



Integrated Pest Management Program

Department of Plant Science and Landscape Architecture
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STRATEGIES TO MINIMIZE DEER DAMAGE ON SCHOOL GROUNDS

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The population of white-tailed deer (*Odocoileus virginianus*) in Connecticut has increased dramatically from very few in the early 20th century to over 76,000 today. Damage to horticultural plant material from deer has also increased due to the reduced populations of predators, diminished areas of natural vegetation, successful capacity for reproduction, and neighborhoods constructed within their natural home territory. The over-abundance of these docile, but voracious, creatures has impacted design and maintenance of landscapes in urban and suburban areas, including school properties.

Not only does the surplus population of deer in suburban and urban locations present a challenge for landscape maintenance, it also has the potential to impact the health & safety of school children, teachers, and staff. Deer are the primary host of the adult Blacklegged Tick or Deer Tick (*Ixodes scapularis*) that transmits Lyme disease, Babesiosis, and Anaplasmosis. On daycare and K-8 school properties, methods to reduce tick populations have been severely impacted since the pesticides used to eradicate tick pests have been banned. Discouraging deer populations on school properties is the first line of defense to reduce overall tick populations. This includes the regular cleaning up of debris along school property perimeters along the wood line edge where ticks reside and encounter animal carriers.

School landscapes should not attract or encourage deer to wander close to school buildings where populations of children predominate. Accordingly, plants selected for school properties should be deer-resistant so that deer are discouraged from wandering close to school buildings and in landscape beds. The addition of native plants that are less palatable to deer should also be incorporated into school landscapes since they are more sustainable than exotic species.

BEHAVIOR AND BIOLOGY

Deer are primarily browsers; they are herbivores that feed on woody shrubs, and herbaceous flowering plants (forbs). They consume an average of 5-15 lbs./day of leaves, soft shoots, twigs, acorns, lichens, and fruit. When a preferred food source such as acorns, corn, or hay is abundant, they will eagerly devour it, but when favored vegetation is unavailable, deer will eat almost anything to survive. In harsh conditions, when drought or starvation are a possibility, deer also will strip bark off small trees and branches. Deer injure and disfigure plants not only by eating leaves and stems, but also by rubbing antlers against the bark of trees. This act is particularly damaging to young trees with thin bark.

Deer can be creatures of habit; often their travels to locations are to those areas to which they feel safe and without danger. Often these areas have been visited by other deer; that lingering scent is easily identified and confirms the sense of security around that location.

ENVIRONMENTAL DAMAGE CAUSED BY DEER

With hunting prohibited in many parks and natural areas, a disproportionate density of deer within small geographic regions here in CT has become an extensive problem. Forests with high populations of deer will have little, if any, natural regeneration of desired hardwood species. Many wildflowers and flowering shrubs, including threatened or endangered species, such as trilliums and orchids, are favored as a food source by deer. Often, browse resistant plants, such as the invasive Oriental bittersweet and Japanese barberry, have lower economic, aesthetic, and wildlife value than the species they displace. Many bird species also are negatively impacted by the change in forest ecosystems caused by excessive deer browsing.



Deer Damage on Hosta

Deer will continually venture to urban and suburban landscapes to forage when food is scarce, especially in winter months. In spring, deer again venture to gardens to seek out young, tender new growth emerging from the ground. They tend to prefer soft vegetation with high water content, especially delicate young flower buds. Well-fertilized and over-watered plants are particularly lush and appealing.

Deer frequent areas where they feel safe and the scent of other deer is evident. While the scent of deer may direct some travel, the extent and type of feeding damage caused by deer during their travel can vary widely. Deer may nibble plants to taste, or limit their grazing to buds and young



Deer Damage on Arborvitae

growth. When they locate plants that they truly favor, or when they are struggling to survive, deer may strip plants of leaves or bark. The severity of the damage depends on the season, food scarcity, food source, and weather conditions. For trees, damage is most common on those plants that are easy to reach, young, or low-branched.

Deer need to be trained to stay away from locations where their browsing is not acceptable. Therefore, the animals need to be convinced the area is not safe and the food source to which they are drawn is unsavory.

