



GREEN SPRING GARDENS

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GARDEN INSTALLATION AND MAINTENANCE FOR THE ECO-FRIENDLY GARDENER

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A. Garden Installation Guide

Soil

Good soil is important to the success of gardens. There are three sizes of mineral particles in soil – sand, silt, and clay (excluding rock fragments such as stones and gravel). **Soil texture** represents the relative composition of sand, silt, and clay. **There are three broad textural classes of soil:**

- **Sandy soils** – coarse texture; drain rapidly - preferred by some plants that need excellent drainage; lower level of nutrients. Uncommon in the Washington, D.C. area - in scattered areas. More common in the Coastal Plain.
- **Loamy soils** – medium textured; dominated by the properties of silt; the best soil for most plants. Common in the Washington, D.C. area.
- **Clay soils** – fine texture; drain slowly; usually higher level of nutrients. Common in the Washington, D.C. area. Fine for many plants if not compacted – compaction is a serious problem in construction zones.

The textural class of a soil cannot be changed by adding organic matter but soil structure can be improved. Soil structure describes the arrangement of the solid parts of the soil and the pore spaces between them. Soil structure has a major influence upon plant growth – compacted soil is much harder for plant roots to grow in than porous soil.

Soil pH - Most plants prefer a pH between 5.5 - 7.5 (6-7 is best). Ericaceous plants, such as azaleas, rhododendrons, and blueberries, are a notable exception: they prefer a pH between 5.0 - 5.5. Many woodland perennials like a pH between 5.5 and 6.5. A pH of 7 is neutral, below 7 is acid, and above 7 is alkaline (basic).

Get a soil test done for agricultural lime, potassium, and phosphorus recommendations before planting a new garden or periodically for an established garden. Testing is done through the Virginia Cooperative Extension/Virginia Tech Soil Testing Laboratory. Soil test kits are available at Fairfax County public libraries.

Agricultural lime to raise soil pH - The primary active ingredient of lime is calcium carbonate. One of the greatest benefits to plants, in terms of nutrient levels, is from proper pH values: calcium availability and the availability of other nutrients is affected by pH. Pelletized lime is the easiest form of lime to use if soil pH needs to be raised - pulverized lime is dusty to apply.

In most situations it is better to use calcium carbonate lime (calcite lime) rather than dolomite lime: over time dolomitic lime can cause an undesirable buildup of magnesium in soils. Only use dolomite lime when you have a soil test showing a large deficiency of magnesium in your soil (see the University of Missouri Extension Natural Lawn Care by Brad S. Fresenburg at <http://extension.missouri.edu/p/G6749>). Soil tests are often done about every four years to see when reapplication of lime is needed.

Fertilization - Fertilizer should only be applied if nutrients are deficient.

Nitrogen - Soil testing labs don't actually measure nitrogen in the basic test because it is - susceptible to rapid changes in availability (it can be lost as a gas or leached out). Testing labs - just make an estimate on how much a particular crop might need – nitrogen is commonly - overused. It is best to apply nitrogen only after plants are planted if a nitrogen deficiency is - evident (see the Garden Maintenance Guide below under fertilization on P. 14 -15). -

Phosphorus - Apply granular phosphorus only according to soil test recommendations. - Many states have restricted phosphorus fertilizer use because of its negative effect on water - quality, including Virginia and Maryland (<http://www.cga.ct.gov/2012/rpt/2012-R-0076.htm>). -

Phosphate mining for phosphorus also destroys the site it is mined from (as does potash mining for potassium). Soils that have been fertilized frequently often have high phosphorus levels and more phosphorus is not needed. For environmentally sound lawn fertilization information, see the Maryland's Lawn Fertilizer Law website from the Maryland Department of Agriculture (<http://mda.maryland.gov/Pages/fertilizer.aspx>). Virginia's information is only available to people

and organizations that need to become certified fertilizer applicators for fertilizer application (<http://www.vdacs.virginia.gov/plant&pest/cfa.shtml>).

Preparation For New Beds And Borders

Plants are easier to take care of in beds and borders. A border is a bed that is generally longer than wide and planted with a variety of plants. It may be backed by walls, fences, or hedges and is chiefly viewed from one side. Free-standing island beds are a variation on the border. Bed edges look best with sweeping curves or straight lines and not wiggly lines.

Do not import topsoil for new garden beds. Improving existing soil is almost always the best option. Soils sold as topsoil are often poor quality subsoils from construction sites. **Manufactured soils** (compost, sand, soil, and/ or other additives) are a better alternative for special circumstances such as inner-city areas where little soil is left, ballfields with heavy foot traffic, and green roofs for public buildings. Manufactured soils are expensive and use large amounts of energy to prepare and transport.

Kill all perennial weeds if possible in the area of the new garden bed. Perennial weeds such as Bermudagrass and ground ivy are difficult to kill after planting (annual and biennial weeds are easier to kill).

New Bed Preparation Can Be Done In 3 Ways:

1. - **No-tillage (no-till) for organic gardeners** – No-tillage bed preparation is commonly used if extensive amending of soil is not necessary, and in woodland areas. A thick organic mulch can be used for several months in areas with turf or with many weeds - 3 to 6 inches of mulch can be used initially. If the existing vegetation is tall, use a mower or string trimmer before mulching. When mulching the bed again several months later, the standard 2 to 3 inches of mulch can be used. Organic gardeners eliminate remaining weeds over time by extensive hand weeding.

Woodland gardens – Usually soil is prepared in the immediate planting area only with a shovel.

2. - **No-tillage (no-till) using glyphosate herbicide** - This is a relatively safe herbicide with minimal impact on the environment due to rapid breakdown and few effects on non-target species. No-tillage bed preparation using glyphosate is commonly used. It is effective in killing a wide variety of plants. **As with all pesticides read and follow label directions.** It is marketed under many names including Roundup Pro. Glyphosate is most commonly used to control perennial weeds, invasive plants, and weeds in large garden areas. The percentage of glyphosate that is mixed to kill most common garden weeds is around 2%, with 4-5% being used on more difficult perennial weeds; application at Green Spring is done with 2 gallon hand-held compressed sprayers.

Unwanted vegetation can be killed with glyphosate to create a new bed, then mulch the killed area after at least a couple of weeks. However, it is much more ecological to mow or string trim the area first, then mulch heavily with a thick organic mulch to kill as much vegetation as possible - then use glyphosate and hand weeding to kill the weeds that emerge through the mulch. Some perennial weeds are very difficult to kill without herbicides, such as Canada thistle and mugwort.

