



# GREEN SPRING GARDENS

---

4603 GREEN SPRING ROAD • ALEXANDRIA • VIRGINIA 22312

PHONE: (703) 642-5173 • FAX: (703) 642-8095

[WWW.FAIRFAXCOUNTY.GOV/PARKS/GSGP](http://WWW.FAIRFAXCOUNTY.GOV/PARKS/GSGP)

## GARDEN INSTALLATION FOR THE ECO-FRIENDLY GARDENER

### CONTENTS AT A GLANCE

- ❖ **Soil** – P. 1
  - ❖ **Preparation For New Beds And Borders** – both no-tillage (no-till) and tillage techniques – P. 2 - 3
  - ❖ **Composting** – P. 4
  - ❖ **Landscape Planning And Plant Selection** – P. 4 - 8
  - ❖ **Planting** – P. 8 -11
- 

### Soil

**Good soil is important to the success of gardens.** Excluding rock fragments such as stones and gravel, there are three sizes of mineral particles in soil – sand, silt, and clay. **Soil texture** represents the relative composition of sand, silt, and clay in a soil.

#### **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 - often in scattered pockets. 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 of 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.

## **Preparation For New Beds And Borders**

The outline of beds can be determined with hoses, pulverized limestone, or by eye. Bed edges should have sweeping curves or straight lines and not have 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, landfill restoration, 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). See the weeds section of **Garden Maintenance For The Eco-Friendly Gardener** for useful references on weeds (on Green Spring's website under Gardening and in the Horticulture Center; see more details at the end of this information sheet).

### **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 - about 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 mostly by extensive hand weeding. Organic gardeners can use corn gluten meal as a natural substitute for pre-emergent herbicides, but it needs to be applied for a couple of years to be as effective as possible. This product keeps seeds from germinating and does not kill existing weeds. Green Spring only had some weed control with this product. *The Truth About Organic Gardening. Benefits, Drawbacks, And The Bottom Line* by Jeff Gillman discusses this product (a 2008 book by a University of Minnesota horticulture professor that supports eco-friendly gardening).
    - ❖ **Tip for woodland gardens** – Usually soil is prepared in the immediate planting area only with a shovel or a pickaxe, then mulched after planting.
- 

- 2. No-tillage (no-till) using glyphosate (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 as well. Glyphosate is marketed under many names including Roundup Pro and Razor Pro. It has a low acute toxicity to humans – read and follow label directions.

Unwanted vegetation can be killed with glyphosate, then mulch the killed area. However, it is much more ecological to mulch heavily with a thick organic mulch to kill as much vegetation as possible, then use glyphosate and hand weeding to kill the remaining weeds. Some perennial weeds are very difficult to kill without herbicides, such as field bindweed, Canada thistle, and mugwort.

- ❖ **Using glyphosate around water** - A formulation of glyphosate without a surfactant needs to be used around water because surfactants are toxic to frogs – **trade names include AquaMaster and Rodeo.**
- 

- 3. Tillage** – Tillage is used for bed preparation if extensive amending of the soil is needed and if soil structure needs to be improved. 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.** Amendments include lime, well rotted organic matter, any needed coarse sand or pine bark, and fertilizers for needed phosphorus and potassium.
- ❖ **Get a soil test done through the Virginia Cooperative Extension/Virginia Tech Soil Testing Laboratory for lime, potassium, and phosphorus recommendations.** Soil test kits are available at Fairfax County public libraries. Pelletized lime is the easiest form of lime to use if the pH needs to be raised - pulverized lime is very dusty to apply.

**Nitrogen** - Soil testing labs don't actually measure nitrogen in the basic test because it is susceptible to rapid changes in availability in soil (it can be lost as a gas or leached out). Testing labs just make an estimate on how much a particular crop might need – **keep in mind that nitrogen is commonly overused.** Apply nitrogen only after plants are planted and if a nutrient deficiency is evident (see fertilizer use section of Green Spring's **Garden Maintenance For The Eco-Friendly Gardener** – more details at the end of this information sheet).

**It is best to apply granular phosphorus only according to soil test recommendations.**

Phosphorus is very destructive to the health of the Chesapeake Bay and other local waters. Phosphate mining destroys the site it is mined from, including many natural areas (as does potash mining for potassium). Soils that have been fertilized frequently, such as turf, often have high phosphorus levels and more phosphorus is not needed.

