Virginia Cooperative Extension

2006 PUBLICATION 426-220

America's Anniversary Garden:™ Bulbs for a Red, White, and Blue Spring Garden

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The Commemoration

In 2007, Virginia will mark the 400th anniversary of Jamestown, the first permanent English settlement in the Americas. The 18-month-long commemoration began in May 2006 and features educational programs, cultural events, fairs, and various live and broadcast entertainment sponsored by the Commonwealth of Virginia and many of its cities and towns. See the **America's 400th Anniversary website** at *www.americasanniversary.com* for information about this salute to America's birthplace. Communities and citizens also will be improving their streets, parks, schools, businesses, and gardens as part of the commemoration.

The Statewide Garden Theme

Virginia Cooperative Extension (VCE) developed the **America's Anniversary Garden™** to help individuals, communities, and groups commemorate America's 400th Anniversary with a signature landscape or garden. These signature gardens have red, white, and blue color schemes and are being promoted throughout Virginia and beyond. This is the third in a series of VCE garden design, plant selection, plant installation, and maintenance publications for **America's Anniversary Garden™.**

Why Plant a Bulb Garden?

Whether you garden on a large piece of property, on the balcony of a condominium, or on the rooftop of a building, one of the easiest ways to have showy spring flowers is by planting bulbs. Unlike planting trees, shrubs, and annuals, which immediately has an aesthetic effect in the garden, incorporating spring-flowering bulbs takes advanced planning because bulbs need to be planted in the fall or early winter to reap the rewards of flowers the following spring.

You have three major options for adding bulbs to your outdoor garden:

- Containers (including window boxes)
- Regular flower beds or landscape/lawn areas
- Special raised berms following a method developed by Brent and Becky Heath, owners of Brent and Becky's Bulbs, Gloucester, Va. (See page 4.)

Shopping for Bulbs

Most garden centers and retailers of plants and gardening supplies sell spring-flowering bulbs in the fall, but their range of bulb types and cultivars (varieties) may be limited to either common cultivars and/or small-sized bulbs. In addition, bulbs placed out on display (vs. held in a cooler until shipping) may dry out, rot, or prematurely sprout. Buy the

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Produced by Communications and Marketing, College of Agriculture and Life Sciences, Virginia Tech

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VT/141/0606/10M/262748/426220

largest bulbs you can find and afford in order to be assured of healthy growth, good flower production, and re-blooming in subsequent years. Most bulbs should be plump, clean, and firm.

Though it is often impractical or uneconomical to buy trees or large shrubs from mail order sources, for the widest selection, highest quality, and largest bulb size consider mail order shopping. Place your order in early summer to be assured of receiving your desired selections.

