

Very few things are as uplifting as a flower garden. Properly planned and prepared, it is possible to have not only healthy plants, but also blooms in the New Jersey garden for at least nine months of the year.

## TYPES OF HERBACEOUS PLANTS

### Annuals

Annuals complete their life cycles (grow, flower, set seed, and die) within one year or growing season. They may be vines or small to tall plants. They include tender perennials, which are treated as annuals in USDA hardiness zone 6, and plants that flower the same year they are grown from seed. There are some that are cool weather tolerant (sweet alyssum, snapdragon, calendula) and those that must have hot weather to thrive (Madagascar periwinkle, celosia.)

### Biennials

Biennials grow vegetatively the first year from seed; then grow, flower, set seed and die the second growing season.

### Herbaceous perennials

Herbaceous perennials are plants that do not form woody stems. They die down to the ground in winter and renew their growth in the spring. Some live almost indefinitely, while others tend to die out after a few years. A few are evergreen, some are vines.

Spring and summer blooming bulbs are also perennial. Bulbs are different types of storage structures. Plants classed as bulbs may grow from true bulbs, corms, tubers, tuberous roots, or rhizomes.

## USES FOR FLOWERING PLANTS

- **Edging, border, or filler** for temporary and permanent gardens.
- **Container** plantings, such as window boxes, pots, hanging baskets.
- **Color accents**
- **Cutting and drying** flowers for arrangements, wreaths, pressing.
- **Attract beneficial insects and butterflies**
- **Companion and trap plants**
- **Mass plantings** to offset building, roadways, or walks; to display corporate logos
- **Herbs and others** for cooking, medicinal, fragrance, tea or salad use
- **Screening** (vines, tall plants)

## CONSIDERATIONS

Reference books, the internet, and catalogs are good sources for information on the cultural requirements of individual flowering plants or of the specifications that a gardener may have for different personal or garden needs.

- **Season/Length of Bloom**  
Perennial bloom ranges from January to December, with the majority in spring, summer and fall.  
Length of bloom varies. For example, oriental poppies bloom for about 1 week, while coneflower, blanketflower, and coreopsis can bloom for months.  
Annuals generally bloom for the entire growing season.  
Most bulbs bloom for about 2 weeks or so depending on temperature.
- **Height and Width**  
Low-growing plants (less than 1 foot) are good edging plants. Plants over 3 feet are better as background and specimen plants. Those between 1 and 3 feet provide the filler for beds. Width of the plant at maturity determines spacing. Some perennials (blue false indigo, purple coneflower, Joe-Pye-weed) do not reach their mature width until they are about 3 years old.
- **Flower/Foliage Color**  
Color groups are white, yellow to orange, pink to red, blue to purple, and multicolored. It is possible to design a monochromatic theme garden or to have many colors throughout the garden. Flowers that bloom in spring will not

compete with the color of those that bloom in summer or fall. Plants such as coleus, alternanthera, and lamb's ear are grown for their foliage color.

Cool colors such as blue, violet, green, and indigo make a garden seem farther away. The warm colors such as red, orange, yellow, and pink make a garden seem closer and more dynamic. Color significance and psychological impact of flower colors include:

- **Blue:** peace and serenity
- **Purple:** creativity and eccentricity
- **Green:** balance, harmony
- **White:** peace, innocence, purity
- **Orange:** blend of dynamic and energetic
- **Yellow:** cheerfulness, sunshine, energy, new beginnings
- **Red:** love and passion, dynamic, attracts attention

- **Fragrance**

Lily-of-the-valley, lavender, some day- and hybrid lilies, and others are delightfully scented and useful in gardens for the blind. Use caution when selecting numbers of fragrant plants so that the smell is not overpowering.

- **Sun/Shade Requirements**

Most prefer at least 6 hours of direct sun each day. There are others that must have shade. Some prefer partial shade, but tolerate full sun in moist soil. Check reliable references for individual plant needs.

- **Moisture Requirements**

Most prefer well-drained soil. There are plants that must have well-drained soil, especially in winter, such as dianthus, sea thrift (*Armeria*), and sea lavender. Others tolerate or require wet or boggy conditions, such as yellowflag iris, cardinal flower lobelia, and impatiens.

