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Garden Flowers
for South Dakota



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Garden Flowers for South Dakota

By L. L. DAVIS,

Acting Head Department of Horticulture and Forestry

Foreword

Each year flowers become more important to South Dakota people. New household conveniences permit many more people to spend additional time in the garden enabling us to enjoy many old flower varieties and to try the new varieties as they are introduced.

The author wishes to acknowledge the valuable assistance given by L. E. Tupper, graduate student in the Department of Horticulture at South Dakota State College.

SELECTION OF GARDEN FLOWERS

Garden flowers are grown for cut flowers and for landscape effects. Many people prefer to have the flowers for cutting in a separate garden which is laid out in rows similar to a vegetable garden. The cut flower garden is more convenient for cultivation and for securing the blossoms for bouquets. Annuals are used extensively because they offer pleasing variety, bloom all summer, are relatively cheap, while perennials do not need to be replaced every year and include many of our old favorites.

There is almost an unlimited number of ways in which flowers can be used for a landscape effect. The gardener generally makes his first plantings around the foundation of the house. This foundation planting usually consists of shrubs but a greater variety is obtained by the addition of garden flowers. Perennials are the most satisfactory group to use but annuals are needed to give color after the perennials have ceased flowering. There is an excellent opportunity to use spring flowering bulbs as squill, grape hyacinth, tulip, etc. among this shrubbery.

No matter how small the yard, there is an opportunity to use a flower border. If this border is very narrow it may be desirable to use only perennials and annuals, but good landscape effects are always obtained by placing the flowering materials in front of a background of shrubbery. Even though the border is small it is possible to have a continuous display of flowers throughout the growing season by the proper selection of annuals and perennials.

Why break up an open expanse of good lawn with flower beds? Nature does not make such a mistake. Isn't it better to confine the beds to the borders of the lawn, if we want an informal or naturalistic type of garden?

Before the flower garden is planted it should be planned to obtain the maximum artistic effect and value. With pencil, paper and ruler make a rough sketch of the area to be planted. Draw the plan to some convenient scale such as making one inch equivalent to two feet of garden. Plan your garden on paper; locate the plants to be used, the number of each variety, and allow for the proper

distances between them. Consider the flower colors and obtain artistic color combinations such as blue delphinium and orange flare cosmos or delphinium and coreopsis. Arrange to have flowers in bloom in all parts of the garden throughout the growing season. This does not mean that the selection must include so many different kinds that the garden appears to be a collection of botanical specimens. There does not need to be a continuous display of flowers over all parts of the garden at any one time but continuity of points of interest in the garden is important.

Varieties of flowers should be selected according to the soil, the light requirements of the plants, the size of the area and the drainage. In a border planting that is to be viewed from only one side plan to use the taller growing varieties in the background with the low growing plants in front. In this way all varieties will be displayed effectively. In beds that are to be viewed from all sides it is necessary to plant the taller materials in the center and gradually work out with the smaller varieties. An edging of some dwarf plants such as alyssum will merge the flower border or bed more or less into the lawn area.

CLASSIFICATION

Annuals are botanically classified as those plants which grow from seed, produce flowers and seed and die in the same growing season. The gardener also classifies annuals in respect to their relative hardiness; as hardy annuals, those that will stand a slight frost; and tender annuals, those that are killed by the slightest frost. The group of annuals includes cosmos, zinnia, caliopis, calendula, nasturium etc., but for a more complete list turn to the chart of annuals on page 13. Annuals must be planted every year. Some reseed themselves such as portulacas, but others must be sown every year. They add variety, can be changed every year and make for continuous bloom in the flower garden.

Biennials are those plants that flower only or mostly the second year after planting the seed and then die. The hollyhock, sweet william, canterbury bell and foxglove are the most commonly grown biennials. A new planting of this group should be made every year to secure flowering plants every season. Some biennials, as hollyhocks, reseed themselves each fall, produce a small plant the same fall and flower the following year.

Perennial plants are those that live year after year. The gardener commonly uses the term perennial for the phrase "herbaceous perennial" which includes those plants whose tops die back at frost to a fleshy rootstock, bulb or tuber that lives over the winter. The tops of the woody perennials, in contrast to the herbaceous perennials, do not die back at frost.

Although many of the woody perennials such as lilacs and spireas are grown for the beauty of their blooms, it is the herbaceous perennials that are usually considered in a discussion of garden flowers. Some of the common herbaceous perennials are the peony, iris, delphinium, aquilegia or columbine and phlox.

Bulbs and tubers that are stored indoors over winter to keep them from freezing are tender perennials. Dahlias, gladiolus and tuberose belong to this group.

SOILS AND FERTILIZERS

Garden soils range from the heavy sands to stiff clay soils. Although plants will not grow in pure sand alone, the gardener is not so much concerned with the type of soil as with its fertility and structure.

Suitable garden soils should be of such structure as to retain moisture, provide for aeration and drainage, permit the transfer of heat and allow for easy root penetration. The addition of organic matter will increase the water holding ability of the soil. Poorly drained soils cut down the aeration and allow for an accumulation of toxic substances. If the garden soil is poorly drained it is essential that some provision for draining the area be made when the soil is prepared. Sometimes this is accomplished by removing the top soil to a depth of two or

three feet and refilling, first with a porous subsoil and then with a rich topsoil. Sandy soils conduct heat readily and warm up much sooner in the spring than peaty or dark clay soils. For early spring flowers, sandy soils are desirable but clay soils are best for plants that are subject to spring frost.