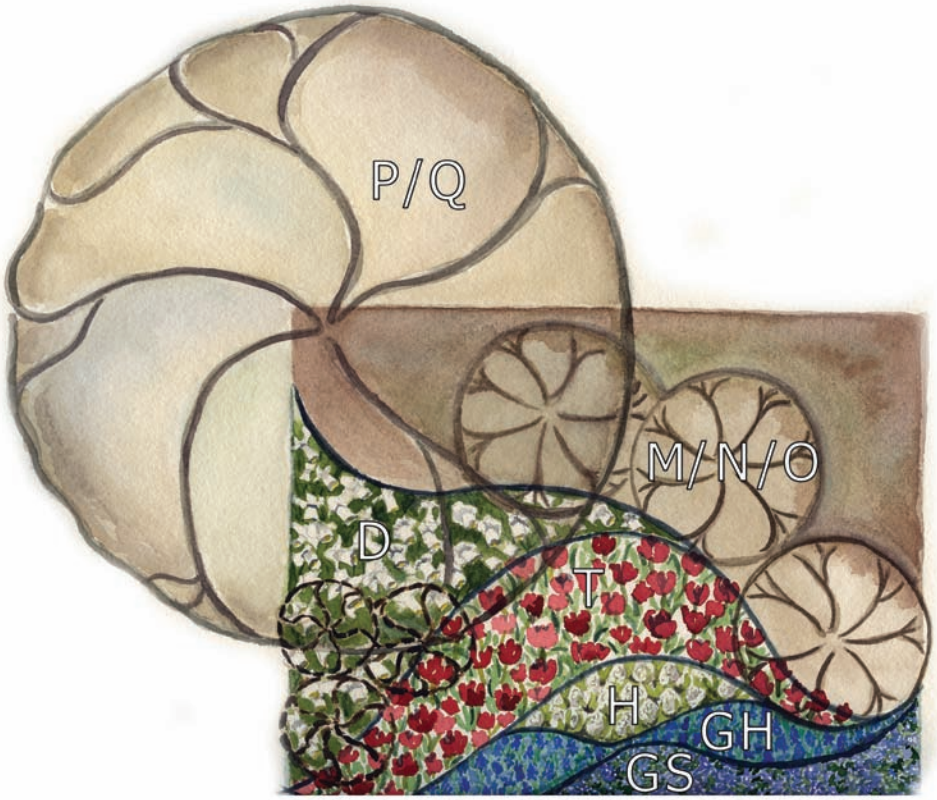
When to Plant Spring-Flowering Bulbs

Spring-flowering bulbs are best planted once the soil temperature, at a depth of six to 12 inches, has dropped to 60°F (usually after the first heavy frost). If you buy or receive your bulbs prior to the soil cooling down from the summer, store them in a cool (50° to 70°F), well-ventilated, and dry area. Bulbs need to form roots before the soil freezes, so in the more northern and western parts of Virginia plant when the soil reaches the optimum temperature. For hardiness zones 5 to 7 in Virginia, try to plant in October and November, and in the small section of hardiness zone 8 in southeastern Virginia, plant in December.

You may wish to incorporate your spring-flowering bulbs into an existing **America's Anniversary Garden™**. If you have already used or modified one of our sample designs from *Plant America's Anniversary Garden*™ or *America's Anniversary Garden*™*: A Statewide Corridor and Entrance Enhancement Program*, Virginia Cooperative Extension publication 426-210 or 426-211, locate your bulbs where you will be removing your summer annuals. If you plan to replace your summer annuals with red, white, and blue fall and winter annuals such as pansies, ornamental kale, and cabbage you can plant your bulbs into the spaces between your fall and winter annuals. You can also wait and plant your bulbs and fall and winter annuals at the same time. Your bulbs can stay in place after they bloom and can be over-planted after spring with red, white, and blue summer annuals to continue a seasonal color transition in the same garden or landscape bed.

Site Selection

The **America's Anniversary Garden™** bulb combinations selected by Brent Heath use daffodils (*Narcissus*), tulips (*Tulipa*), hyacinths (*Hyacinthus*), grape hyacinths (*Muscari*), and glory of the snow (*Chionodoxa*). Full sun (minimum of six hours of direct sunlight) is preferable for all of these bulbs, although daffodils, grape hyacinths, and glory of the snow will tolerate partial shade. If tulips and hyacinths are planted in much shade they tend to produce long, weak stems with smaller flowers.



An 8-foot-by-10-foot garden bed showing how early-blooming bulbs planted among later-blooming perenninals can start the garden season with a vivid display of red, white, and blue.D-daffodil Barrett Browning; T-tulip Abba; H-hyacinth Carnegie; GH-grape hyacinth Blue Spike; GS-glory of the snow; M-redtwig (red osier) dogwood; N-bigleaf hydrangea; O-Virginia sweetspire; *P-fringetree; Q-dogwood*

The amount of shade an area receives generally increases as spring progresses. For bulbs that bloom in early spring prior to deciduous trees leafing out, planting under trees may be acceptable. You often see daffodils naturalized that way in wooded areas. If, however, you use mid- to late spring blooming bulbs you will be safer to locate them in full-sun areas.