**Certain towns, counties, and entire states in the eastern half of the U.S. are restricting phosphorus fertilizer use because of its negative effect on water quality.** States where phosphorus fertilizer regulations have been put in place include Minnesota, Maine, Florida, New Jersey, Wisconsin, and Michigan (see *Lawns Green, Lakes Clean. Use phosphorus-free fertilizer* on the website of the Department of Environmental Protection in Maine, as well as links to regulations in the above states at <http://maine.gov/dep/blwq/doclake/fert/phospage.htm>).

4. **Adding a 1 inch layer of well rotted organic matter is commonly done before tillage** (this does not apply to organic soils, which are often 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 in this region and the harvesting of peat moss destroys wetlands.
5. **Coarse sand (washed concrete sand)** - Sand can be added to clay soils along with organic matter if the structure is poor - many clay soils have good structure and do not need to be amended with sand if the right plants 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 but some other public gardens use it.
6. **Use a round point shovel, rototiller (rotary tiller), or cultivator mounted on a tractor to turn the soil.** Break up the clumps with the shovel after digging by hand. Dig to a single spade depth (up to 12 inches deep). Tillage can be done whenever the soil isn't frozen or too wet. If the soil is compacted, a pickaxe or backhoe can also be used to break it up.
7. **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. Nitrogen fertilizers are not needed (manure or granular ones). 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. For more information see *The Truth About Organic Gardening. Benefits, Drawbacks, And the Bottom Line* by Jeff Gillman.

**Compost tea** is also used successfully by some individuals and institutions (see *Sustainable Landscape Construction. A Guide to Green Building Outdoors*. 2nd edition. J. William Thompson and Kim Sorvig).

---

## **Landscape Planning And Plant Selection**

There are many factors to consider in making a garden a success:

1. **Light** – Select plants adapted to existing light levels and note seasonal differences. Light can be categorized two basic ways:

### **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

- **For Woodland Gardens** - Trees may need to 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 cause contact dermatitis in many individuals.

### **Directional Exposure:**

- ❖ **Southern Exposure** - summer breeze from southwest or southeast, hot midday sun and high summer temperature, and mild protected winter
  - ❖ **Eastern Exposure** - mild morning sun, cooler summer temperature, and mild protected winter
  - ❖ **Northern Exposure** - cool summer, cold unprotected winter, and cold northwestern winter wind
  - ❖ **Western Exposure** - afternoon sun, hot summer temperature, and cold northwestern winter wind
- 

2. **Soil Conditions** - Consider two additional factors:

- ❖ **Soil Moisture** – Moisture levels can be dry, moist, or wet (standing water). The best option is to select plants adapted to the moisture conditions of the site. Group plants with similar moisture requirements together.

### **Site modifications are also possible to remove water or to conserve water:**

- A. **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).

- B. 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) - Bioretention areas and rain gardens** are major components in the low impact development approach to managing stormwater. LID 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** (see *Reducing Stormwater Costs through Low Impact Development Strategies and Practices* from the Environmental Protection Agency at

[www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf](http://www.epa.gov/owow/nps/lid/costs07/documents/reducingstormwatercosts.pdf)).

Pollutants include fertilizers, pesticides, other chemicals, sediment (eroded soil), and debris. Stormwater runoff is highest from impervious surfaces such as roofs and paved areas.

LID 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.

**Components of LID include:**

- **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 used in accordance with guidelines developed by the Environmental Services Division of Prince George's County in Maryland – drain pipes, a gravel layer, and geotextile fabric were used under the soil mix. Planting of woody and herbaceous plants has been extensive and more plants will be added over time. 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 or by paved areas so water can accumulate during rains and gradually soak into the soil. These gardens should be located 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 in the Virginia Department of Forestry publication below). Plants that tolerate wet soil are an integral part of these gardens. These gardens need less irrigation during dry periods.

**Other LID techniques to reduce runoff and save water include:**

- 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, galvanized watering troughs (use Bt mosquito dunks), and cisterns
- Green roofs - most often used on large buildings
- 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” and “Aqua-Loc” pavers.
- Street swales – currently used in commercial areas for retaining water for street trees.

- Oregon is a leader in this area of LID.
- 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.