A thorough preparation of the soil is essential. The soil should be prepared to a considerable depth and this is especially true for perennials which are to remain in one place for several years. Deep preparation provides easier root penetration, better aeration and the retention of more moisture.

Most garden soils that have been cultivated for some time are improved by the addition of a fertilizer. Barnyard manure may be applied at the rate of 400 to 500 pounds per 1,000 square feet. A light application of well rotted manure applied every year is better than a heavy application every second or third year. Too heavy applications of manure in semi-arid regions will cause gardens to "burn out" quickly during dry weather. More straw manure may be used on heavy soils than on light soils. Unrotted manure may contain weed seeds. Poultry, pigeon and sheep manures should be used sparingly as they may burn the plants if free of litter.

Some gardeners will not be able to secure barnyard manure but they may use artificially made manure. A compost is made by piling alternate layers of leaves, lawn clippings or weeds from the garden with soil and soaking the pile with water. Sods and manures are also used in making the compost. The compost pile should be turned two or three times before it is ready for use. Such a compost started in the fall will be ready to spread on the soil by spring. Decomposition will be hastened by adding 60 pounds ammonium sulphate and 30 to 40 pounds phosphate per ton of organic matter.

Many garden soils are deficient in humus or organic matter. This organic matter can be added to the soil by the application of barnyard manure, rotted straw or decomposed plant materials such as leaves, lawn clippings or weeds. The proper amount of humus in the soil aids drainage in clay soils and increases the water holding capacity of sandy soils.

Such materials as lime and coal and wood ashes are beneficial as correctives to loosen the soil but they have little value as fertilizers.

SEEDAGE

Annuals are started from seeds which are sown in the spring. Except for certain annuals which do not transplant readily, it is better to sow the seed in some container in the house or in a coldframe from the middle to the last of March. Hardy annuals may be sown directly in the open ground during the latter part of April but the tender varieties should not be sown outdoors until after May 15 or until all danger of frost is over. This late planting necessarily means late flowers.

Perennials may be started from seed. The seed is sown in a coldframe in April or in the open ground after May 15. Plants grown from seed sown in the spring will not ordinarily flower the same season. Seeds of perennials may be sown in a coldframe in August or September and the plants transferred to their permanent locations in the spring. Most perennials will bloom the following summer after fall planting.

Much of the success in growing plants depends on the seed. Seed should be secured from a reliable firm and the bargain collections so often offered should be scrutinized carefully. Named varieties are easier to include in a good landscape plan than mixed varieties. It is true that the initial cost of the mixed package is less but the quality of the seed and the advantage of solid colors in the named packages more than balances the small extra cost. The experienced gardener realizes the value of groups of flowers of single colors. A bed of scarlet petunias is considerably better than a bed of mixed colors including pink, red, blue and white.

Small boxes or flats can be used when the seeds are started indoors. Cigar boxes or other wooden boxes can be secured from grocery stores. The depth of the box should be from four to five inches and it should permit drainage through the bottom.

Seedage soil should be of a sandy loam texture, not very fertile, containing no humus or manure and free from lumps. The soil should be moist. Form a handful of soil into a ball; if it crumbles upon loosening the fingers it is too dry. If water oozes out between the fingers, it is too wet. The ball should break apart readily. As an aid in controlling damping-off fungus the soil should be sterilized with a solution of one ounce formaldehyde to one quart of water before it is used. The treated soil is kept covered with blankets for two or three days and then aired for two or three days before using.

If the soil is not of medium texture it should be screened. A one-half inch layer of coarse soil is placed in the bottom, and the flat is filled with a medium textured, fine soil. If necessary add sand until the soil is of a sandy texture. The soil is packed firmly at the edges and corners, levelled off and firmed with a trowel or board.

Seed is sown broadcast or in rows $1\frac{1}{2}$ inches apart. A shallow furrow is made with the edge of the trowel and the seed scattered thinly in the row. Very fine seeds, such as petunia, are sown more evenly if mixed with sand. The rows will extend from left to right and labels are placed at the beginning of each row. When only three or four different kinds of seed are sown in a flat they may be broadcast in strips and separated by a small stick.

The seeds are covered to a depth of approximately two times the diameter of the seed with sifted soil made up of 50 percent fine sand. Level and firm with a trowel or flat board. Cover with cheese cloth and thoroughly water with a sprinkling can. Remove the cheese cloth and cover flats with glass and shade with a newspaper.

The glass is removed as soon as the seedlings begin to come up. The flats do not ordinarily need to be watered until after the glass is removed. Water the flats thoroughly when needed; it is best not to water them on cold, cloudy days. Water only when the temperature is rising so that a little ventilation will dry off the plants.

Seedlings should be transplanted in 18 to 21 days after they develop their first true leaves to avoid crowding. They can be transplanted either into flats or into a hotbed. In either case the soil is prepared in the same manner as for seedage. The seedlings are lifted out of the seed beds with some soil by running a knife underneath the roots. Holes to receive the plants can be made with a lead pencil or dibble and are about two inches apart. The soil should be firmed about the

roots, leveled, sprinkled with sand and thoroughly watered. It is desirable to shade the plants with a newspaper for a few days.

Sometimes it is desirable to sow the seeds in coldframes. The coldframe is easily made by constructing a box-like frame on the surface of the ground and covering it with glass or a glass substitute. The preparation of the soil and seedage is essentially the same as in preparing a seed flat. Seeds can be planted in coldframes several weeks before the danger of frost is over. The glass should be removed on warm days but it should be replaced by sundown.