Regardless of exposure, select an area where the soil is well drained. All of the selected bulbs are cold hardy across Virginia. They should establish and bloom for many years with the exception of tulips that do not tolerate the heat in southeastern Virginia and thus may not become perennials in your garden.

Garden Design

There are two basic ways to design bulb gardens relative to bloom time. Bulbs can be sequenced in order to spread their bloom over an extended period of time or they can be selected to bloom simultaneously (at the same time). Whether for containers or in beds, to achieve the desired **America's Anniversary Garden™** red, white, and blue effect coordinate your bulbs so they bloom simultaneously.

Bulbs planted in the ground can go into beds, or in some cases, directly into your lawn for a more naturalized effect. Whether in the ground or in containers, bulb heights can be staggered, going from shorter bulbs like grape hyacinths and hyacinths in the front to taller daffodils or tulips in the back, or they can be layered with one type of bulb coming up through another (such as taller red tulips coming up through smaller blue grape hyacinths and white glory of the snow).

Bulbs should always be massed, and never planted in single bulb straight lines. Use large numbers of bulbs (at least 10 to 12 of each kind) for the most dramatic effect. It is often better to plant fewer types of bulbs in larger quantities than to plant only a few of several types of bulbs.

Soil Preparation, Planting Techniques, and Planting Depths and Spacing

Most bulbs should be planted in well-drained soil. If your soil is very clayey or sandy, consider adding compost or another organic amendment to the entire bed area, but not to individual bulb holes. Incorporate the amendment 12 to 18 inches deep. A lightly acidic soil, around pH 5.5 to 6.5, is best for bulbs.

If you plan to plant bulbs individually, dig or open up holes with a trowel, small truffle spade, hand or stand-up tubular bulb planter, dibble bar, or an auger powered by a portable drill. Follow the recommended depth given in our suggested bulbs chart, but if your soil is sandy, plant a bit deeper. If you are planting in a bed, or want to layer different types of bulbs together, consider digging trenches as opposed to individual planting holes.

A healthy, sizable bulb has enough stored food to allow it to grow well the first year. Fertilizer can be added at planting time by mixing it into the soil below where you will place your bulbs. Do not place fertilizer in the bottom of individual bulb holes to avoid fertilizer burn to roots as they grow. Incorporate a slow-release fertilizer of relatively equal parts nitrogen, phosphorus, and potassium (such as 9-9-6 or 10-12-10) at the rate recommended on the bag or approximately one tablespoon per square foot. Avoid using fertilizers like 10-10-10 because they are fast release, and bone meal because it often attracts animal pests.

Daffodil bulbs and leaves are poisonous to most insects and animals, and hyacinth bulbs repel pests. However, chipmunks, voles, mice, woodchucks, squirrels, and other animals will forage for and eat newly planted tulips, grape hyacinths, glory of the snow, crocus, and a majority of other bulbs you might add to your **America's Anniversary Garden™**. To protect your susceptible bulbs consider spraying them pre-plant with bad tasting repellents such as Deer-Off (Havahart Products) or Ropel (Burlington Scientific Corp.). Another approach is to surround each bulb with a handful of sharp, crushed gravel or a sharp aggregate product like VoleBloc (Carolina Stalite Co.). You can also put groups of bulbs into wire mesh bulb baskets or cover the bed with chicken wire.

Most bulbs are planted to a depth three to four times the height of the bulb. Bulbs usually are spaced three times the width of the bulb apart (see the suggested bulbs chart for recommended numbers of bulbs per square foot). Place the bulbs with their "noses" (the pointed tops) up and their roots or flat stem/root plate down. Cover with half the soil and water to settle the soil around your bulbs and eliminate air pockets. Then cover with the remaining soil and water again.