Using glyphosate around water - A formulation of glyphosate without a surfactant needs to be used in and around bodies of water because standard surfactants are toxic to frogs. For spraying aquatic weeds and areas by water, Green Spring currently uses Aqua Neat. Other aquatic formulations are Aquamaster and Rodeo. Due to the sensitive nature of these areas, certification in Aquatic Pest Control is required by the state of Virginia for commercial and government application for controlling pests. The aquatic formulations do not have a surfactant (the ingredient in most formulations that is toxic to fish and aquatic invertebrates): a non-ionic surfactant that is safe for frogs needs to be purchased separately and added to the solution, such as Cide-Kick.

3. - Tillage Or Digging – Tillage is used for bed preparation if extensive amending of the soil is needed, and it has traditionally been used as a means to kill weeds or turf. Tillage is not necessary most of the time - it consumes fuel if mechanized equipment is used and it destroys organic matter and tree roots.

- **Apply amendments before tilling or digging.** Amendments include lime, well rotted organic matter, any needed coarse sand or pine bark, and fertilizers for needed phosphorus and potassium.
- **Adding up to a 1 inch layer of well rotted organic matter can be done before tillage** to provide slow release nutrients in an organic form and to improve water retention (not needed in organic soils, which are found in wetlands or former wetlands). Compost (including Leafgro) and well-rotted shredded leaves are excellent materials to use. Leafgro is produced in Maryland from composted leaves and grass clippings. Peat moss should not be used - it decomposes rapidly and the harvesting of peat moss destroys wetlands.
- **Coarse sand (washed concrete sand)** - Sand can be added to clay soils along with organic matter if the structure is poor. However, many clay soils have good structure and do not need to be amended with sand if plants that grow well in clay soil are used. The biggest drawback is that a large amount of sand is needed: “for an existing volume of clay, half that volume (in sand) must be added” (from *Sustainable Landscape Construction. A Guide to Green Building Outdoors*. 2nd edition. J. William Thompson and Kim Sorvig). **Organic matter must be added at the same time as sand** or the soil can become as hard as concrete. If any existing soil is removed, it usually is best to add it to a compost pile.
- **Fine pine bark** – Fine pine bark can be substituted for coarse sand but it will not change the soil textural class, just the soil structure. Green Spring does not use fine pine bark as a soil amendment.
- **Use a round point shovel, a garden spade, rototiller (rotary tiller), or cultivator mounted on a tractor to turn the soil.** Dig to a single spade depth (up to 12 inches deep) and turn the soil over. Tillage can be done whenever the soil isn't frozen or too wet. If the soil is compacted, a pickaxe or backhoe can be used to break it up.
- **Raking** – After tilling, level the soil (or have it slightly raised in the middle of the bed) with a landscape rake and let the soil settle before planting.

Composting

Compost improves soil in many ways - It improves soil structure, increases water-holding capacity, increases nutrient levels, and supplies a wide range of slow-release nutrients. Composting is a great way to recycle plant debris from the garden and the kitchen and to have a ready source of organic matter for the garden. Just pile up organic materials in a less visible,

well drained area of the yard. Don't bother to sort organic material into layers. Do not add nitrogen fertilizers (manure or granular ones). Don't add fleshy fruit waste to the compost pile if rats are present. Excess soil from other garden operations is a good addition to compost piles. Take finished compost from the bottom of the pile when it's ready for garden use. Compost tea is also used successfully by some institutions and individuals.

Landscape Planning And Plant Selection

There are many factors to consider in making a garden a success. Select plants that will grow well in the particular location.

1. - **Light Levels** – Select plants adapted to existing light levels and note seasonal - differences. -

Relative Levels Of Sunlight:

- ❖ **Full Sun** - 6 hours or more of sunlight daily
- ❖ **Part Shade**
 - an area shaded part of the day -
 - among deciduous trees with high branches -
 - among deciduous trees with foliage that is not heavy -
 - among thinned deciduous woods -
- ❖ **Full Shade**
 - shade under a dense deciduous tree canopy -
 - shade beneath many evergreens -

Woodland Gardens - Trees can be removed or limbed up (lower limbs properly cut off) to increase light levels. Brush may need to be cleared to make room for choice plants. Learn what poison ivy looks like during the growing season and after the leaves are gone to avoid a bad rash! All parts of the plant can cause contact dermatitis.

2. - **Soil Moisture and Site Modifications**

Soil Moisture - it is easiest to select plants adapted to the moisture conditions of the site. Group plants with similar moisture requirements together. Moisture levels can vary by season.

Sites can be:

- Dry
- Moist
- Wet (standing water) – for wetland species

To remove water or to conserve water, site modifications are also possible:

- **Removing water** - Extensive modifications of poorly drained sites to improve drainage are primarily done for vegetable and fruit gardens. Options to improve drainage include using raised beds, installing drainage, or doing grading corrections (at least a 1% slope is needed).
- **Conserving water** - The opposite approach is to make modifications in the landscape to collect water on-site for plants and to reduce runoff.

Low Impact Development (LID) and Environmental Site Design (ESD) - Bioretention areas and rain gardens are major components in the low impact development approach to managing stormwater (the state of Maryland now is referring to this stormwater management approach as Environmental Site Design or ESD). LID or ESD uses a wide range of techniques to reduce water volume and pollutant loading into streams, rivers, and

the Chesapeake Bay by **managing runoff as close to the source(s) as possible**. Pollutants include fertilizers, pesticides, other chemicals, sediment (eroded soil), and debris.

These practices treat water as a valuable resource for plants and attempt to mimic the functions of plants and soils in forests and other natural areas in filtering water, retaining water, and increasing groundwater renewal. Plants help reduce the volume of runoff into receiving waterways by evaporation and transpiration. Over 90% of the water that plants take up with their roots is released into the air.

Using Bioretention Areas and Rain Gardens to Conserve Water and Reduce Runoff:

- **Bioretention areas** - These large, shallow basins use many plants and a porous soil mix to treat stormwater before it flows into storm drains and then waterways. Green Spring has two large bioretention areas in the Entrance Garden. A porous soil medium was prepared with sand, compost, and soil. Construction techniques were layered as follows: drain pipes, a gravel layer, and geotextile fabric were used under the soil mix. Planting of woody and herbaceous plants has been extensive. Less supplemental watering is needed in these areas during dry periods.
- **Rain gardens** – These smaller, shallow basins are more useful for the average gardener – they are easier to construct and their small size is perfect for home gardens. They are created in areas near the end of downspouts, by paved areas so water can accumulate during rains and gradually soak into the soil, and in certain drainage areas. Plants that tolerate periodically wet soil are an integral part of these gardens. These gardens need less irrigation during dry periods.