**Websites with information about low impact development techniques and associated native plants for this region:**

- *Rain Gardens. A landscape tool to improve water quality. Technical Guide.* Virginia Department of Forestry (available as a publication and at [www.dof.virginia.gov/rfb/rain-gardens.shtml](http://www.dof.virginia.gov/rfb/rain-gardens.shtml))
- Prince Georges' County in Maryland has extensive specifications for LID ([www.goprincegeorgescounty.com/government/agencyindex/der/lid/bioretenion.asp](http://www.goprincegeorgescounty.com/government/agencyindex/der/lid/bioretenion.asp))
- Montgomery County Department of Environmental Protection in Maryland ([www.montgomerycountymd.gov/Content/DEP/Rainscapes/home.html#Publications](http://www.montgomerycountymd.gov/Content/DEP/Rainscapes/home.html#Publications))
- For an extensive list of native plants to grow in these moisture-retentive areas see the brochure *Riparian Forest Buffers - Native Plants for Conservation, Restoration and Landscaping* (Natural Heritage Program of the Virginia Department of Conservation and Recreation; also available at [www.dcr.virginia.gov/natural\\_heritage/documents/riparian.shtml](http://www.dcr.virginia.gov/natural_heritage/documents/riparian.shtml))

---

**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).

Lime (pulverized limestone) is used to raise the pH of soils – the primary active ingredient is calcium carbonate. Pelletized lime or pulverized lime are most commonly used, although pelletized lime is the easiest to apply since it is less dusty. 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. Get soil tests done through the Virginia Cooperative Extension/Virginia Tech Soil Testing Laboratory.

---

### **3. Plant Selection - Plant Information Sheets from Green Spring Gardens**

A wide variety of 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. Extensive information about **native plants** is available – if the information sheet has a mix of native and non-native species, **plants native to Virginia are highlighted in red and marked with an asterisk (\*)**.

#### **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 issue because more irrigation is needed. 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. Don't plant thirsty plants in hard to reach areas.
- ❖ **Dry garden sites are common.** Plants that are adapted to dry sites are noted in the Green Spring information sheets in the comments column. Don't forget that 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, Zone 7b a minimum of 5 -10 degrees F, and Zone 8a is a minimum of 10-15 degrees F.

- ❖ **Exotic Invasive Plants** - These plants reproduce quickly, displace native plant species, and are difficult to eradicate. The Division of Natural Heritage in the Virginia Department of Conservation and Recreation lists exotic invasive plant species in Virginia on their website ([www.dcr.virginia.gov/natural\\_heritage/documents/invlist.pdf](http://www.dcr.virginia.gov/natural_heritage/documents/invlist.pdf)). **Exotic invasive plant species still offered in the nursery trade are listed at the bottom of several Green Spring plant information sheets (sheets with a mix of natives and non-natives), as well as ornamental plants showing the potential to be invasive in this region.**

Do not plant exotic invasive species and remove existing exotic invasives. See the weeding section in **Garden Maintenance For Eco-Friendly Gardeners** for details. For a national perspective on finding native substitutes for commonly-grown exotic invasives, see *Native Alternatives to Invasive Plants* (Brooklyn Botanic Garden All-Region Guides) by C. Colston Burrell.

---

#### 4. **Reduce The Size Of Lawn Areas**

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 – lawn equipment in the U.S. is not required to have catalytic converters. Lawns have higher water runoff rates than forests, grasslands, meadows, and some gardens, as well as limited value to wildlife. About 7 million birds are killed yearly by chemicals used on lawns ([www.audubon.org/bird/at\\_home/pdf/LawnFlyer.pdf](http://www.audubon.org/bird/at_home/pdf/LawnFlyer.pdf) and [www.birds.cornell.edu/AllAboutBirds/attracting/landscaping/songbirds](http://www.birds.cornell.edu/AllAboutBirds/attracting/landscaping/songbirds)). For further information see *Reduce All Pesticides But Eliminate Those Used on Lawns* by the National Audubon Society ([www.audubon.org/bird/at\\_home/ReducePesticideUse.html](http://www.audubon.org/bird/at_home/ReducePesticideUse.html)) and *Outdoor Air – Transportation: Lawn Equipment - Additional Information* from the Environmental Protection Agency ([www.epa.gov/air/community/details/yardequip\\_addl\\_info.html](http://www.epa.gov/air/community/details/yardequip_addl_info.html)).