Raised Berms for Heavy Clay Soil and "Rodent Proofing"

A big challenge when bulb gardening is preventing voles from eating the bulbs. Spraying your bulbs preplant with a foul tasting commercial repellent, such as Mole-Med (Mole Med, Inc.) or Ropel, can help, but to really outwit these rodents, and to provide an excellent, well drained substrate, particularly if your soil is heavy or clayey, try building a raised bed following this method developed by Brent and Becky Heath:

- Select a partial to full-sun landscape area where a raised berm can be a focal point, a partial screen, or a feature to control foot traffic. If creating a raised area of one to two feet high is not practical or aesthetically acceptable, consider excavating several inches of soil from your selected area and then starting your layering.
- Cover the existing soil with two inches of sharp gravel.
- Cover the gravel layer with six inches of mature compost (compost that has been aerobically processed for at least two to four months).
- Place your bulbs atop the compost layer, spacing them according to bulb type.
- Spray your bulbs with the above-mentioned repellents for extra protection and allow them to dry.
- Cover the bulbs with two inches of sharp gravel, then four to six inches of additional compost, soil, or sand (sand is cheaper than compost and more weed free).
- For winter protection, cover the entire bulb berm with six inches of organic mulch such as pine needles or shredded pine bark. Avoid straw due to weed-seed contamination. In the spring remove some of the mulch once the bulb leaves and flowers begin to emerge.

Besides preserving your bulbs and improving drainage, another benefit of this method is no more digging individual holes – just layer and cover! Though bulb berms can serve as focal points in your landscape, creating a berm may be inconsistent with the appearance of your landscape. If so, consider excavating a trench several inches deep and then layering as above in order to reduce the berm's aboveground height.

Brent Heath building a bulb berm surrounding an entry sign at the Hampton Roads Agricultural Research and Extension Center.

Watering, Mulching, Fertilizing, and Other Maintenance

Water your bulbs after planting to stimulate root growth and at least once a week in the spring if rainfall decreases to less than one inch per week during a growing season. Remember that some of your bulbs may be planted six to eight inches deep so be sure to water until the soil is wet at least down to that depth. If you have an automatic irrigation system avoid planting bulbs in areas where irrigation is programmed for daily watering to avoid rotting your bulbs or increasing the chances of fungal diseases.

To conserve soil moisture, reduce weed growth, and buffer temperature extremes apply two inches of mulch over your beds using materials such as pine needles, shredded pine bark, or recycled hulls from buckwheat, cocoa, peanuts, or rice. Avoid excessive mulching, especially over tulips, because thick mulch layers create warm winter habitats for voles. Do not layer weed barriers such as black plastic or woven/nonwoven landscape fabrics under your mulch – they will interfere with bulb flowers penetrating above ground. If you want to use a pre-emergent herbicide in combination with your mulch be sure that the herbicide label indicates that the product is safe for use around bulbs.

As mentioned above, fertilizer can be incorporated into planting bed soils prior to layering your bulbs. If you do not incorporate fertilizer preplant, you can top dress (apply to the top of the soil before mulching) with a slow-release fertilizer. Top dressing every fall will help to insure good flowering the following spring. Scatter the fertilizer over the soil or mulch, gently rake it in to make good soil contact, and water.

Do not remove the leaves from your bulbs after flowering occurs. The leaves are vital to the production of food to be stored in the bulb for flowering the next year. Let the leaves die back naturally and once they are yellow or tan they should easily pull away from the bulb. You can remove the spent flowers from your bulbs to prevent seed formation that will drain energy away from the next year's flower buds. This is more important for tulips, because their nectar attracts pollinating insects, than for daffodils or other bulbs that are rarely wind or insect pollinated.

Planting Bulbs in Outdoor Containers

If you live in an apartment or condominium and do not have space to plant an **America's Anniversary Garden™**, you can easily plant an attractive spring-flowering bulb garden in an outdoor container. Container bulb gardens are also nice accents for front porches, business entrances, or street plantings, even where landscape beds are available.

Use Brent Heath's suggested bulb combination for your container planting. You will want to have simultaneous, not sequenced flowering, to have the greatest effect. Follow these steps suggested by Brent and Becky Heath:

- Select a container that is weatherproof and tall enough to provide adequate depth for your bulbs. Allow three inches of height per layer of bulbs, so if you follow the bulb combination in the chart you will need a container that is at least 15 inches deep. Select a container with a wide base to keep the container from blowing or tipping over once the bulbs begin to grow.