After all danger of frost is over the seedlings are transplanted to the garden. Before transplanting, the plants should be "hardened off," a process which accustoms the plants to conditions similar to those in the garden. To accomplish this the plants should be exposed to outdoor conditions for a few hours each day, gradually lengthening the period, and by withholding the supply of water. Transplanting is done more successfully just before or after a rain or in cloudy, cool weather since evaporation and transpiration are less under these conditions. Otherwise transplanting should be done late in the afternoon. A few larger and older leaves should be removed. Less wilting will occur if earth is left on the roots. Before setting the plants the hole is filled with water. Plants are set a little deeper than they stood in the seedbed. The surface of the soil is left loose and dry to prevent crusting.

Some of the more hardy annuals and perennials can be sown directly outdoors. The soil should be well prepared and leveled. Sow the seed sparingly and in the case of very fine seeds, they may be mixed with sand. Cover the seeds with a thin layer of mixture of sand and soil to a depth of about four times the diameter of the seeds. Firm the soil and water thoroughly. If the soil is covered with burlap until the seedlings begin to appear, it will prevent washing and blowing of the soil. If the seedlings are too thick in the row they should be thinned while they are young.

PROPAGATION OF PERENNIALS

Although most perennials may be started from seed, they are usually obtained from established plants either by division or cuttings. Plants can be divided either in the spring or the fall and no general rule can be made concerning the best time although some plants will do better if divided in the fall and others are benefited by spring planting. In general, plants that bloom in the spring favor fall division while the summer and fall blooming plants grow better when planted in the spring. Peonies and iris should be dug and divided in September. Most perennials will do better if they are divided every three or four years, but here again the gardener must be familiar with the individual differences of the plants. Peonies should not be disturbed until growth is obviously checked.

For most plants, division is easily accomplished by digging up the clump and breaking or cutting it into smaller divisions. All diseased and dead plants should be burned.

At the time of transplanting the gardener should take the opportunity to improve the soil. In case the soil is infested with disease organisms it may be necessary to remove all the old soil and refill the area with fresh, new soil. As a rule the soil will be benefited by the application of a fertilizer and the addition of organic matter.

The divided roots should be reset at about the same depth as the original plant. Be careful not to plant peonies too deep. They should be planted so the eyes are between two and three inches below the surface of the soil, depending on the texture of the soil, while German iris rhizomes are only one-half covered. In a light sandy soil peony eyes should be deeper than in a clay soil. The ground should be thoroughly watered after the perennials are planted.

Some perennials can be grown from stem cuttings or from root cuttings. The cuttings are made during July or August. A stem cutting is made by making the cut with a sharp knife just below a node (joint where the leaves emerge from the stem). Remove the lower leaves and insert the cutting in clear sand. Water the cuttings well and keep them shaded for a few days. When the cuttings are rooted they can be transplanted into their permanent bed or into a coldframe until spring. Examples of plants which may be propagated by stem cuttings are carnation, chrysanthemum, lantana, dahlia, delphinium, penstemon, salvia, sedum, and veronica.

Root cuttings of perennials species of salvia, phlox and campanula are made by cutting the roots into lengths of one or two inches. When scattered over the surface of the soil and covered with a half-inch of fine sand or light loam, they send up new tops. Later these little plants may be transplanted to their permanent location.

New plants can be secured from a nursery or florist. When the plant is propagated by division or cuttings the new plant is ordinarily exactly like the parent plant. Seeds of some varieties produce new plants like the parent while other varieties will not come true from seed.

New gladiolus corms (bulbs) or cormels are produced each year by the old corm. Cormels that are less than three-fourths inch in diameter will not bloom the first year but they will increase in size and bloom after two or three years. Corms should be planted in the spring any time after May 1 and a series of plantings will prolong the blooming season. The last plantings can be made about July 1. Gladiolus corms should be planted three to four inches deep, depending on the size of the corms, four to six inches apart in the row and the rows should be two feet apart.

Dahlias are commonly propagated by dividing the clumps from the previous year. Every healthy tuber in the clump will produce a better plant than if the whole clump was planted undivided providing a portion of the stem where the tuber is attached is included. They can be planted any time after the danger of frost is over. Tubers are planted six to eight inches deep in sandy soil and four to five inches in clay soils. The depth will also depend on the vigor of the tuber. A space of three to four feet should be left between the plants.

Spring flowering bulbs including tulips, narcissus and hyacinths are planted in the fall before the ground freezes. Bulbs are generally planted at a depth equal to two or three times their diameter. They should be set deeper in sandy soils than in clay soils. Well drained soils are essential for optimum blossoms and growth from bulbs. Bulbs can be planted in separate beds or among other perennials or shrubbery. If they are planted in an exposed place they should be given winter protection with material that does not mat down too compact.

Lilies are propagated by bulblets which are formed as offsets of the old bulb,

by bulbils or bulb-like structures formed in the axils of the leaves of some species, or from the bulb scales. Bulblets and bulbils should be planted in a rich sandy soil that is well drained. In a few years the bulbs will be large enough to produce flowers. New bulbs can be obtained by planting the scales of the lily bulb in cold-frames in midsummer and transplanting the bulbs formed in October.

Lilies may be planted either early in the spring or in the fall but fall planting is recommended. The depth of planting depends on the size of the bulb but ordinarily they can be planted three times the depth of their diameter except for Madonna lilies which are planted two to three inches deep. The soil should be well drained and well supplied with nutrients but the bulbs should not be allowed to come in direct contact with the barnyard manure.