**There are many options to reduce the size of lawns:**

- ❖ It is best to limit lawn to areas where use demands it, such as play areas & other foot traffic areas.
- ❖ **Manage remaining turf areas in a more ecological fashion.** Organic 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/bitstream/1813/3574/2/Lawn+Care+without+Pesticides.pdf>). 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 poorly here. One organization dedicated to this cause is the SafeLawns Foundation or [SafeLawns.org](http://SafeLawns.org).
- ❖ **Replace lawn areas with garden beds and borders.** Include native plants and edible plants for an enticing garden.
- ❖ **Think about wildlife gardening.** Look for areas in a yard to supply food, water, cover, and places to raise young. The National Wildlife Federation runs the **Certified Wildlife Habitat** program and has information about gardening for wildlife ([www.nwf.org/backyard](http://www.nwf.org/backyard) and [www.nwf.org/gardenforwildlife](http://www.nwf.org/gardenforwildlife)). Two Green Spring information sheets address wildlife gardening with native plants: **Using Native Plants To Attract Birds In The Washington, D.C. Area And Virginia** and **Using Native Plants To Attract Butterflies And Clearwing Moths In The Washington, D.C. Area And Virginia**.

**If you have a cat as a pet, keep it indoors.** Free-roaming domestic cats kill millions of birds each year in the United States. “**Cats Indoors! The Campaign for Safer Birds and Cats**” by the American Bird Conservancy ([www.abcbirds.org/abcprograms/policy/cats/index.html](http://www.abcbirds.org/abcprograms/policy/cats/index.html)) addresses this serious problem. The National Audubon Society ([www.audubon.org/bird/at\\_home/SafeCats.html](http://www.audubon.org/bird/at_home/SafeCats.html)) and The

Humane Society of the United States also have excellent websites on this issue ([www.hsus.org/pets/pet\\_care/cat\\_care/keep\\_your\\_cat\\_safe\\_at\\_home\\_hsus\\_safe\\_cats\\_campaign/](http://www.hsus.org/pets/pet_care/cat_care/keep_your_cat_safe_at_home_hsus_safe_cats_campaign/)).

- ❖ **Meadows Or Meadow Gardens** - Grasslands are natural communities dominated by native grasses. Grasslands in Virginia are mostly found in places with extreme environmental conditions or are maintained by disturbances such as fire or infrequent mowing. For gardeners who love naturalistic design and wildlife habitat, a meadow or a meadow garden is the gardener's version of a grassland community. These naturalistic gardens are planted with a mix of native grasses and wildflowers. The sunny garden in the forest's edge section of the Virginia Native Plant Garden at Green Spring is inspired by grassland communities (opposite the native perennial border and upper rock wall).

Meadows are cut down or mowed every year or two (often in mid to late winter) in order to keep them from reverting to woodland (burning can be used in less developed areas with careful management). See the brochure *Grasslands - Native Plants for Conservation, Restoration and Landscaping* for a list of native grassland plants for Virginia (published by the Natural Heritage Program of the Virginia Department of Conservation and Recreation; the website is [www.dcr.virginia.gov/natural\\_heritage/documents/natvglnd.pdf](http://www.dcr.virginia.gov/natural_heritage/documents/natvglnd.pdf)).

---

## **Planting – A General Guide**

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 and mulch with 2 to 3 inches of mulch (generally an organic mulch such as shredded leaves). Newly planted plants need more watering than most established plants. Mulching is a very important way to cut down on water loss and to supply nutrients over time. Do not mulch too closely to plant crowns (the plant base) because crown rot can occur. Fertilization is seldom needed right after planting except on some small transplants that are showing signs of nutrient stress. Hardy winter- and spring-flowering bulbs are in a special class in terms of many cultural techniques such as planting time and planting depth.

Watering, mulching, fertilizing, and many other topics are covered in detail in **Garden Maintenance For The Eco-Friendly Gardener** (see the end of this information sheet for an outline).

---

## **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 establish. Summer planting is fine for most plants with careful watering.

**Planting hardy perennials in the fall** – If fall planting is an option, 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 alternate freezing and thawing. This is less of a problem with large container-grown stock.

**Planting hardy perennials** - Use a hand trowel or a round point 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).