  Whether you use a lighter weight plastic container or a heavier terra-cotta container, be sure it has drain holes. If you have neighbors below be sure to put a saucer under the container to catch water that drains through the container. For variety, you might want to plant red and white flowering bulbs in a glazed blue container.

- Place a few layers of newspaper in the bottom of your container to keep your potting soil from falling through the holes, and consider covering that with an inch of gravel if mice and voles are able to climb through the drain holes. Do not make the gravel layer more than an inch thick because, contrary to popular belief, several inches of gravel will not improve drainage but rather shortens the column of potting soil through which water can drain.

- Put a few inches of a coarse potting soil (such as a ground pine bark/sand mix or a bark/compost mix – the latter will hold more water than the first) over the newspaper/gravel layer. Place your layer of deepest bulbs into the container and cover them to their top with more potting soil. (If animals may be a problem consider treating your bulbs with a repellent as mentioned earlier.) If your potting soil is dry, water to wet the soil and settle the bulbs before putting in your next layer of bulbs. Continue layering potting soil and bulbs until your top layer is completed. If you plan to recycle your bulbs to a garden after they flower, top dress them with a slow-release fertilizer.

Bulbs laid out for layering (left), and the first layer – the daffodils – ready to be covered (right). Note the blue ceramic pot used to help reinforce the red-white-blue color scheme.

- In the colder parts of Virginia, consider topping your layered bulbs with an inch of gravel to protect the bulbs and keep them from heaving out of the container while they root into the soil. Water the pot well to encourage root growth. Water every few weeks to keep the potting soil moist but not wet.

- For rooting and flowering to occur, your containerized bulbs need to be chilled at temperatures between 32° and 48°F for 12 to 16 weeks. Place them on the north side of a building, in an unheated garage, in a cool basement, or an old refrigerator. If left outside, place the containers in leaf-filled plastic bags or even in old coolers (but be sure to open the lid every few weeks to vent ethylene gas produced by the bulbs) to insulate them.

Individual pots of tulip Blue Base, daffodil Horn of Plenty, and hyacinth Blue Jacket (top). One pot with tulip Blue Base, daffodil Jenny, and hyacinth Blue Jacket (right).

Other Spring-Flowering Bulbs for America's Anniversary Garden™

You certainly are not limited to the list of bulbs we have suggested here. Other good choices for spring gardens and containers include ornamental onions (*Allium* – blue, white), windflowers or anemones (*Anemone* - reds, whites, and blues), Indian hyacinths or quamash (*Camassia* – blue, white), crocus (*Crocus* – white), snowdrops (*Galanthus* - white), Spanish bluebells/wood hyacinths/scillas (*Hyacinthoides* – blue, white), star flower (*Ipheion* – blue, white), Dutch and dwarf iris (*Iris* – blue, white), snowflakes (*Leucojum* – white), stripped squill (*Puschkinia* – blue, white), and bluebell or squill (*Scilla* – blue). As you can see there are lots of bulbs for blue and white flowers, but for the best reds stick with tulips.

- Once the chilling period has occurred and the danger of hard freezes is past, move the containers stored inside to a sunny outdoor location when you see leaves and bulbs beginning to emerge. For containers stored outdoors, begin to uncover them to encourage leaves and buds to emerge.
- Bulbs grown in containers rarely grow well in the containers for multiple years due to the challenge of providing sufficient nutrients. Better to recycle them to your garden or that of a family member or friend and start with new bulbs the next year. They are ready to transplant after they bloom and after any chance of a hard freeze has passed.

Resources and Acknowledgments

The information in this publication was adapted from magazine articles, a cultural instruction pamphlet, a spring/fall flowering bulb catalog, and books by Brent and Becky Heath and is used with their permission.

Heath, Brent and Becky. *Tulips for American Gardens*. Bright Sky Press, New York, N.Y.