Rain gardens should be located at least 10 – 15 feet away from homes and are 6 inches below the existing grade of the surrounding soil when completed. If the native soil has a good infiltration rate, no amending of the soil is necessary. If the infiltration rate is too slow, soil to a depth of up to 3 1/2 feet needs to be dug out and the bottom of the basin filled with a soil mix that is 50% sand, 25% topsoil (little or no clay), and 25% compost or leaf mulch (leaving the mix 6 inches below the existing grade of the surrounding soil. Details are in the *Rain Gardens Technical Guide. A Landscape Tool to Improve Water Quality*. Virginia Department of Forestry (available as a publication and at <http://www.dof.virginia.gov/print/mgt/Rain-Gardens-Tech-Guide.pdf>).

Other References on Rain Gardens:

*For an extensive list of native plants to grow in moisture-retentive areas see *Riparian Forest Buffers - Native Plants for Conservation, Restoration and Landscaping* (Natural Heritage Program of the Virginia Department of Conservation and Recreation; available at http://www.dcr.virginia.gov/natural_heritage/documents/riparian_nat_plants.pdf

**Creating Rain Gardens. Capturing the Rain for Your Own Water-Efficient Garden*. Cleo Woelfle-Erskine and Apryl Uncapher (2012).

Other Techniques to Conserve Water and Reduce Runoff:

- Directing downspouts into permeable areas like garden beds, lawns, or woods
- Directing downspouts and gutters into containment structures for garden use such as rain barrels and cisterns
- Permeable paving or porous pavement – products include porous asphalt and

open-jointed blocks (permeable paving units) made from concrete or stone. Open-jointed blocks have open, permeable spaces between the units and include products like Hanover “EcoGrid”, “Aqua-Loc”, and PaveDrain pavers.

- Street swales (streetside swales) – used in commercial areas for retaining water for street trees. For a local certified project by the Sustainable Sites Initiative (http://www.sustainablesites.org/cert_projects/), see Square 80 Plaza at The George Washington University (http://www.sustainablesites.org/cert_projects/show.php?id=59). Simper designs are used in median strips in local residential areas as well.
- Green roofs
- Forest restoration and meadow development – Mowed lawns generate up to 50% more runoff than forests. Meadows and meadow gardens also produce less runoff than turf. For further information and references about native ornamental grasses and meadows, see **Native Ornamental Grasses and Sedges for Gardens and Meadows in the Washington, D.C. Area** on the Green Spring website and in the Horticulture Center.

3. Plant Selection and Plant Information Sheets from Green Spring Gardens

Recommended woody and herbaceous plants for the Washington, D.C. Area are listed in numerous plant information sheets on the Green Spring website under Gardening and in the Horticulture Center. **There are 10 information sheets solely featuring native plants, 3 with a mix of natives and non-natives, and 3 featuring non-native plants.**

Tips For Plant Selection:

- Consider available space and mature size when selecting plants, and use a diversity of plant species. Think about microclimate and cultural requirements when placing plants.
- **Newly planted plants need more watering than most established plants.** Annuals, tender perennials, and tender bulbs generally need more water because they are replanted yearly. In dry years this can become a major maintenance issue. Fewer of these plants need to be used if reduced watering is desired. In contrast, hardy winter- and spring-flowering bulbs that go dormant in the summer are usually tolerant of dry sites in the summer and fall.
- **Dry garden sites are common.** Plants that are adapted to dry sites are noted in the Green Spring information sheets in the comments column. Even drought tolerant plants need adequate moisture until their root systems get established.
- **Plant Hardiness** - Adaptation to winter's cold, and to summer's heat and humidity, is needed. The Washington, D. C. area is mostly Zone 7a on the USDA Plant Hardiness Zone Map, although protected microclimates in portions of D.C., Arlington, and Alexandria are Zone 7b and sometimes even 8a. Zone 7a has an average annual minimum temperature of 0 - 5 degrees F.
- **Invasive Plants** - These plants reproduce quickly, displace native plant species, and are - difficult to eradicate. **Do not plant invasive species and remove existing invasives.** - Invasive plant species and potential invasives still offered in the nursery trade are listed - outside of the table format at the bottom of several Green Spring plant information - sheets featuring non-native plants for gardens and landscapes. For further details see - the Garden Maintenance Guide under Weed Control below (P. 12 -13). -

Planting In General

Most plants, with the exception of dormant bulbs, should be planted so they will be growing at grade or slightly above grade once they become established (at grade is the existing level of the

soil). Water plants individually after planting. Newly planted plants need more watering than most established plants.

Gardeners can mulch with 2 to 3 inches of mulch after planting, which is optional (generally an organic mulch such as shredded leaves). Mulching cuts down on water loss, supplies nutrients over time, and reduces the number of weeds. Do not mulch too closely to plant crowns (the plant base) because crown rot can occur.

Fertilization is seldom needed right after planting except for some transplants of vegetables and some tender perennials that are showing signs of nutrient stress – most other plants will recover fast enough once the soil warms up and if water is adequate. Nutrient deficiencies are more common in the spring when transplants are planted in cold soil. A liquid fertilizer, such as quick-release synthetic (inorganic) 20-20-20, works rapidly if a plant is nutrient deficient (do not apply granular fertilizers due to the potential for plant damage). Liquid fertilizers are usually purchased in the dry form and mixed in a watering can. Lightly rinse the leaves with fresh water after using liquid fertilizer to avoid fertilizer burn, especially for small plants or stressed plants.

Planting Herbaceous Perennials

Planting time for hardy perennials - the best time is spring or early fall - Plants that are borderline hardy are best planted in the spring so they have more time to become established before winter. Summer planting is fine for most plants with careful watering.

Planting hardy perennials in the fall – plant early enough so a good root system develops before the onset of cold weather (**preferably from September into early October**). If plants aren't firmly anchored, plants can heave out of the soil due to freezing and thawing. This is less of a problem with large container-grown stock. **Do not plant marginally hardy perennials in the fall.**

Planting hardy perennials - Use a hand trowel or a shovel to dig a hole that is wide enough and deep enough for roots to spread out (up to 1 ½ times as wide as the root ball). Tease the roots free along the sides and bottom of the root ball of larger container-grown plants (plants in small pots that are not pot-bound can be planted as is). Plant at grade (the same depth as in the pot) or slightly above grade and firm the soil with the hands, not feet.