CARE OF THE GARDEN

Weeds should not be allowed to grow in the garden. Cultivation not only destroys the weeds but it helps to conserve moisture, aids in the absorption of rainfall, increases soil aeration and improves the general physical condition of the soil. In gardens where hoeing is difficult, the dust mulch secured by cultivation can be replaced by a mulch of rotted straw, lawn clippings or peat moss.

Artificial applications of water are necessary during the summer months to prevent wilting or excessive drying. Thorough applications twice a week are more economical and efficient than frequent sprinklings. Soak the soil to a depth of three or four inches. Light sprinklings every night wet only the surface of the soil, causing the development of shallow roots which are easily burned by the hot sun.

Tall varieties of garden flowers such as delphinium, peonies, dahlia, columbine, maltese cross and anchusa need to be supported to prevent strong winds and storms breaking and blowing them. Wire or wood stakes may be used. Stakes painted green will harmonize with the foliage and be less conspicuous. The height of the stakes will depend on the size of the plants they are to support. Tie the plant loosely to the stake, using raffia or twine. Large clumps such as delphiniums or peonies are sometimes supported by using a wire hoop around the plant. The single stake is usually less conspicuous.

Pruning of annuals and herbaceous perennials consists of removing dead and diseased plants, pinching and disbudding and the removal of wilted flowers and seed pods. If a plant becomes diseased, it is often best to pull the plant and burn it to protect the healthy plants. Dead plants or foliage are unsightly and should be eliminated at once. Chrysanthemums, asters, snapdragons, dahlias and roses will produce large flowers with longer stems if the plants are disbudded. Some flowers such as snapdragons, petunias, and zinnias will produce larger and more flowers if they are pinched back early in the growing season. The removal of wilted flowers and seed pods prolongs the blooming season and improves the attractiveness of the garden.

WINTER PROTECTION

Tender perennials and tender bulbous plants such as dahlias, gladiolus, canna and tuberose should be brought inside for the winter. Dahlia roots should be dug after the tops have been killed by frost. Be careful in digging the clumps so that the necks of the tubers are not injured. Let the tubers dry in the

open air for several hours and then store them in a cool, (40 to 50 degrees), moist cellar. Pack them in sand or sawdust. The object of storage is to keep them plump, free from mold or rots and from early sprouting.

Gladiolus corms should be dug after the first frost. Remove the foliage from the corms and let them dry for about two weeks where they are free from rain and frost. Then clean the corms, remove the old corm and separate the cormels from the corms of flowering size. Store them in a cool, dry cellar during the winter.

Cannas are dug as soon as the foliage has died down. They are stored in a cool cellar. Tuberose should be dug in the fall before a hard frost and stored over winter in a root cellar similar to gladiolus corms.

All but the very hardy perennials should have some winter protection to prevent injury from alternate freezing and thawing. A blanket of snow would provide this protection but since snow is not certain a mulch of straw, leaves, or similar material should be applied after the ground has become slightly frozen. The perennial garden should be well drained during the winter and spring months.

The climbing roses, hybrid perpetual and hybrid tea roses should be laid on the ground after winter sets in and pinned down with wire pins. Cover them with soil to a depth of 3 to 10 inches after freezing weather is sure to continue. Climbing roses should be taken off the trellis, laid flat on the ground and covered with soil. Poor drainage is more harmful to roses than cold weather so do not allow the water from melting snow to flood the roots. The soil should be removed in the spring little by little so that the roses are uncovered by planting time.

ARRANGEMENT OF FLOWERS IN THE HOME

Every flower lover desires flowers in the home to be arranged artistically and to have a prolonged life. Volumes have been written on flower arrangement. Some people have the imagination and natural ability for artistic arrangements but anyone can improve the beauty of his arrangements by following a few simple rules, by continued practice and by observing closely bouquets arranged by others.

The containers for holding the flowers should be selected with care. They may be of pewter, bronze, glass or pottery but simplicity in design, form and shape is desirable. Colors of green, brown, grey or white are usually the most pleasing. The height of the container is determined by the flowers, as pansies, sweet peas, roses and gladiolus require different containers. Pansies fit well into a low glass dish while iris look well in a tall, heavy vase of pottery.

A few simple rules will help to improve the beauty of the arrangement.

1. Choose a vase that harmonizes in size and color with the flowers and select a holder to support the stems. The best holders are made of wire which allow the stems to be arranged at various slants. In tall vases, stems and foliage of lilac, peony, honeysuckle, etc. may be used in the water to aid in supporting the flowers.

2. The beginner should use only one kind of flower or at the most three kinds in one bouquet.

3. A common fault is to use too many flowers. A few flowers, well arranged

and openly spaced is much more effective than many flowers massed together. Avoid crowding. Too many flowers plunged deeply into too small a container destroys the individuality of each specimen. Look to nature for examples; nature displays each blossom.

4. When using two or more colors, allow one color to dominate and give distinction to the arrangement. Also use colors that harmonize such as orange and blue but avoid such combinations as red and purple.

5. For composition and stability it is best to place the darkest and heaviest flowers at the base and use the buds or half opened flowers toward the top.

6. The flowers should appear to grow-out-of the container or to be part of it. This can be accomplished by bringing a few blossoms down over the edge of the container.

