Heuchera spp. (Alumroots)
Hibiscus spp. (Rose Mallows)
Hydrastis canadensis (Goldenseal)
Hypericum calycinum (Aaron's Beard)
Iberis sempervirens (perennial Candytuft)
I. cristata (Crested Iris) and I. versicolor (Blue Flag)
Lewisia spp. (Lewisia)
Liatis spp. (Blazing Stars)
Lobelia spp. (Lobelias)
Lupinus spp. and hybrids (Lupines)
Lythrum spp. (Loosestrifes)
Mentha spp. (Mints)
Mertensia virginica (Virginia Bluebells)
Mitchella repens (Partridgeberry)
Monarda spp. (Beebalm)
Oenothera spp. (Evening Primroses)
Opuntia humifusa (Prickly Pear)
Pachysandra procumbens (Allegheny Spurge)
Penstemon spp. (Beard-Tongues)
Phlox subulata (Moss Pink), P. stolonifera (Creeping Phlox), P. divaricata (Wild Blue Phlox)
Physostegia virginiana (Obedient Plant)
Podophyllum peltatum (Mayapple)
Polemonium caeruleum (Jacob's Ladder)
Potentilla spp. (Cinquefoils)
Pycnanthemum spp. (Mountain-Mints)
Ranunculus spp. (Buttercups)
Ratibida spp. (Prairie Coneflowers)
Rudbeckia spp. (Coneflowers)
Salvia spp. (perennial Sages)
Sanguinaria canadensis (Bloodroot)
Scutellaria incana (Skullcap)
Sedum spp. (Stonecrops)
Senecio spp. (perennial Groundsels)
Sidalcea malviflora (Miniature Hollyhock)
Silene spp. (Pinks)
Silphium spp. (Rosinweed)
Sisyrinchium angustifolium (Blue-Eyed Grass)
Solidago spp. (Goldenrods)
Stachys hyssopifolia (Hyssop Hedge-Nettle)
Stylophorum diphyllum (Celedine-Poppy)
Teucrium canadense (Germander)
Thalictrum spp. (Rues)
Tiarella spp. (Foamflowers)
Tradescantia virginiana (Spiderwort)

Trillium spp. (Wake-Robins)
Trollius laxus (Globeflower)
Vancouveria hexandra (Vancouver Fern)
Verbena spp. (Vervains)
Vernonia noveboracensis (NY Ironweed)
Veronicastrum virginicum (Culver's Root)
Viola labradorica (Labrador Violet)
Yucca filamentosa (Yucca)

Listed compiled by Brad Roeller.

Note: Underlined plants showed good resistance to browsing in trials at the Cary Institute's display gardens.