Other Tips For Hardy Perennials:

- **Plants that require very well drained soil, such as lavender** - Coarse sand, pea gravel, and/ or chicken grit are best mixed in with the existing soil to improve drainage - (**grit = crushed granite**; grower grit and starter grit are a couple of available sizes). -
- **Calcium-loving woodland plants** – Lime or gypsum (calcium sulfate) should be added - to the backfill soil at planting time for certain plants such as maidenhair fern (*Adiantum pedatum*) and black bugbane or fairy candles (*Cimicifuga racemosa*). These plants - often grow in limestone-derived soils in nature and like a pH that is less acid and closer - to neutral (pH of 7). See the Green Spring plant information sheets for details. Lime can - periodically be reapplied over the years. -
- **Spacing** - Mature plant widths can be used to determine spacing (measure from the - center of plants; See *Herbaceous Perennial Plants. A Treatise on Their Identification, Culture, and Garden Attributes* by Allan Armitage (2nd edition); *Armitage's Native Plants for North American Gardens* only gives height information). Perennials also can be -

overplanted to achieve a fuller look more rapidly, then move plants or divisions of plants to other beds as they grow more crowded.

Planting Annuals, Tender Perennials, Tender Bulbs, And Biennials

Plant these plants as perennials are planted. Water plants individually after planting, and mulching is optional. Some annuals can be direct seeded, such as larkspurs. See **Annuals, Tender Perennials, Tender Bulbs, and Biennials for Gardens in the Washington, D.C. Area** on Green Spring's website and in the Horticulture Center for details.

Approximate Planting Times:

- Tender plants - after May 1 (for most species can plant earlier if frost isn't expected)
- Half-hardy annuals – after April 15
- Biennials and hardy annuals – can be planted before April 15
- Some hardy annuals are even planted in the fall, such as pansies and violets - pansies are best planted through November.

Planting Hardy Bulbs - Bulbs have specialized planting requirements. For information see **Hardy Bulbs For The Washington, D.C. Area** on Green Spring's website and in the Horticulture Center.

Planting Woody Plants (Trees, Shrubs, Woody Vines, And Woody Groundcovers)

Woody plants are most commonly planted in spring and early fall, but summer planting is possible if careful attention is given to watering. The planting hole should only be dug as deep as the plant is going to be placed and up to three times wider than the root ball. A pickaxe may be needed to prepare compacted soil (backhoes are sometimes used for large operations). Water plants after planting.

Backfilling with compost is seldom necessary unless more soil is needed to raise the grade or when planting in turf. Sod can't be used as backfill – only the soil below it can be used. If the soil is compacted clay or light sand, it is better to amend the soil over the entire planting area, not just the planting hole, and to grow plants that are adapted to conditions at the site.

A slight ridge is often created around the outside of the tree circle after planting to hold water – turf can be turned upside down and used in this fashion. Over time (a couple of years at least) the ridge can be raked and shoveled down into the area outside the circle and mulched – this also helps increase the size of the circle to protect the tree or other woody plants from mower damage in lawn areas.

Spacing of woody plants - Trees and shrubs are commonly spaced at mature widths or closer (see *Manual of Woody Landscape Plants* by Michael Dirr. 5th addition). Smaller trees can be planted as close together as 5 to 10 feet for an intimate feel. Planting woody plants close together looks good initially, but over time crowding will occur and some plants will have to be removed.

❖ **Container-Grown Woody Plants**

- Tease the roots free along the sides and bottom of the root ball.
- It is usually best to plant at grade or slightly above grade so the plant will settle at grade or slightly above it. If a hole is too deep, tamp more soil into the bottom of the hole and plant a little higher than recommended so the plant can settle to the right depth. If the crown or root flare gets buried on woody plants (the area where the trunk widens at the base of the stem) plants often have greatly shortened lives due to crown rot.

- If woody plants are planted too high above grade, pay close attention to mulching to protect tree roots from sunscald. It is best not to plant too high.
- ❖ **Balled And Burlapped Woody Plants**
 - Balled and burlapped plants often perform best when they are planted in the early to mid spring. Some species have low survival rates when they're dug in the fall, so certain species need to be dug in the winter or spring for fall planting. If a root ball falls apart too much during planting in the late spring, the plant is more likely to die than if it was planted in early spring.
 - Remove any soil within the ball from the crown or root flare when planting. The crown is commonly covered with soil during digging at the production field.
 - Large plants should be planted slightly above grade so they settle at grade or slightly above. If a planting hole is initially dug too deep, these plants settle quite a bit after planting because soil balls are very heavy. It's better to make the planting hole too shallow than too deep - compost can be brought in to grade the mound into the existing landscape.
 - Remove as much cloth burlap as possible before backfilling the soil (leaving a small amount at the base of the root ball is fine). Be careful not to let the ball fall apart – it is better to leave burlap than to lose the root ball.
 - Remove wire baskets with bolt cutters if possible before backfilling with soil.
 - ❖ **Bare Root Woody Plants** – These plants are seldom sold in the retail nursery trade. It is best to plant them in a container in a potting mix (often adding coarse sand as well) and grow them on a bit before planting outside in the ground. These plants are generally shipped in the early spring.

After Planting Woody Plants

- ❖ **Firm the soil by hand.** Feet are seldom used because of soil compaction – tamping - with feet is most commonly used on large balled and burlapped plants that are tilting in - the wrong direction. -
- ❖ **Water plants individually, and stake only if needed.** Stakes are usually removed after - one year on smaller plants and after two years or more for large plants on windy sites. - Black plastic or rubber chain link and 2 inch x 2 inch pointed oak stakes work well for - staking. Green or brown twine and bamboo stakes are useful on smaller plants. More - substantive staking techniques are primarily used on large trees planted by - professionals – these systems use steel and protective coverings for the bark. Metal - cages, plastic deer mesh used with wooden stakes, or plastic tubes can be used to - protect plants as much as possible from deer feeding. -

Environmental Benefits of Reducing The Size Of Lawn Areas, Ecological Lawn Care, and Gardening for Wildlife

Concern is growing in the U.S. about the overuse of water, fertilizers, and pesticides to maintain lawns. Gas-powered equipment for turf care causes noise and air pollution. Lawns have higher water runoff rates than forests, grasslands, meadows, and some gardens, as well as limited value to wildlife. Lawn can be limited to areas where use demands it, such as play areas and other foot traffic areas. Some tips to address these concerns include:

- **Manage remaining turf areas in a more ecological fashion.** Ecological lawn care information is limited and more research needs to be conducted. One guide is *Lawn Care Without Pesticides* by Frank Rossi (published by Cornell University Cooperative Extension (<http://ecommons.library.cornell.edu/handle/1813/3574>)). This brochure is useful but needs to be adapted to the Washington, D.C. area. For example, certain tall fescue cultivars are best for most lawns in the Washington, D.C. area, and Kentucky

bluegrass does not do well here without extensive management (also see the University of Missouri Extension Natural Lawn Care by Brad S. Fresenburg (<http://extension.missouri.edu/p/G6749>)).