7. Place only one flower in the vase at a time, putting it where it will serve the best purpose. If small flowers as sweet peas are used they may be placed in bunches of three or four as if each bunch was a single flower.

8. Avoid using stems of equal lengths. This gives a "cabbage-head" effect. Use taller stems in the middle and back.

9. A general rule for the height of the flowers in a vase arrangement is one and one-half times the height of the container. If a flat bowl is used the height must be governed by the width of the bowl and the flowering material. The height will vary but the finished composition should never look top-heavy or lop-sided.

10. Avoid the use of crossed stems. Stems do not ordinarily cross each other in nature.

11. Ordinarily the flowers' own foliage adds more to the beauty of the arrangement than foreign green materials. This is especially true of roses, but in the case of carnation, calendulas, phlox or other flowers which either do not have much foliage of their own or of which the foliage is coarse and unattractive; other materials may be added such as asparagus ferns or true ferns.

12. When you think the arrangement is completed stand back from it and observe it critically. If you have a feeling it is top-heavy, lop-sided or that any flower is out of place, crowded or hidden, keep rearranging it until it is a masterpiece in your estimation.

Flower lovers are anxious to prolong the life of cut flowers. A few suggestions may be given which will improve the keeping quality of the flowers.

1. Cut the flowers early in the morning or in the evening.

2. Use a sharp knife because a scissors or a dull knife crush and close the water conducting tubes.

3. Plunge the flowers into cold water as soon after picking as possible.

4. Place them in a cool place for several hours before arranging them to allow them to take up as much cold water as possible.

5. Although the cold water treatment is recommended for most flowers, the stems of a few flowers such as poppies, dahlias, heliotrope and mignonette should be dipped in hot (not boiling) water for a few minutes before placing them in cold water. Care must be taken to protect the blossoms from the steam of the hot water.

6. Iris, gladiolus, snapdragons and other long-spiked flowers should be cut when the first few florets open. Asters, calendulas, daisies, marigolds and dah-

lias should not be cut until the flower is fully opened. Some flowers such as roses and peonies may be cut when the buds begin to unfold or later.

7. When arranging the bouquet make a slanting cut on each stem with a sharp knife and remove all the foliage that would be in the water if it is of a soft succulent nature such as calendulas.

8. Keep the bouquet in a cool, humid room. At night it is well to place them in a room where it is 42-50 degrees. Direct sunshine and wind are harmful to cut flowers.

9. Daily care consists of changing the water and adding fresh cold water, cutting off about one-half inch of the stems and removing wilted blossoms. The flowers will keep longer if the stems are cut under water because air cannot rush in instead of water. Always make a slanting cut to expose more surface to water.

10. The additions of certain chemicals such as aspirin, salt, sugar or charcoal to the water has not been proven effective in prolonging the life of cut flowers.

INSECT CONTROL

Our insects can be divided into two types depending on the kind of damage they do. The chewing or biting insects eat the plant parts and the damage done by them is easily visible. Examples of chewing insects are cutworms, grasshoppers and caterpillars. Sucking insects pierce the plant tissue as a mosquito and extract the juices necessary for plant growth. This type includes aphids or plant lice to which we should add red spider although the red spider is not a true insect.

The control measure for insects depends on the type of insect. For chewing insects use a stomach poison, or one that is applied to the surface of the plant and is eaten by the insect when it bites into the plant. Some poisons that can be used are lead arsenate, calcium arsenate, paris green and rotenone.

Since sucking insects do not feed from the surface of the plant a contact insecticide is necessary to control them. Such an insecticide penetrates through the body of the insect and paralyzes it. Contact poisons include nicotine preparations, pyrethrum and rotenone.

Lead arsenate is the most commonly used stomach poison. Mix a half ounce of powdered lead arsenate or three to four tablespoons with one gallon of water. For a dust mix one part of powdered lead arsenate with six to eight parts of filler such as air-slaked lime, cheap flour or fine road dust. Dusts should be applied early in the morning while there is a dew. In the absence of dew the plants should be sprayed with water before dusting them.

Calcium arsenate is better adapted for use as a dust. Mix one part of powdered calcium arsenate with 12 to 15 parts of lime or flour. For a spray use two to three tablespoons of the poison with one gallon of water.

Paris green does not adhere as well as the arsenates, but it is commonly used in poison baits for cutworms. The following formula may be used for a poison bait:

Wheat bran	25 lbs.	Water	3 gal.
Paris green	1 lb.	Molasses	1 qt.

For sucking insects a nicotine sulphate spray is most effective. Mix one or two teaspoonfuls of nicotine extract to one gallon of soapy water. Black Leaf 40 is a commercial preparation containing nicotine.

Pyrethrum is a safe insecticide for man to apply, and is very effective against most sucking insects and some chewing insects. It is obtained from a flower resembling the Painted Daisy, and is the poisonous ingredient in many commercial sprays and dusts.

Rotenone is the killing property in the following commercial insecticides: Derris, Rotecide, Cube and Rotenone and are applied according to the manufacturers directions.

An effective spray for both sucking and chewing insects may be made by adding three teaspoonfuls powdered lead arsenate, one-third bar laundry soap and one teaspoonful nicotine sulphate to one gallon of water. An effective all-round spray for the control of both insects and diseases can be had by adding the above ingredients to one gallon of Bordeaux mixture made in the proportion of one pint commercial Bordeaux to one gallon water.

The symptoms of plant diseases are yellowing of the foliage, wilting, leaf spots, rots, galls, scab and death of the plant. Diseases are generally caused by fungi, by bacteria or by improper growing conditions.