- **Hardiness/Cold and Heat Tolerance**

Hardiness is low temperature tolerance. Plants like delphinium may be hardy, but can't tolerate our summer temperatures. Some annuals tolerate frost or very cool temperatures, but most need warm weather to thrive. Some hit their peak in hot weather. Perennials vary in their hardiness. Bulbs that bloom in spring are winter hardy. Most summer-blooming bulbs must be lifted and stored over winter.

- **Pest Resistance/Attracting Beneficials and Butterflies**

Many herbaceous plants are resistant to insects, disease, slugs, and mites. Some are food sources for deer, woodchucks, rabbits, voles and other animals. Some are pollen and nectar sources for beneficial insects or food sources for the caterpillar stage of some butterflies.

- **Soil Fertility and pH Requirements**

Generally, flowering plants need a complete nutrient supplement containing nitrogen, phosphorus, and potassium to grow well. The source can be an organic or rock powder product or a synthetic fertilizer. Some annuals (nasturtium and California poppy,) perennials, and wildflowers will bloom most prolifically in rather poor soil. Some (Astilbe, peony, chrysanthemum) need soil of high fertility to thrive. A pH range of 6.0 to 6.5 is desirable for most plants.

- **Rate of Growth/Invasiveness**

Plants like butterfly weed can remain in the same place for years and not outgrow the allotted space. Some plants such as lamb's ear, spiderwort, gooseneck loosestrife (*Lysimachia clethroides*) and garden heliotrope spread so rapidly that they crowd out desirable neighbors. Plants like purple loosestrife (*Lythrum salicaria*) are so invasive that they should not be grown at all.

- **Availability/Cost**

Although many are available as seed or started plants at local garden centers, some must be purchased through catalogs or collected from the wild if this practice is legal in your area. "Plant swaps" held by garden clubs and civic organizations are another way to increase a plant collection.

- **Maintenance Requirements**

Some require pinching, staking, deadheading or frequent dividing and are more labor intensive than others. Use references to learn the needs of individual species.

- **Practical Uses**

Some have culinary or medicinal qualities. Some are used for dyeing. Many are excellent for fresh or dried arrangements, centerpieces, and wreaths. Some are used in bath water or as room air fresheners.

- **Toxicity:** Does the plant have any parts that could poison or be an irritant to children or pets? Some like castor bean and angel trumpet (*Datura*) should not be grown at all where there are small children.

## SITE SELECTION

Individual annuals and perennials have different requirements for sun, shade, partial sun, soil quality, and drainage. The majority prefers **full sun, moderately rich garden soil, and good drainage**. Other factors in choosing a place to plant are **visibility** (will you be able to see and enjoy them where they are planted?) and **accessibility** (can you get to them to remove dead flowers, to weed, and to fertilize?) The average flower border should be no wider than 5 to 6 feet or should have paths, so the middle can be accessed from both sides without stepping in the garden.

Some tree roots will compete with flowers for nutrients and water. Swamp red maple, willow, silver maple, poplar, and others will invade a well-maintained area. Some flowers may be killed by contact with the roots of black walnut.

For most bulbs, select an area that has well-drained soil and full sun to light shade. To increase their visual impact, especially of shorter bulbs, plant them where they can be easily seen. Plant large numbers (200 or more) if the planting area is more than 30 feet from the viewing area. Some possible locations are next to entryways, under deciduous trees, in front of evergreens, in open flowerbeds, and among ground covers and perennials that will hide yellowing bulb foliage later in the season. Bulbs to be **naturalized** (planted outside bed areas) should be located where mowing is not required until late spring.

Many flowers do well in containers, especially when growing conditions are not ideal, when soil is contaminated or disease infected, or when variety is desired. Use a special soil or soil-less mix for moisture retention and aeration and to reduce compaction.

## BED DESIGN

Using graph paper to design the bed lines and plant placement is the most efficient way to plan the garden. Flowerbeds can be created by laying flexible garden hose or twine on the ground until the appropriate form is obtained or by using a dribble of limestone. Use this as the pattern to edge out the bed. Bed lines can be straight or rounded, but curved lines are more interesting. Planning the design on paper with the correct spacing between plants will assure that there is the right number of plants for the design. Keep taller plants to the back of the border, and those that are low to the front.

Color selection is personal preference. There are many vibrant primary and soft pastel colors available, so many combinations are possible. Warm reds, pinks, and yellows make a garden appear larger and closer. Cool blues, violets, and greens appear farther away.