- **Replace lawn areas with garden beds and borders.** Some ideas include using native plants for an enticing garden for both people and wildlife, or you may want to grow edible plants for culinary use. You also may want to consider planting a meadow garden: see the Green Spring information sheet **Native Hardy Ornamental Grasses and Sedges for Gardens and Meadows in the Washington, D.C. Area** for recommended ornamental grasses and references. -
- **Think about wildlife gardening** - The National Wildlife Federation runs the Certified Wildlife Habitat program and has information about gardening for wildlife (<http://www.nwf.org/Home/How-to-Help/Garden-for-Wildlife.aspx>). Two Green Spring information sheets address wildlife gardening with native plants: **Using Native Plants To Attract Birds In The Washington, D.C. Area** and **Using Native Plants To Attract Butterflies, Moths, and Other Pollinators In The Washington, D.C. Area** (both will be updated in the summer of 2014).

B. GARDEN MAINTENANCE GUIDE

1. Watering

Water greatly influences plant health and vigor. Use supplemental watering during the growing season only when needed and if rainfall is less than 1 inch per week. Less water is needed in cooler periods in the spring and fall than during the hot days of summer. Less irrigation will be needed if plants are adapted to the moisture conditions of the site. Mulching is a way to cut down on water loss. Useful publications include *Water Wise Landscaping and Watering Guide* (www.mwcog.org/environment/water/watersupply/downloads/landscape%20guide.PDF).

Watering Tips:

- **Newly planted plants need more watering than most established plants.** Annuals, tender perennials, and tender bulbs generally need more water because they are replanted yearly.
- **Plants that are tolerant of dry sites need less moisture per week, but they need to be watered well until their root systems get established.** During extended dry periods (drought conditions), even plants that are adapted to dry sites like supplemental water, especially woody plants because they generally suffer more damage than herbaceous plants.
- **Water deeply by hand rather than sprinkling lightly.** Spraying plants quickly with water does not result in adequate watering. When watering by hand, it is helpful to use a **water breaker** at the end of the hose to disperse the water flow. Hold the water breaker close to the soil or place the water breaker on the soil by a plant so more water gets to the plant roots. When using a hose it is best to water individual woody plants for several minutes.
- **Watering cans** can be used for hand watering. Long-reach watering cans are easier to use than those with shorter necks (the best cans also allow the removal of the water breaker). **Watering bags** that slowly release water can be used on trees – these are commonly used on young street trees in some communities. Remember to refill the bags with water during dry periods.
- **Reduce the use of sprinklers.** Hand watering uses less water than sprinklers. - Soaker hoses and drip irrigation use less water than sprinklers - they are easiest to use in areas with linear plantings like vegetable gardens. -
- **Sprinklers should water deeply when used.** Sprinklers often are used to water a given area for one to two hours at a time during dry periods – generally on a weekly or - biweekly basis, but some woodland areas and reliably moist to wet areas can wait longer. -

Public gardens water more frequently than many home gardeners due to aesthetic standards. Green Spring uses oscillating sprinklers most of the time, and impact sprinklers are occasionally used.

- **Home gardeners and sprinklers** – To save water in dry periods, water established plants just enough to keep plants alive. Wilting is a sign of water stress - some plants wilt in the middle of hot, sunny days and look better again in the evening or by the next morning. If a plant hasn't recovered by morning it needs water (although some species wilt a lot and actually need less water than their appearance suggests).
- **Green Spring doesn't have an in-ground automatic irrigation system** - households with these systems use about 35% more water than the average household according to the American Water Works Association.

2. Weed Control

An essential part of gardening is weeding. A weed is any unwanted plant. Invasive plants are weeds in general: the Division of Natural Heritage in the Virginia Department of Conservation and Recreation has a list of invasive plant species in Virginia (www.dcr.virginia.gov/natural_heritage/documents/invlist.pdf).

Other References on Weed Identification and Invasive Plants:

- *A Field Guide for the Identification of Invasive Plants in Southern Forests*. James Miller, - Erwin Chambliss, and Nancy Loewenstein. USDA Forest Service. Southern Research Station (http://www.srs.fs.fed.us/pubs/gtr/gtr_srs119.pdf) -
- *A Management Guide for Invasive Plants in Southern Forests*. James Miller, Steven - Manning, and Stephen Enloe. USDA Forest Service. Southern Research Station - (http://www.srs.fs.fed.us/pubs/gtr/gtr_srs131.pdf). One of the best guides for control - techniques. -
- *Invasive Plants. Guide to Identification and the Impacts and Control of Common North American Species* by Sylvan Ramsey Kaufman and Wallace Kaufman (2007) -
- *Plant Invaders of Mid-Atlantic Natural Areas* by the National Park Service and the U.S. - Fish and Wildlife Service (4th edition; 2010)(www.nps.gov/plants/alien/pubs/midatlantic/) -
- *Weeds of the Northeast* by Richard Uva, Joseph Neal, and Joseph DiTomaso (1997) -
- Virginia Tech Weed Identification Guide (<http://oak.ppws.vt.edu/weedindex.htm>) -
- *Weeds of North America*. University of Chicago. Available August 2014. Likely to be an - important resource. -

There are several ways to remove unwanted plants:

Hand Weeding

- Tools such as a hand trowel, round point shovel, garden spade, dandelion fork (weeding fork), hand hoe (hand weeder/ cultivator), and Japanese farmer's knife (hori-hori) are useful for the removal of weeds.
- Gardening gloves keep hands from getting too weathered – manual dexterity is better with nitrile and cloth gloves than with leather gloves.
- Polypropylene tip baskets, wheelbarrows, and carts are useful for transporting weeds to the compost pile.
- Don't put wild garlic bulbs, other weedy bulbs, or weeds with fully ripened seeds in the compost pile – put them in the trash so they don't reestablish in gardens.

String Trimmers And Mowers

In rough areas, smaller weeds can be cut down with string trimmers, then mulch or apply glyphosate. Be careful not to injure plants to be kept, especially trees (and shrubs to a lesser extent) – **bark injury greatly shortens the life of trees**. This applies to trees in manicured lawn areas as well – young trees and trees with thin bark are the most easily damaged.

Using mowers to knock down invasive groundcovers like English ivy is possible but is hard on mowers. String trimmers generally hold up better when cutting back small or low growing woody plants. Electric string trimmers are suitable for relatively short weeds in small areas and aren't as powerful as gas-powered machines. Two-stroke engines pollute more than four-stroke engines because gas is mixed with oil, but string trimmers with two-stroke engines are lighter and easier to use.

Mechanical Removal Of Woody Plants – Smaller woody plants can be removed with a shovel, and sometimes a steel pry bar is used in combination with a sledgehammer if a shovel isn't sufficient. A weed wrench is useful for large-scale removal of small woody invasives. Certified arborists can grind out stumps in high visibility areas accessible by trucks, and backhoes can dig out smaller stumps, but these techniques are expensive and energy intensive.