STRATEGIES TO MINIMIZE DEER DAMAGE IN LANDSCAPES

The most significant way to discourage deer from causing disfiguring damage in the landscape is to plant trees, shrubs, and perennials that deer prefer not to eat. However, no plant is completely deer proof (young deer do not know which plants are palatable until they are sampled). Deer tend to avoid plants:

- with strong scents and bitter, acrid flavors, such as herbs;

- with thorns or prickles on leaves or stems;
- that have hairy or fuzzy foliage;
- that are poisonous or have thick, latex-like sap.

Strategies to use in combination to reduce browse damage and to protect plant material on school properties:

- **Incorporate deer-resistant plants** into the landscape. See below for a list of recommended plants.
- **Divide the school landscape into zones**, prioritized by deer feeding preferences and damage potential. Plant the most browse resistant plants along the far edge of the property where deer have access to the area. Plants that are the most susceptible to browse damage should be planted in close proximity to frequently used entrances, interspersed with deer resistant plants, or grown within a fenced in or protected area such as a school courtyard.
- **Protect young trees and those with thin bark** with protective devices to discourage feeding and deer rub. Wire-mesh cylinders that encircle the trunk are popular and easy to create and install.
- **Use tree protectors, plastic tree wrap, burlap, netting, or fishing line** to restrict access to young or specimen plants. Fishing line strung around specimen plants is an easy and inexpensive method to confuse and repel deer. Regardless of product used, the design should not pose a hazard to children who may travel near the landscaped area.
- **Use fencing to restrict deer access** when possible. Deer are jumpers, so fences must be at least 8-feet high, with no more than 6-inch by 6-inch gaps, and must extend to the ground. While fencing is the best deterrent to protect plant material from deer, it may be impractical on school property settings.
- **Modify fertilization of landscape plants** if deer tend to repeatedly travel to a specific location. Deer favor lush, well-fertilized plants, but may avoid the same plants if they are less appetizing.
- **Incorporate the use of CT DEEP approved EPA minimum risk repellents.** Repellents are products that deter feeding or discourage deer browse because of an unpleasant taste or odor. Repellents function as an application within a physical location, as a treatment absorbed and translocated within the plant, and as a direct contact deterrent affixed to the plant surface. Coverage of the plant should begin at the ground level and extend upward at least six feet. These approved repellents should be applied on a rotating, regular basis as new growth emerges and need to be reapplied after repeated rainfall. Refer to DEEP's most current list of EPA minimum risk products that are exempt from federal registration as a resource of available products. Some of the repellents are to be sprayed on ribbons as part



Tree with bark damaged by deer



Tree Uprooted and Pushed Over by Deer

of fencing kits rather than directly on plant surfaces. Because of the lingering unpleasant taste or odor, many of these repellents may not be suitable for landscape beds adjacent to school buildings. It also is important to note that homemade concoctions developed as deer repellents are unregistered and by law are not allowed to be applied on school properties. Items such as soaps or dryer sheets, while not a homemade repellent recipe, need to be referenced in the IPM plan, if placed in a school landscape.

- **Use motion-activated sprinklers, lights, or noisemakers** (ie. radios or whistles), where appropriate, to startle deer and cause them to flee. Typical success with these type of deterrents is often short-lived. Deer become accustomed to and recognize the devices if they are not moved or altered in pattern that keeps deer constantly wary and concerned.

PLANTS TO AVOID IN AREAS WITH HIGH DEER POPULATION

PERENNIALS:

Cardinal flower (<i>Lobelia</i>)	Daisy (<i>Leucanthemum</i>)	Daylily (<i>Hemerocallis</i>)
Hardy Geranium (<i>Geranium</i>)	Hollyhock (<i>Alcea rosea</i>)	Hosta
Lily (<i>Lillium</i>)	Phlox	Purple Coneflower (<i>Echinacea</i>)
Rose Mallow (<i>Hibiscus</i>)	Sea-holly (<i>Eryngium</i>)	Strawberry (<i>Fragaria</i>)

WOODY SHRUBS AND TREES:

American Arborvitae (<i>Thuja</i>)	Atlantic White Cedar (<i>Chamaecyparis</i>)	Azalea (<i>Rhododendron</i>)
Blueberry (<i>Vaccinium</i>)	Burning Bush (<i>Euonymus</i>)	Cherry (<i>Prunus</i>)
Crabapple (<i>Malus</i>)	Eastern Redbud (<i>Cercis</i>)	English Ivy (<i>Hedera</i>)
Fringetree (<i>Chionanthus</i>)	Pear (<i>Prunus</i>)	Plum (<i>Prunus</i>)
Rhododendron	Rose (<i>Rosa</i>)	Yew (<i>Taxus</i>)

RECOMMENDATIONS FOR DEER RESISTANT PLANTS

In the referenced list, plants in the “rarely damaged” category are the least likely to attract deer and are the preferred options to select if plant damage by deer browse is of concern. Plants that are “seldom severely damaged” are also good options. **In addition, ornamental grasses and ferns are nearly all considered to be highly resistant to deer damage.**

Deer Tolerance Level:

R = Rarely Damaged
S = Seldom Severely Damaged

Light Level:

FS = Full Sun SH = Full Shade
PS = Part Shade

<u>Woody Species</u>	<u>Deer Tol.</u>	<u>Height</u>	<u>Wide</u>	<u>Flower Color</u>	<u>Flower Time</u>	<u>Light</u>	<u>Nat-ive</u>	<u>Attributes/Maintenance</u>
Bayberry (<i>Morella/Myrica pensylvanica</i>)	R	5-10'	5-10'	yellow-green	May	FS/PS	Yes	Tolerates drought, erosion, wet soils. Salt tolerant. Roots form suckers to colonize an area. Best in groups or massed. Foliage fragrant; fruit showy - attracts birds, provides winter interest. Separate male and female plants - need at least one male plant for fruit production on females.
Boxwood (<i>Buxus sempervirens</i>)	R	15-20'	10-15'	insignificant	Spring	FS/PS	No	Drought tolerant. Protect from drying winds, especially in winter. Evergreen. Root rot can be a problem in poorly draining soils. Used for foundation planting or low hedge.
Cypress, Siberian (<i>Microbiota decussata</i>)	S	.5-1.5'	3-12'	non-flowering	-----	FS/PS	No	Dwarf, evergreen conifer forms excellent ground cover. Best performance is in cool summer climates. More shade tolerant than ground cover Junipers.
Dogwood, kousa (<i>Cornus kousa</i>)	S	15-30'	15-30'	white, pink	May-June	FS/PS	No	Prefers organically rich, medium moisture, well-drained, sandy soils. Good fall color; showy, edible fruit; attracts butterflies.
Leucothoe, drooping (<i>Leucothoe fontanesiana</i>)	R	3-7'	3-7'	creamy white	May-June	PS	No	Prefers moist, fertile, acidic soils. Not drought tolerant. Evergreen. Fragrant, long lasting flowers. Needs little or no pruning, but may be rejuvenated if needed by cutting back to the ground after flowering.
Maple, sugar (<i>Acer saccharum</i>)	S	40-80'	30-60'	green	April	FS/PS	Yes	Easily grown in average, medium, well-drained soil in full sun to part shade. Prefers fertile, slightly acidic soil. Shade tolerant. Excellent specimen tree for lawn or parks. Has been frequently used as a street tree, but is generally intolerant of road salt, soil compaction and pollution.
Pieris, Japanese (<i>Pieris japonica</i>)	R	4-8'	3-6'	white	late March-mid April	FS/PS	No	Prefers fertile, acidic soils and mulch. Evergreen. Protect from winter winds. Watch for lacebug infestations. Prune immediately after flowering in late spring by cutting branches to just above a set of leaves.
Pine, eastern white (<i>Pinus strobus</i>)	S	50-80'	20-40'	non-flowering	-----	FS	Yes	Prefers fertile soil and cool, humid climates. Some susceptibility to white pine blister rust and white pine weevil. Water roots deeply, particularly in dry spells, but avoid wetting the foliage. Plant in protected locations and apply a winter mulch.
Serviceberry, Downy (<i>Amelanchier arborea</i>)	S	15-25'	15-25'	white	March-April	FS/PS	Yes	Root suckers can be removed to produce a more tree like form, otherwise will become shrubby. Attractive fall color, fragrant flower; edible red berries attract birds. Salt tolerant.