## SOIL PREPARATION

Remove and compost any grass covering the area. Dig out stumps, large roots, stones and other obstructions. It may be necessary to control noxious perennial weeds by hand or hoe or with an herbicide such as glyphosate (Roundup or Kleenup). Steam sterilization by placing clear plastic over damp soil and allowing time for the heat buildup to kill weeds will also work, but requires months to work.

Most plants need soil that is loose enough for roots to grow easily. Adding coarse sand and well-rotted organic matter to clay (heavy) soil will help loosen it. Organic matter should also be added to sandy (light) soil. For the average garden bed, spread 1 to 3 inches of compost or peat moss, or 1 inch of well-rotted manure over the surface of the garden and spade or rototill in before planting.

A **soil test** is essential for determining the pH (level of soil acidity or alkalinity) and major nutrient levels to be sure the amount of fertilizer and limestone is just what the plants need. Standard bed establishment practice also includes the addition of well-rotted **organic matter**. The old recommendation for fertilizer was 2 to 4 lb. per 100 sq. ft. of a complete (10-10-5 or 5-10-10) **fertilizer**, but the problem was that this is only a guess. If manure or enriched compost is used, include this as part of the fertilizer recommendation.

An excellent phosphorus source for any flowers, but especially for bulbs, is **bone meal** (1-11-0 to 4-12-0). Apply at the rate of up to 5-lb/100 sq. ft. when used as the only fertilizer and soil test shows the soil is phosphorus deficient. If 2-4 lb/100 sq. ft. of 5-10-5 is also used, reduce the amount of bone meal. For bulbs planted individually the rate of bone meal is 1 teaspoon per hole for minor (small) bulbs, and 1 tablespoon per hole for major (large) bulbs. Mix bone meal into the soil thoroughly, so there is no direct contact with the bulb.

Spade or rototill needed amounts of lime, organic matter, fertilizer(s), and sand into the soil to a depth of 6-8 inches for general annual and perennial beds. When large, deeply planted bulbs such as daffodils, tulips or lilies are planted, cultivate to a depth of 12 inches. This allows room below the bulbs for root development. Rake smooth after incorporating these amendments. Lime, organic matter and sand may be incorporated into the soil in the fall for a head start on spring gardening and to allow winter freezes and thaws to settle materials.

## PLANT SELECTION AND ARRANGEMENT

Choose garden flower species based on the list of considerations. Don't be afraid to try some of the wonderful plants such as Pentas and Lisianthus that were unknown or very uncommon in our grandparent's day. Pick plants at a reliable garden center that are healthy, uninfested, and not too large for the 4-pack, 6-pack, or individual pot soil volume. For smaller numbers of plants, group in odd numbers (1,3,5,7, etc.) for balance. Try to keep beds no wider than 6-7 feet or install paths so that all flowers can be accessed for maintenance without tramping on the soil.

## PLANTING

### Seed

Follow seed packet instructions for distance apart, correct depth of planting and proper timing. Timing important because some seeds are not frost or cold tolerant and must be sown when the soil is warm. Seeds sown in fall or very early spring may need freezes to break seed dormancy. Cover the seeds with fine soil and water thoroughly. Biennials and many perennials will not bloom the first year from seed.

### Bulb Planting

Plant as soon as bulbs are purchased or received from the supplier to prevent drying out, or plant as soon as conditions permit. The ideal time for spring blooming bulbs is **September and October**, but bulbs can be planted until the ground freezes. Bulbs found in a forgotten bag can be kept in cold storage, and then planted during a mid-winter thaw. (Not ideal.) Spring-blooming bulbs are planted in fall so they will have time to form a strong root system before the ground freezes. Summer blooming bulbs are generally planted on or after the frost-free date in spring. (This is about May 10 in central New Jersey.)

Depth of planting is usually 2 1/2 to 3 times the diameter of the bulb measured to the bulb's shoulder: a little deeper in sandy soil, shallower in heavy soils. Individual recommendations for tubers, tuberous roots, and rhizomes do not follow this rule.

### Transplants

Select healthy, robust seedlings in individual pots or 4-6 packs from the garden center. Reject any that appear stressed or unthrifty because of nutrient deficiency or infestation. If you raise your own plants from seed make sure they are hardened off for a week before transplanting. Tender plants sunburn or die if planted outside directly from protected greenhouse or window growing conditions. Stopping fertilizer applications, reducing watering, lowering temperature, and increasing ventilation help harden them off. Expose the plants to protected (shaded) outdoor conditions for a week or so before the transplant date. Most transplants obtained from nurseries and garden centers have already been hardened off.