Cutting Down Woody Plants

Pruning equipment such as a pruning saw, bow saw, lopper, hand pruner, and chain saw are used to cut down woody plants that are too large to dig up or to be cut down by string trimmers and mowers. Few conifers are capable of resprouting after they are cut down, but yews and most broadleaf woody plants will resprout. Cut the stump close to the ground and cut off any suckers that come up over time (stumps will decompose faster if covered with soil). A concentrated solution of glyphosate can be used to reduce or eliminate suckering of stumps (see below).

Glyphosate Herbicide (Commonly Referred to as Roundup)

This is a relatively safe herbicide with minimal impact on the environment due to rapid breakdown and few effects on non-target species. It is effective in killing a wide variety of plants. **As with all pesticides read and follow label directions.** Glyphosate is marketed under many names including Roundup Pro.

Glyphosate is most commonly used to control perennial weeds, invasive plants, and weeds in large garden areas. The percentage of glyphosate that is mixed to kill most common garden weeds is around 2%, with 4 - 5% being used on more difficult perennial weeds; application at Green Spring is done with 2 gallon hand-held compressed sprayers. In contrast, a 25 - 50% solution of glyphosate can be mixed in small, clearly labeled spray bottles to spray on stumps immediately after invasive trees, shrubs, and vines are cut down to reduce or eliminate suckering (spray within a few minutes, and spray the top and the sides of the stump). **See P. 3 - 4 for guidelines on using glyphosate in and around water since standard formulations are toxic to frogs.**

3. Mulching

Mulches reduce evaporation of soil moisture, reduce weed populations, and gradually enrich the soil. Mulching materials include shredded leaves (leaf mulch), pine bark, shredded hardwood bark, and grass clippings (don't use grass clippings if the lawn was recently treated with herbicides). Shredded leaves are an excellent choice – it's available from local governments, attractive, and breaks down rapidly enough to supply needed nutrients to plants.

Mulch as needed, which is yearly in some high visibility areas when shredded leaves are used (less frequent mulching is needed with bark mulches). Mulching in woodland areas is mostly done around new plantings only because leaves provide a natural mulch.

Mulching Tips:

- **Apply mulch to a depth of 2 to 3 inches.** In gardens that are mulched too much mulch can build up over the years – rake up the older mulch and compost it.
- **Do not mulch too closely to plant crowns** (the plant base) because crown rot can occur – especially a problem on woody plants.
- **Plants that need excellent drainage and air circulation, such as many rock garden and Mediterranean plants (including lavender)** - these plants can be mulched with a layer of pea gravel.
- **Mulching Tools** – Pitchforks and manure forks are useful for loading and spreading mulch. Aluminum scoop shovels are useful for spreading mulch because less mulch drops on the ground when walking to the desired location. Wheelbarrows and polypropylene tip baskets are useful as well.
- **Mulching is optional.** Some ornamental plants reseed better on bare ground. Plants can be densely planted so they grow together in the summer, which minimizes water loss. Many ground-dwelling bees need bare ground in order to nest, so it's good to leave some bare soil areas in the landscape: for information see *Enhancing Nest Sites For Native Bee Crop Pollinators* at (http://plants.usda.gov/pollinators/Enhancing_Nest_Sites_For_Native_Bee_Crop_Pollinators.pdf) and *Enhancing Habitat for Bees* (<http://www.xerces.org/enhancing-habitat-for-native-bees/>).

4. Fertilizer Use on Established Plants (Minimal Use Emphasized)

The best reason to fertilize is if a plant is showing signs of a nutrient deficiency. Nitrogen, phosphorus, and iron are the most common nutrients to be deficient. **Most established plants need little or no fertilization when grown in the ground**, especially when shredded leaves are used as mulch (air pollution also results in higher nitrogen levels in soils). Nutrient deficiencies are more common in the spring when small transplants are planted in cold soil. A liquid fertilizer, such as quick-release synthetic (inorganic) 20-20-20, works rapidly if a plant is nutrient deficient. Liquid fertilizers are usually purchased in the dry form and mixed in a watering can. Virginia's most up-to-date fertilizer information is only available to people and organizations that need to become certified fertilizer applicators for fertilizer application (<http://www.vdacs.virginia.gov/plant&pest/cfa.shtml>).

Organic granular fertilizers such as Plant-tone (5-3-3) are an option if fertilization is needed. Organic fertilizers slowly release their nutrients – they are derived from natural products including plant and animal by-products, as well as rock powders. **Using generous amounts of compost, especially for vegetable production, might be a better option** – compost decreases the need for additional fertilizer.

A 20-20-20 fertilizer is:

20% **nitrogen (N)**

20% **phosphate** - indicates the phosphorus (P) level - phosphate is a compound that is 44% phosphorus

20% **potash** - indicates potassium (K) level - potash is a compound that is 83% potassium

The true expression of N-P-K levels for a 20-20-20 fertilizer:

20% nitrogen

About 9% phosphorus

About 17% potassium

Nutrient Deficiencies

- **Nitrogen Deficiency** – If nitrogen is in short supply, older foliage is yellow and new foliage is green. Eventually all leaves can turn yellow. **Use nitrogen fertilizers carefully if at all - nitrogen is very destructive to the health of watersheds.**

Fertilizing Trees and Shrubs – Ornamental woody plants seldom need fertilization due to their extensive root systems. The most common nutrient to be deficient is nitrogen. If they are nutrient deficient, they are best fertilized in early to mid spring as plants start active growth and after any pruning is done. **Nitrogen fertilization of woody plants often results in reduced flowering and floppy growth that is prone to pests. Woody plants in the ground are rarely fertilized at Green Spring.**

- **Phosphorus Deficiency** – This deficiency usually shows up as purplish colorations on - leaves and plants grow slowly. It is most commonly seen on vegetable transplants in the - spring before the soil has warmed up, and most plants recover without fertilization as the - soil warms up. -

Apply granular phosphorus only according to soil test recommendations. Get soil tests done through the Virginia Cooperative Extension/Virginia Tech Soil Testing Laboratory. Many states have restricted phosphorus fertilizer use because of its negative effect on water quality, including Virginia and Maryland. According to Maryland's Lawn Fertilizer Law, phosphorus can only be applied to lawns when a soil test indicates that it is needed or when a lawn is being established, patched, or renovated (<http://mda.maryland.gov/Pages/fertilizer.aspx>) – the same principal should apply to gardens and landscape plantings.