Sumac, fragrant (<i>Rhus aromatica</i> 'Gro-Low')	R	1.5-2'	5-8'	yellow (insignificant)	Spring	FS/PS	Yes	Salt tolerant. If winter injury or die back, just cut the affected part down to 6" and it will regrow. Showy red fruit in fall; fast spreader.
Sweetbells (<i>Eubotrys racemosa</i>)	R	4-6'	4-6'	white, pink	May-June	FS/PS	Yes	Does well in moist locations. Bright red fall color.
Sweetfern (<i>Comptonia peregrina</i>)	R	2-5'	4-8'	yellow (insignificant)	April-May	FS/PS	Yes	Does well in dry, infertile soils; difficult to transplant, best when container grown. Good for naturalizing and embankments. Foliage fragrant.
Sweetgale (<i>Myrica gale</i>)	R	3-4'	3-5'	yellow	March-May	FS/PS	Yes	Prefers moist or wet soils, can grow in very acid soil. Plant fixes nitrogen. Separate male and female plants; both needed to produce seed. Aromatic fruit and foliage.

<u>Herbaceous Species</u>	<u>Deer Tol.</u>	<u>Height</u>	<u>Wide</u>	<u>Flower Color</u>	<u>Flower Time</u>	<u>Light</u>	<u>Native</u>	<u>Attributes/Maintenance</u>
Bleeding heart (<i>Dicentra spectabilis</i>)	R	2-3'	1.5-2.5'	white, pink	April-May	PS/SH	No	Prefers moist, moderately fertile soils. Intolerant of wet soils in winter and dry soils in summer. Good soil drainage is essential for plant survival. Foliage usually goes dormant by mid-summer; plant among ground cover/late developing perennials, ie. hostas and ferns.
Bleeding heart, fringed (<i>Dicentra eximia</i>)	R	1-1.5'	1-1.5'	rose pink to purplish red	April-July	PS	Yes	Prefers moist, moderately fertile soils. Intolerant of wet soils in winter and dry soils in summer. Naturalizes by self-seeding in favorable environments. Good soil drainage is essential for plant survival.
Ginger, European (<i>Asarum europaeum</i>)	R	6"	1-1.5'	green-yellow, brown	April-May	PS/SH	No	Prefers moderately fertile, consistently moist, acidic soils. May self-seed. Glossy, leathery, heart-shaped leaves used for groundcover in heavy shade.
Ginger, wild (<i>Asarum canadense</i>)	R	6"-1'	1-1.5'	purplish-brown	April-May	PS/SH	Yes	Prefers moderately fertile, consistently moist, acidic soils. Spreads slowly by rhizomes - attractive groundcover for heavy shade.
Indigo, false (<i>Baptisia australis</i>)	R	3-4'	3-4'	indigo blue	May-June	FS/PS	Yes	Roots should not be disturbed once plants established. Taller plants may need support, particularly when grown in part shade locations. Best flowering in full sun. Attracts butterflies. Attractive seed heads in summer/fall.
Sage, Russian (<i>Perovskia atriplicifolia</i>)	R	3-4'	3-4'	purplish blue, lavender	July-Sept.	FS	No	Drought tolerant. Blue-grey, fragrant foliage. Give it room to spread. 'Little Spire' is a compact cultivar.
Spurge, Allegheny (<i>Pachysandra procumbens</i>)	S	.5-1'	1-2'	white	March-April	PS/SH	Yes	Drought tolerant. Fragrant flowers. Prefers acidic, fertile soil. For ground cover, set plants 6-12" apart. Spreads slowly to form colonies. Avoid overhead watering; thin plants periodically for air circulation to prevent disease.
Yarrow (<i>Achillea mill.</i> 'Sunny Seduction')	R	1.5-2.5'	1-2'	yellow	June-Sept.	FS	Yes	Drought tolerant. Salt tolerant. Fragrant flowers attract butterflies.

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