Mildew is one of the most common plant diseases. It can be distinguished by a white powdery growth on the leaves and is prevalent on roses and phlox. Dust the plants with powdered sulphur and eliminate moisture on the foliage as much as possible. The rose insects and fungous diseases can be controlled at the same time by dusting with a mixture of nine part sulphur and one part calcium arsenate.

Rusts are common on hollyhocks, aster, snapdragons, chrysanthemums and carnations. The fungi causing rusts live over winter in the plants so all diseased plants should be removed.

Wilt is common on asters, snapdragons and carnations. Resistant varieties have been developed and should be planted where wilt is common.

Root rots may be found in iris, peonies, larkspur and lilies. It is usually necessary to destroy the diseased plants. Carnations are subject to a stem rot.

Roses are subject to leaf-spot and should be sprayed with Bordeaux.

Damping off is a disease common in seed beds. The soil should be sterilized with a solution of one ounce formaldehyde to one quart of water.

The control of plant diseases is accomplished by removal and destruction of diseased plants, by spraying or dusting with Bordeaux or powdered sulphur, by growing resistant varieties, by using disease free seed, by soil sterilization, and by proper cultural practices.

Bordeaux spray is made by mixing four pounds copper sulphate and four pounds hydrated lime in 50 gallons of water. For small amounts use two ounces of copper sulphate and two ounces of hydrated lime in three gallons of water. Put the copper sulphate in a sack and suspend it so it just dips under the water surface. Mix the lime with water and when the copper sulphate has all diffused into the water add it to the lime solution. Bordeaux may also be bought in a powdered form all ready to mix with water.

We did not intend to give the impression in the following lists of flower varieties that only those mentioned are satisfactory in South Dakota. Rather the lists are to give the reader an idea of the range of colors and a partial list of good varieties.

ANNUALS OR FLOWERS GROWN AS ANNUALS

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
AGERATUM	<i>Ageratum</i>	*Blue Ball	deep blue	8 in.	sun or half shade	tender	July-Sept.
		*Little Danish	white	6 in.	sun or half shade	tender	July-Sept.
ALYSSUM	<i>Alyssum</i>	*Little Gem	white	4 in.	sun	very hardy	July-Sept.
		*Maritimum (sweet Alyssum)	white	8 in.	sun	very hardy	July-Sept.
ASTER	<i>Aster</i>	Giant Crego	mixed	24 in.	sun	half hardy	Aug.-Oct.
		Heart of France	red	20 in.	sun	half hardy	Aug.-Oct.
		California Giant	mixed	36 in.	sun	half hardy	Aug.-Oct.
		Ostrich Plume	mixed	12 in.	sun	half hardy	Aug.-Oct.
		Quilled Pompom	mixed	10 in.	sun	half hardy	Aug.-Oct.
BABYS BREATH	<i>Gypsophila</i>	*Elegans Grani-flora	white	24 in.	sun	hardy	June-Sept.
BACHELOR BUTTON	<i>Centauria</i>		blue rose white	24 in.	sun	very hardy	July-Sept.
BALSAM	<i>Balsam</i>		rose pink white	24 in.	sun	tender	July-Oct.
BLANKET FLOWER	<i>Gaillardia</i>	Lorenzinana rubra	red	18 in.	sun	hardy	June-Sept.
		Indian Chief	bronze	18 in.	sun	hardy	June-Sept.
		Picta aurora	red, brown, yellow	18 in.	sun	hardy	June-Sept.
CALENDULA	<i>Calendula</i>	Orange ball	orange	18-24 in.	sun	half hardy	July-Oct.
		Radio	orange	18-24 in.	sun	half hardy	July-Oct.
		Campfire	orange- scarlet	18-24 in.	sun	half hardy	July-Oct.
		Sunshine	yellow	18-24 in.	sun	half hardy	July-Oct.
CALIFORNIA POPPY	<i>Escholtzia</i>	*Golden West	yellow- orange	12-15 in.	sun	very hardy	June-Sept.
		*Sunlight	lemon	12-15 in.	sun	very hardy	June-Sept.
		*Carmon King	deep- carmon	12-15 in.	sun	very hardy	June-Sept.
CALLIOPSIS	<i>Coreopsis</i>	*Drummondii	golden	20 in.	sun	tender	June-Sept.
		*Mixed	yellow brown orange	20 in.	sun	tender	June-Sept.
CANDY-TUFT	<i>Iberis</i>	*Giant Hyacinth	mixed	12 in.	sun	hardy	June-Sept.
		*Little Prince	white	6 in.	sun	hardy	June-Sept.
CANTERBURY BELL	<i>Campanula</i>	*Mixed	pink, white, blue	18 in.	half shade	half hardy	Aug.-Sept.

* Plants Suitable for Rock Gardens.