- **Iron Deficiency** – This deficiency is usually related to the pH of the soil and young - leaves are affected - veins are green and the rest of the leaves are yellow or whitish. It - is commonly treated with sprays with soluble forms of iron and by stopping liming for - several years (iron chlorosis is more common with some plants as the pH gets above - 6.5). Amendments can be added to acidify the soil, such as sulfur, but results can be - difficult to predict. -

Other Fertilizer Tips:

- **The likelihood of fertilizer burn is much greater when quick-release synthetic granular fertilizers are used, and they are much more likely to leach into groundwater.** Organic fertilizers are better for the environment than most slow-release synthetic fertilizers as well. For example, 50% slow-release synthetic fertilizers are commonly sold and only 50% of the nutrients are in slow-release form, so half of the nutrients are released rapidly.
- **Applying granular fertilizers** - Use rubber or plastic gloves when applying by hand in planting beds around plants that need fertilization. In contrast, use a drop or rotary spreader to apply fertilizer evenly to your lawn and keep fertilizer applications at least 10 to 15 ft from waterways. Water granular fertilizers in well after application so nutrient uptake can begin or apply them before a light to moderate rain is expected. If fertilizer lands on sidewalks, paved areas, or other impervious surfaces, clean it up or sweep it back onto the grass.
- **Container grown plants usually need some fertilization due to more leaching.**

Slow-release Osmocote can be incorporated into potting mixes and quick-release synthetic liquid fertilizers, such as 20-20-20, can be used on an as-needed basis. Osmocote Classic only has nitrogen, phosphorus, and potassium (N-P-K), so secondary nutrients and micronutrients need to be supplied by another source. Osmocote Plus has N-P-K plus magnesium and micronutrients.

5. Staking

Staking is used to keep plants upright. Staking is most useful for some tall plants, such as newly planted trees, indeterminate tomatoes (ones that keep growing in height), and tall dahlias. Other conditions that may cause plants to need staking include over-fertilization, too much shade, overcrowding (due to plant growth over time or planting too close together), or the growth habit of some plants. Staking is labor intensive and is only done for a few plants at Green Spring. It is easiest to insert stakes early when growth is still low. For ornamental herbaceous plants, stakes should be about 2/3's as tall as the ultimate height of the plant. Tie loosely at intervals using green or natural colored twine.

Materials To Use For Staking Include:

- Brush stakes or twiggy brush
- Bamboo stakes - ones that are dyed green are commonly used
- Metal or wooden stakes – 2 in x 2 in oak stakes work well
- Wire supports – tall supports are commonly used for tomatoes, although they work better if they are secured to wooden stakes

6. Deadheading

Spent blossoms can be cut off or removed on certain plants to improve their appearance. Some plants will rebloom when deadheaded, but many plants will rebloom without deadheading. Use a scissors-type pruning shear. Some plants should not be deadheaded due to their long season of interest into the winter. It is best not to deadhead plants that attract seed-eating birds: it is especially important to leave the spent flowers of native herbaceous perennials standing as long as possible because native plants support more wildlife than non-natives.

7. Fall Cleanup

Cleaning up before the winter begins is a gradual process. Some tasks need to be done sooner than others. Fall cleanup tips include:

Tender plants and borderline hardy plants:

- **Dig up tender perennials or take cuttings before the first hard frost for plants that need to be overwintered indoors.** It also is best to dig up some borderline hardy bulbs before the first hard frost, such as ginger lilies (*Hedychium*), and pot them up for wintering indoors. If they have large clumps, it is often good to leave some plants in the ground and mulch them thoroughly, in addition to bringing some indoors for the winter. See **Annuals, Tender Perennials, Tender Bulbs, And Biennials For Gardens In The Washington, D.C. Area** on Green Spring's website or in the Horticulture Center for hardiness details.
- Start taking cuttings of tender perennials from late summer into early fall and pot them up when they root (cuttings of some difficult to root plants are best taken in early summer).

Leaf Removal:

- Thick layers of tree leaves can be raked up on lawn areas because lawns can die if leaves are too thick.
- Alternatively, leaves can be shredded with a lawn mower and left in place, except in a few places where it may be too thick.
- In many gardens including woodland gardens, leaves only need to be raked off plants that are sensitive to rot when leaves remain on their crowns, such as cardinal flower and creeping phlox. With these sensitive plants, leaves should be removed by late winter.
- Bamboo and plastic leaf rakes are easier to use than metal leaf rakes, and use rakes instead of blowers to reduce noise and air pollution.

Mulching For Winter Protection:

- This is helpful for newly planted plants and marginally hardy plants, especially when they are young. Place up to 6 inches of mulch on marginally borderline hardy bulbs like *Amarcrinum*, *Crinum*, *Hedychium*, and *Canna*. Apply protection around Thanksgiving and after. Shredded leaves are widely used because they are readily available.
- Newly planted pansies, violets, and other hardy plants can be mulched with 2 to 3 inches of mulch after planting, but it's optional. If they aren't mulched then check them more for frost heaving in the winter and push any plants that are elevated back in the ground.

Cutting Back Spent Foliage:

- Do not cut back the foliage of borderline plants until March, or at least wait until early blooming bulbs come up under them (a good plant combination for dry sites). These plants include *Salvia chamaedryoides*, *Salvia greggii*, *Salvia microphylla*, and hybrids between the last two species.
- Dying, non-evergreen foliage of hardy perennials can be cut back from one to several inches from the ground (if a plant is cut back too much it can be hard to find later). However, it is best to leave many herbaceous perennials standing as long as possible to provide cover and seeds for birds and other overwintering wildlife – this is especially true for native plants because they support more wildlife than non-natives.
- Place garden debris and leaves in the compost pile

Pruning of Woody Plants – dead wood can be removed from woody plants at any time. Many hardy plants can be pruned from the late fall into the winter, such as boxwood and American elm. For detailed pruning information, see *The Pruning Book* by Lee Reich (The Taunton Press, 2nd edition, 2010). The American Horticultural Society also publishes books on pruning in conjunction with British authors, so fall pruning information for roses in an earlier edition was unsuited to our region (I have not been able to examine the most recent addition). For example, major fall pruning for roses, crape myrtle, and other more cold sensitive woody plants should not be done after mid August here. Cooperative Extension publications on the internet are good sources of pruning information.

8. Late Winter And Spring Tasks in the Garden

Get the garden ready for the upcoming growing season from winter through about mid April, depending on the weather.

Cleanup Tips

- Rake leaves off areas where thick layers have accumulated, especially on sensitive plants such as cardinal flower and creeping phlox. Remove the thick mulch used for winter protection on borderline hardy bulbs before plants start actively growing in the spring.

- Cut back remaining dried foliage including ornamental grasses. This generally doesn't benefit the plant – it is for aesthetic reasons.