Our **frost-free date** (central New Jersey) is about May 10. Weather vagaries as well as individual communities or microclimates can vary this date. Don't be so eager to put tender flowers in the ground that they are lost to frost. Be prepared to cover those that may be threatened by frost or night temperatures below 45°F for warm weather annuals.

Plant hardened-off annuals and perennials anytime on an **overcast day**. If the day is sunny, transplant seedlings in early morning or late afternoon so midday sun doesn't stress or damage them. After removing the plants from their container, check the root system. If roots are tightly massed and take the form of the pot, loosen or cut them slightly so they will be able to grow into the surrounding soil. Set the plants in the ground at the **same depth** they were in the pot and settle soil around them gently, being careful not to leave air pockets around the roots. (The exception to the depth rule is potted and forced spring bulbs, such as Easter lily, hyacinth, tulip, or daffodil. These bulbs must be placed in the ground at the appropriate outdoor planting depth, not the depth they were in the pot.)

Water thoroughly. It takes a lot of water to reach bulbs planted 6 to 8 inches deep. Do not allow the soil to dry out during fall and early winter when roots are forming. Water annuals and perennials to help them establish, then water only as needed by species.

Some gardeners use a transplant solution of water-soluble fertilizer, compost or manure tea, worm casting tea, or liquid seaweed mixed according to the label to reduce transplant shock on annual and perennial seedlings.

## MAINTENANCE

**Watering:** All plants need water to grow. For most flowers 1" on clay soils to 1 1/2" on sandy soils is enough water for garden beds each week. Use a rain gauge to determine how much rain has fallen, and reduce irrigation by that much. Ideally, water should be applied in the early morning. Water thoroughly so the soil is moistened to at least 8 inches deep. Frequent, shallow sprinkling encourages shallow root systems and disease development. Some plants are tolerant to very tolerant of dry growing conditions **once established**. Incorporating **water-retentive polymer crystals** in garden soil or container potting mixes helps retain water and reduces watering frequency. Container grown plants may need to be watered daily, but this is determined by the size of the container (soil volume), the type of plant grown, and the direction the plants face (Plants facing south or west tend to dry much faster than plants facing north or east.)

**Mulching:** Organic mulches such as grass clippings or wood chips, or inorganic mulches such as black polyethylene weed barrier with slits cut for plants, help maintain even soil moisture and temperature and deter weeds. A little extra fertilizer (complete analysis, such as 10-6-4 or 10-10-10) when using wood mulches offsets the nitrogen used up in decomposition of the mulch. Sometimes organic mulches harbor pests, such as earwigs and slugs, but this disadvantage is usually offset by the advantages of using organics. Mulch depth should not exceed two inches.

**Cultivation:** Lightly scratch the soil surface to prevent crusting. Remove weeds to reduce competition for water and nutrients. Take care not to damage developing roots of desirable plants.

### **Pinching and Shearing:**

Some annuals, such as sweet alyssum and lobelia, benefit from pinching their tips to encourage branching or to maintain form. Some chrysanthemums will form a more compact and bushy plant before buds set if the tips are pinched several times during the growing season.

### **Deadheading:**

Removal of spent flowers to keep plants productive, to prevent roots or bulbs from putting their energy into seed production, and to maintain an attractive appearance is called "deadheading". Marigolds, zinnias, calendula, daffodils, tulips, and others benefit from this form of pruning. Do not deadhead if seed dispersal is desired for self-sowing or if seed is going to be harvested.

The spent flowers of flowering bulbs are removed after bloom. Do not remove the seedheads of winter aconite, chionodoxa, scilla, puschkinia or other small bulbs if naturalizing by reseeding is desired. Cut off the foliage only after it has yellowed and withered. Leaves are necessary for photosynthesis to occur. Do not tie up, knot, or braid bulb foliage or use any method that interferes with the sunlight reaching the leaves until at least May 10. If necessary to divide overcrowded clumps, wait until after the foliage has yellowed which may be as late as mid-June. The bulbs may then be lifted, sorted, divided, and replanted immediately or stored for fall planting.

### **Fertilizing**

Annuals grow rapidly and may need additional nutrients in order to complete their life cycle in one growing season. Sidedress at mid-season (August) or as required by individual plants. Plants may be sprayed instead with liquid seaweed, fish emulsion or manure or compost tea or earthworm casting tea several times during the growing season. Perennials generally need less fertilizer on well-improved soil. Compost tea, worm castings, and liquid seaweed can also provide nutrients, especially the trace elements.