ANNUALS OR FLOWERS GROWN AS ANNUALS (Continued)

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
CARNATION	<i>Dianthus</i>	*Giant marguerite	white pink crimson	12 in.	sun	hardy	July-Sept.
CORN-FLOWER	<i>Centaurea</i>		blue rose white	24 in.	sun	very hardy	July-Sept.
COSMOS	<i>Cosmos</i>	Sensation	white pink crimson	4-6 ft.	sun	very hardy	July-Oct.
		Orange Flare	orange	4 ft.	sun	very hardy	July-Oct.
COXCOMB	<i>Celosia</i>	Spiked coxcomb	rose white	3 ft.	sun	tender	July-Sept.
		Feathered coxcomb	crimson & yellow	3 ft.	sun	hardy	July-Oct.
		Flame of Fire	scarlet	18 in.	sun	tender	July-Sept.
DUSTY MILLER	<i>Centaurea</i>	*Candidissima	yellow	12 in.	sun	very hardy	July-Sept.
		*Gymnocarpa	lavender	18 in.	sun	very hardy	July-Sept.
FORGET-ME-NOT (Summer)	<i>Anchusa</i>	Blue Bird Capensis	blue gentian-blue	18 in. 24 in.	sun sun	hardy hardy	July-Sept. July-Sept.
FOUR O'CLOCK	<i>Mirabilis</i>	Marvel of Peru	mixed	24 in.	sun	half hardy	June-Sept.
HELIO-TROPE	<i>Heliotropium</i>	Black King	deep-purple	24 in.	sun	hardy	July-Sept.
		Mme. Burant	violet-blue	18 in.	sun	hardy	July-Sept.
		Mammoth Hybrids	white blue lavender	18 in.	sun	hardy	July-Sept.
LANTANA	<i>Lantana</i>	*Dwarf Hybrids	yellow orange red	18 in.	sun	half hardy	July-Oct.
LARKSPUR	<i>Delphinium</i>	La France	salmon	36 in.	sun	hardy	July-Sept.
		White Spire	white	36 in.	sun	hardy	July-Sept.
		Blue Spire	dark blue	36 in.	sun	hardy	July-Sept.
		Daintiness	lavender	36 in.	sun	hardy	July-Sept.
LOBELIA	<i>Lobelia</i>	*Bedding Queen	purplish-violet	4 in.	sun or half shade	hardy	July-Sept.
		*White Gem	white	4 in.	sun or half shade	hardy	July-Sept.
MARIGOLD	<i>Tagetes</i>	*Harmony	golden & maroon	12 in.	sun	hardy	June-Sept.
	<i>Dimorphotheca</i>	Yellow Supreme	yellow	36 in.	sun	hardy	June-Sept.
	<i>Dimorphotheca</i>	Orange All-double	orange	36 in.	sun	hardy	June-Sept.
	<i>Dimorphotheca</i>	Crown of Gold	yellow	36 in.	sun	hardy	June-Sept.

* Plants Suitable for Rock Gardens.

ANNUALS OR FLOWERS GROWN AS ANNUALS (Continued)

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
MARIGOLD (Con't.)	<i>Dimorphotheca</i>	Guinea Gold	orange	36 in.	sun	hardy	June-Sept.
MIGNONETTE	<i>Reseda</i>	Machet Goliath	red golden	15 in. 15 in.	sun sun	hardy hardy	July-Sept. July-Sept.
MORNING GLORY	<i>Convolvulus</i>	Heavenly Blue Brazilian Mixed	blue rose blue, rose, white	15 ft. 15 ft. 15 ft.	sun sun sun	hardy hardy	July-Oct. July-Oct.
NASTURTIUM	<i>Tropaeolum</i>	*Dwarf Double Gem *Golden Globe *Scarlet Globe Climbing *Dunnett's Orange *Midnight	mixed yellow scarlet mixed orange mahogany	12 in. 12 in. 12 in. 48 in. 12 in. 12 in.	sun sun sun sun sun sun	half hardy half hardy half hardy half hardy half hardy half hardy	July-Oct. July-Oct. July-Oct. July-Oct. July-Oct. July-Oct.
PAINTED TONGUE	<i>Salpiglossis</i>	Emporer	mixed	30 in.	sun	hardy	July-Oct.
PANSY	<i>Viola</i>	Swiss Giant Oregon Giants *Swiss Alpine-glow *Swiss blue Ruffled Master-piece	mixed mixed red blue mixed	8 in. 8 in. 8 in. 8 in. 8 in.	half shade half shade half shade half shade half shade	half hardy half hardy half hardy half hardy half hardy	July-Oct. July-Oct. July-Oct. July-Oct. July-Oct.
PETUNIA	<i>Petunia</i>	*Scarlet Flare *Burgundy *Salmon Supreme *Purple Beauty *Apple Blossom *Balcony	red red pink blue pink mixed	12 in. 12 in. 12 in. 12 in. 12 in. 12 in.	sun sun sun sun sun sun	hardy hardy hardy hardy hardy hardy	June-Oct. June-Oct. June-Oct. June-Oct. June-Oct. June-Oct.
PHLOX	<i>Phlox</i>	Brilliant Lilac Flaming Velvet Carnea *Cinnabar *Isabellina *Fireball	rose lilac red pink scarlet yellow crimson	15 in. 15 in. 15 in. 15 in. 6 in. 6 in. 6 in.	sun sun sun sun sun sun sun	hardy hardy hardy hardy hardy hardy hardy	July-Oct. July-Oct. July-Oct. July-Oct. July-Oct. July-Oct. July-Oct.
PINCUSHION FLOWER	<i>Scabiosa</i>	Shasta Azure Fairy Peachblossom Black Prince Loveliness	white blue pink black salmon	30 in. 30 in. 30 in. 30 in. 30 in.	sun sun sun sun sun	hardy hardy hardy hardy hardy	July-Sept. July-Sept. July-Sept. July-Sept. July-Sept.
PINKS	<i>Dianthus</i>	*Snowball *Fireball *Chinensis, double *Laciniatus splendens	white red mixed mixed crimson	12 in. 12 in. 12 in. 12 in. 12 in.	sun sun sun sun sun	hardy hardy hardy hardy hardy	July-Sept. July-Sept. July-Sept. July-Sept. July-Sept.