Division – this is used mostly to increase the number of plants, but it is also used to rejuvenate plants and to curtail their spread. **Tips about division include:**

- Division is usually done in the spring or early fall, although some plants like bearded iris and daylilies can be divided in the summer. Spring is best for most plants. Water well after replanting.
- Plants can benefit from division when the center of a plant dies out or growth becomes leggy.
- Many tools can be used to divide plants: round point shovel, garden spade, a knife, an ax, a sledgehammer used with a wedge or an ax, steel pry bar, or backhoe. If the clump is small, a garden spade and/ or knife is often better than using round point shovel. Discard the older center with little or no growth in the compost pile.

Pruning Roses – Rose pruning is usually done from March into mid April, although **dead wood can be removed from woody plants at any time**. It is best not to do any significant pruning after mid August due to potential winter hardiness problems in the Washington, D.C. region. Some birds like to nest in vigorous shrub roses. For plants that birds frequently nest in, spring pruning needs to be done earlier – complete pruning by early March if possible. Otherwise prune after the nesting season is done.

Rose rosette disease is caused by a virus that is very destructive to roses and infected plants need to be removed – **sterilize the blade of any tools used to cut down these plants with rubbing alcohol to avoid spreading the virus to other roses**. This disease is spread by a tiny mite that was introduced to provide biological control of multiflora rose, an invasive. Green Spring has had several rose cultivars with this disease, and it eventually spreads to the entire plant. See the Virginia Cooperative Extension website for further details (<http://www.pubs.ext.vt.edu/450/450-620/450-620.html>).

Timing Of Rose Pruning:

- **Roses that bloom only on old wood** – These roses should be pruned little in the spring. This group includes most old garden roses - any serious pruning should be done after the first flush of bloom so prune in late May or early June.
- **Roses that bloom on new wood as well as old wood** - Most modern shrub roses are in this group. They can be cut back as needed in early spring, but pruning will remove the flowers on old wood.

Pruning Other Woody Plants:

- Spring is not the best time to prune living wood out of plants that bleed sap as they emerge from dormancy, such as yellowwood and maple.
- Except for the removal of dead wood, woody plants that bloom only on old wood should be pruned little in early spring: these plants tend to bloom in the spring or early summer. This includes most *Hydrangea macrophylla* cultivars (the new reblooming hydrangea cultivars are an exception – they bloom on old and new wood). Any serious pruning should be done after the first flush of bloom in spring or summer.
- Woody plants that bloom on new wood can be cut back as needed in early spring: these plants bloom in the summer and early fall.

9. Insect and Mite Pests

Properly identify pest problems before taking action and use organic and non-chemical control methods. Grow plants with little or no pest problems.

Insect And Mite Control Tips:

- **Insects** – Insects have 6 legs. Aphids are small insects with sucking mouth parts for feeding on plant sap. For aphid control outdoors, it is best to wait for predators, such as ladybird beetles, to take care of the problem (natural biological control). Do not purchase ladybird beetles to release into the outdoors – nature will take care of it. Most of the time, nature will keep problems with pests to a low level. *Organic Gardening* and other publications by Rodale Press are helpful to organic gardeners. An excellent book is *Garden Insects of North America: The Ultimate Guide to Backyard Bugs* by Whitney Cranshaw. Princeton University Press (2004) .
- **Mites** – they are small arachnids with 8 legs and are closely related to spiders. Some species suck plant sap such as spider mites – they cause stippling of leaves (small dots) and plants look unhealthy. There are also predatory mites that eat other mites, thrips, and fungus gnats: spraying with miticides also kills predatory mites.
- **Spraying safe chemicals for organic pest control** – These products are usually applied with a hand-held compressed sprayer. When using any pesticides, read and follow the label and use safety precautions. Several products are available to organic gardeners, and some of the most commonly used ones include:
 - **Horticultural oil**
 - **Insecticidal soap**
 - ***Bacillus thuringiensis* (Bt) and other species** – Bt is made from a soil dwelling bacterium. Formulations are available for caterpillars (most commonly used to control pests on vegetables), mosquitoes (gardeners mostly commonly use dunks in open water), and beetles (San Diego or *tenebrionis* strain; used to control such pests as Colorado potato beetle).

Not all organic insecticides are safe. For example, rotenone is toxic to aquatic life. In addition, people in a large study who applied rotenone developed Parkinson's disease approximately 2.5 times more often than non-users (www.sciencedaily.com/releases/2011/02/110214115442.htm).

10. Deer and Other Furry Pests

- **White-tailed Deer** - Deer are a serious problem in much of the Washington, D.C. area due to a lack of predators (wolves and mountain lions historically) and hunting bans. Deer damage plants during feeding and by rubbing bark in the fall mating season. For information about reducing deer damage in gardens and landscapes, see *Managing Deer Damage in Maryland* by Jonathan Kays (https://extension.umd.edu/sites/default/files/docs/programs/woodland-steward/EB354_ManagingDeerDamage.pdf)

Deer repellents – Commercial repellents can be used, but most people report limited success over time. New ones are being tested in a tablet formulation that is placed in the soil.

Fencing – Electric fencing can be used in small areas but deer often jump over them eventually and the electricity can be dangerous to children and those with heart

conditions (touching these fences causes a very unpleasant sensation!). A deer fence that is at least 10 feet tall (woven wire type) is a better alternative. Without large scale fencing, gardeners can fence individual plants with plastic mesh fencing wrapped around stakes to somewhat reduce feeding. Mesh fencing stops some browsing but not browsing of the top portions of plants if taller fencing and stakes aren't used.

Avoid growing plants that are commonly damaged. See *Mohonk Mountain House Plant Recommendations for Deer-Infested Gardens* from Cornell University (http://www.gardening.cornell.edu/factsheets/deerdef/mohonk_list.pdf). However, when deer populations reach very high levels almost all smaller plants of most plant species will be eaten, and the lower portions of large plants will be browsed on.

Support managed hunt programs by professionals and bow hunters groups in populated areas. Deer are less of a problem in rural areas where hunting occurs on a regular basis.

- **Rabbits and Groundhogs** - Use cages around plants they are eating or have eaten in the past.
- **Squirrels, Mice, and Voles** – Squirrels love to dig up and often eat bulbs like tulips and crocus. However, I still manage to grow beautiful tulips at home even with squirrels around (no nearby woodland, just scattered trees). Squirrels will not dig up many bulbs such as ornamental onion, daffodils, and *Colchicum*, so there are many bulbs to grow if these animals are a major problem. Mice and voles will sometime eat certain bulbs and other plants as well, but foxes are helpful in controlling their populations.

Developed by Brenda Skarphol, Curatorial Horticulturist at Green Spring Gardens. Revised 7-7-14



A publication of
Fairfax County, VA
07/14



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