Heath, Brent and Becky. *Daffodils for American Gardens*. Bright Sky Press, New York, N.Y.

Brent and Becky's Bulbs website (additional selection and cultural information and color pictures of bulbs), *http://www.brentandbeckysbulbs.com/*.

America's Anniversary Garden website, *http://www.ext.vt.edu/americasgarden/*

Plant America's Anniversary Garden, Virginia Cooperative Extension publication 426-210, *http://www.ext.vt.edu/pubs/envirohort/426-210/426-210.html*

Annuals: Culture and Maintenance, Virginia Cooperative Extension publication 426-200, *http://www.ext.vt.edu/pubs/envirohort/426-200/426-200.html*

Special thanks to our reviewers: Jeffrey Ewers, Extension agent, Hampton; Holly Scoggins, Floriculturist, Blacksburg; Paige Thacker, Extension agent, Prince William County.

Credits

Container and landscape bulb designs/lists by Brent Heath

Landscape watercolors by Elizabeth Maurer

Photographs by Bonnie Appleton and Brent Heath

Project supported by funding from Jamestown 2007

Suggested Bulb Selections for America's Anniversary Garden (Selected by Brent Heath)

Flowering Time	Type	Suggested cultivar or species	Height	Bulbs/ sq. ft.	Planting depth	Color	Miscellaneous
For gardens and beds:							
Early to mid-spring	Tulip	Abba	10"-12"	4-5	8"-10"	Red	Fragrant double flowers; containers
	Daffodil	Barrett Browning	14"-16"	4-5	5"-6"	White	Brilliant white with an orange-red center cup
	Grape hyacinth	Blue Spike	6"-8"	10-15	2"-3"	Blue	Loosely formed fragrant double flowers; larger and longer lasting
	Hyacinth	Carnegie	8"-12"	4-5	4"-6"	White	Spike of fragrant dense flowers
	Glory of the Snow	*Chionodoxa forbesii*	5"-10"	6-10	2"-3"	Blue	Spray of 5-10 starry flowers per stem, white center
Early to mid-spring	Tulip	Red Paradise	10"-14"	4-5	8"-10"	Red	Black heart
	Daffodil	Abba	14"-16"	4-5	5"-6"	White	Very fragrant, 3-5 double florets per stem, orange flecked center
	Grape hyacinth	Christmas Pearl	4"-6"	10-15	2"-3"	Blue	Fragrant
Mid- to late spring	Tulip	Parade	20"-22"	4-5	8"-10"	Red	Very large, yellow base, inside yellow-edged, black heart
	Daffodil	Stainless	16"-18"	4-5	3"-8"	White	Flat, large cup with green eye
	Grape hyacinth	Saffier	8"	10-15	2"-3"	Blue	Fragrant; long-lasting
For a small container (under 20" diameter):							
Mid- to late spring	Tulip	*Tulipa linifolia*	3"-4"	10-15	4"-6"	Red	Bright red with a black base; opens wide in sunshine; red-edged leaves
	Grape hyacinth	Blue Spike	6"-8"	10-15	2"-3"	Blue	Loosely formed fragrant double flowers; larger and longer lasting
	Grape hyacinth	Album	4"-6"	10-15	2"-3"	White	Dense spikes of pure white "pearls"
For a large container (over 20" diameter):							
Mid- to late spring	Tulip	Red Riding Hood	10"-12"	4-5	8"-10"	Red	Greigii tulip with purple mottled leaves; containers
	Daffodil	Ice Wings	10"-12"	4-5	5"-6"	White	Fragrant, 2-3 nodding flowers per stem; containers
	Grape hyacinth	*Muscari latifolium*	4"-6"	10-15	2"-3"	Blue	Light blue fragrant top florets, dark violet on bottom; containers

Disclaimer: Commercial products, bulbs, and planting techniques are named and described in this publication for informational purposes only. Virginia Cooperative Extension does not endorse these products and techniques and does not intend discrimination against other products, techniques, or bulb suppliers which also may be suitable.