- ❖ **Moisture loving plants** - Mix well rotted organic matter, such as compost or Leafgro, into the surrounding soil (up to 1/3 compost by volume).
- ❖ **Calcium-loving woodland plants** - Gypsum (calcium sulfate) or lime 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 (*Actaea racemosa*; was *Cimicifuga racemosa*; these plants are Virginia natives). 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 comments column in **Recommended Native Herbaceous Perennials And Ferns For Shade Gardens In The Washington, D.C. Area** and **Recommended Non-Native Hardy Perennials And Ferns For The Washington, D.C. Area** (a few calcium-loving *Epimedium* and *Helleborus* are listed in the latter information sheet). These sheets are on the Green Spring website and in the Horticulture Center.
- ❖ **Spacings** - Mature plant widths can be used to determine spacings (measure from the center of plants). See *Herbaceous Perennial Plants. A Treatise on Their Identification, Culture, and Garden Attributes* by Allan Armitage (2<sup>nd</sup> edition); *Armitage's Native Plants for North American Gardens* only gives height information). However, perennials 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, although plants in small pots seldom need root disturbance. Water plants individually after planting and mulch. Some annuals can also be direct seeded, such as larkspurs. See **Recommended 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
- ❖ 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 planted at Green Spring through November.

### **Planting Hardy Bulbs**

The general guideline is to plant 3 times the height of the bulb deep (measure from the top of the bulb). In reality don't worry about the depth – most bulbs do fine when they're simply planted with a trowel or shovel with adequate soil above them. See **Recommended Hardy Bulbs For The Washington, D.C. Area** on Green Spring's website and in the Horticulture Center for details.

#### **Tips For Bulbs:**

- ❖ Most bulbs are planted in the fall (late October - late November is best for most species), although some can be planted in the spring, summer, or early fall (such as lilies).
- ❖ Most bulbs like full sun best.
- ❖ Good drainage is essential for most bulbs. *Camassia* species are a rare exception – they tolerate periodic flooding.
- ❖ **Many hardy bulbs are useful for dry sites.** Most bulbs that go dormant in the summer are tolerant of dry sites. They are great plants for gardens where irrigation is seldom used.
- ❖ **Do not fertilize bulbs after planting** - fertilization is not necessary. Never place fertilizer in the planting hole with bulbs – it will burn them.

## **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. Some larger woody plants can be safely planted into early November but the likelihood of winter injury is greater, especially on evergreens. 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 can be used as well). Water plants after planting and mulch.

A small amount of well rotted organic matter can be mixed into the backfill soil (up to 1/3 compost by volume). Woody plants have extensive root systems and it is important that the planting hole not act like a container. 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. This can be done for other woody plants as well. 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 slightly above grade (such as one inch higher than in the pot) so plants settle slightly above grade or at grade.
- 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 – select plants adapted to the conditions of the site.

### ❖ **Balled And Burlapped Woody Plants**

- Balled and burlapped plants often perform best when they are planted in the spring. Some species have low survival rates when they're dug in the fall, and if a root ball falls apart too much during planting the plant is more likely to die in the fall than in the 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 nursery.
- 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), but remove all wrapping material if it is woven plastic. 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 seen in the retail nursery trade anymore. When plants arrive, 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 planted in the spring – do not plant them in the ground in late summer or the fall because they may winter kill.

### **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 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 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. Mulch after planting.

---

### **Care Of All Types Of Plants After Planting**

For extensive information on maintenance over time, see **Garden Maintenance for the Eco-Friendly Gardener** on the Green Spring website under Gardening and in the Horticulture Center. Topics are discussed in the following order:

1. Watering
2. Weeding
3. Mulching
4. Composting
5. Fertilizer Use
6. Liming
7. Staking
8. Deadheading
9. Cutting Back Bulb Foliage In The Summer
10. Fall Cleanup
11. Late Winter And Spring Cleanup – including pruning woody plants
12. Division
13. Controlling Insect, Mite, and Slug Problems With Integrated Pest Management
14. Controlling Diseases With Integrated Pest Management
15. Pests In The Garden – white-tailed deer and small mammals
16. Turf Edging Beds And Edging Paths
17. Maintenance Of Lawn And Meadow Areas

© 2008

Developed by Brenda Skarphol, Curatorial Horticulturist

Updated 3-2008 (Installation)



If ADA accommodations are needed, please call (703) 324-8563. TTY (703) 803-3354