For bulbs, adding a thin layer of humus or compost and fertilizing according to soil test or with a complete fertilizer such as 5-10-10 or 5-10-5 at 0.5 lb./100 sq. ft. or with a special bulb fertilizer in late fall or before growth starts in March will help ensure vigorous productive growth each year. Timed-release fertilizers such as Osmocote can be helpful in both beds and containers

Have a soil test run once and again about every five years to maintain nutrient levels at optimum for the plants.

### **Staking/Caging/Supporting**

Tall plants and plants with tall flower stalks benefit from added support to prevent being knocked over by heavy rain or wind. Bamboo stakes, tomato cages, tall brush, and special wire hoops or rings are used as supports and should be positioned just as new growth starts in the spring to avoid damaging plants later.

### **Pest Control**

Pests take many forms: weeds; insects; fungal, viral, and bacterial diseases; mites; slugs, and animals. Take care to keep weeds out of the flowerbed to avoid competition for available nutrients and water, especially while plants are

small. Fortunately, many herbaceous plants are relatively undamaged by insects and disease. When there appears to be a problem with a plant, have it diagnosed so that proper control measures can be taken.

### **Winter protection**

Most perennials and bulbs are winter hardy and do not require protection from the cold. Mulch may be applied after the ground is frozen to a depth of 2" to protect from heaving caused by alternate freezing and thawing and to prevent premature emergence during warm spells in winter. (Do not be concerned if grape hyacinth foliage emerges in fall. This is normal.) Small amounts (2 inches or less) of shredded hardwood and other fine mulches may be left in place in the spring.

### **Propagation**

Flowering plants are propagated from seed, cuttings, or division depending on species. Consult a reliable reference for information on individual plants.

### **Problem Solving**

When problems arise, consult a good reference book from the library or bookstore or with an agent, horticulturist, or Master Gardener at the Rutgers Cooperative Extension in your county. Some garden centers can also help. Most problems can be solved or controlled with cultural, biological, physical, or mechanical means.

### **Useful References on Herbaceous Plants**

Ball, Jeff and Liz, 1990 **Rodale's Flower Garden Problem Solver**, Rodale Press, Emmaus, PA. 422 pp. Descriptions of many common flowering plants. Includes good descriptions of cultural, disease, and insect problems and their least-toxic management.

DiSabato-Aust, Tracy 1998 The **Well-Tended Perennial Garden**, Timber Press, Portland, Oregon. 269 pp. Great info on bed establishment, maintenance, and plants for specific conditions. Most useful for pruning/pinching info.

Hessayon, D.G., 1993, **The Flower Expert**, Expert Books, London, 160 pp, soft-cover. and 1996, **The Bulb Expert**, 128 pp. Good pictures and cultural info on many herbaceous flowering and bulb plants. Includes variety descriptions. English flair.

Imes, Rick, 1992, **Wildflowers**, Rodale Press, Emmaus PA. 160 pp. Encyclopedic within habitats, which include eastern woodland, western woodland, wetland, desert, prairie, and field and roadside. Illustrated with color drawings. Very useful.

Newcomb, Lawrence, 1977, **Newcomb's Wildflower Guide**, Little, Brown, & Co. Boston. 241 pp. Excellent key/ line drawings.

Phillips, Ellen & C. Burrell, 1993, **Illustrated Encyclopedia of Perennials**, Rodale Press, Emmaus, PA. 533 pp. Excellent perennial reference. Good pictures, cultural info and design ideas.

Phillips, Roger & Martyn Rix, 1989 **Bulbs** Random House, NY, 255 pp. Nice color photographs of bulbs.

Phillips, Roger & Martyn Rix, 1991, **Perennials: Vols. 1 (Early) and 2 (Late) Perennials** Random House, NY. Excellent color photographs of perennials. Good for ID, but not much else.

Winterrowd, Wayne, 1992 **Annuals for Connoisseurs** Prentice Hall. Nice photographs, descriptions, and cultural info about many common and unusual annuals.

Also useful are the soft-cover series by Burpee, Ortho, Sunset, et.al. that have volumes on Annuals, Perennials, Wildflowers, etc.

**Reader's Digest New Illustrated Guide to Gardening** and **American Horticultural Society Encyclopedia of Gardening** are two excellent general purpose horticultural references.