* Plants Suitable for Rock Gardens.

ANNUALS OR FLOWERS GROWN AS ANNUALS (Continued)

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
PINKS (Con't.)	<i>Dianthus</i>	*Sweet Wivelsfield	mixed	12 in.	sun	hardy	July-Sept.
POPPY, SHIRLEY	<i>Papaver</i>	Carnation flowered	mixed	36 in.	sun	hardy	July-Sept.
		Peony flowered	mixed	36 in.	sun	hardy	July-Sept.
		Tulip (Glaucum)	mixed	18 in.	sun	hardy	July-Sept.
ROSE MOSS	<i>Portulaca</i>	*Large flowering	mixed	6 in.	sun	very hardy	June-Sept.
SALVIA	<i>Salvia</i>	Spendens	scarlet	30 in.	sun	hardy	July-Sept.
		Alba	white	30 in.	sun	hardy	July-Sept.
		America, Globe of Fire	scarlet	18 in.	sun	hardy	July-Sept.
		Indian Purple	purple	18 in.	sun	hardy	July-Sept.
SNAP- DRAGON	<i>Antirrhinum</i>	Afterglow	bronze	18 in.	sun	hardy	July-Sept.
		Eclipse	red	18 in.	sun	hardy	July-Sept.
		Ceylon Court	yellow	18 in.	sun	hardy	July-Sept.
		Cheviot Maid	pink	18 in.	sun	hardy	July-Sept.
		Purity	white	18 in.	sun	hardy	July-Sept.
		Volcano	orange	18 in.	sun	hardy	July-Sept.
			red	18 in.	sun	hardy	July-Sept.
		Apple Blossom	pink	18 in.	sun	hardy	July-Sept.
		Sun Tan	yellow	18 in.	sun	hardy	July-Sept.
		*Amber Gem	yellow	8 in.	sun	hardy	July-Sept.
		*Pinkie	pink	8 in.	sun	hardy	July-Sept.
STATICE	<i>Statice</i>	*Puberula	violet	4-6 in.	sun	hardy	July-Sept.
		Bonduelli					
		superba	yellow	36 in.	sun	hardy	July-Sept.
		Russian	rose	30 in.	sun	hardy	July-Sept.
		*Sinensis	white	15-18 in.	sun	hardy	July-Sept.
STRAW- FLOWER Everlasting	<i>Helichrysum</i>	Fire ball	crimson	30 in.	sun	hardy	July-Oct.
		Golden ball	yellow	30 in.	sun	hardy	July-Oct.
		Rose Queen	rose	30 in.	sun	hardy	July-Oct.
		Silvery Pink	pink	30 in.	sun	hardy	July-Oct.
		Snowball	white	30 in.	sun	hardy	July-Oct.
SUN- FLOWER	<i>Helianthus</i>	Double Crysanthum flowered	yellow	7 ft.	sun	hardy	July-Sept.
		Gaillardia flowered	red	5-6 ft.	sun	hardy	July-Sept.
SWEET PEA	<i>Lathyrus</i>	Apollo	salmon	4 ft.	sun	hardy	June-Sept.
		Eileen	rose	4 ft.	sun	hardy	June-Sept.
		Mrs. Hoover	blue	4 ft.	sun	hardy	June-Sept.
		Valencia	orange	4 ft.	sun	hardy	June-Sept.
		Vogue	lilac	4 ft.	sun	hardy	June-Sept.
		Snowstorm					
		improved	white	4 ft.	sun	hardy	June-Sept.
		Fluffy Ruffles	rose	4 ft.	sun	hardy	June-Sept.
		King White					
		improved	white	4 ft.	sun	hardy	June-Sept.

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ANNUALS OR FLOWERS GROWN AS ANNUALS (Continued)

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
SWEET PEA (Con't.)	<i>Lathyrus</i>	Magnet	cream	4 ft.	sun	hardy	June-Sept.
		Fiery Cross	scarlet	4 ft.	sun	hardy	June-Sept.
		Brilliant Rose	rose	4 ft.	sun	hardy	June-Sept.
		Powerscourt	lavender	4 ft.	sun	hardy	June-Sept.
		Blue Bird	blue	4 ft.	sun	hardy	June-Sept.
SWEET SULTAN	<i>Centaurea</i>	Amaranth	red	30 in.	sun	half hardy	July-Sept.
		Suaevolens	yellow	30 in.	sun	half hardy	July-Sept.
		Mixed	white	30 in.	sun	half hardy	July-Sept.
			rose crimson lilac				
TORENIA (Wishbone flower)	<i>Torenia</i>	Fournieri	blue	12 in.	half shade	hardy	July-Sept.
		White Wings	ivory	12 in.	half shade	hardy	July-Sept.
VERBENA	<i>Verbena</i>	*Etna	red	12 in.	sun	hardy	July-Oct.
		*Rosea Stellata	rose	12 in.	sun	hardy	July-Oct.
		*Lavender Glory	lavender	12 in.	sun	hardy	July-Oct.
		*Helen Willmott	salmon	12 in.	sun	hardy	July-Oct.
		*Mayflower	pink	12 in.	sun	hardy	July-Oct.
		*Fireball	scarlet	6 in.	sun	hardy	July-Oct.
		*Snowdrift	white	6 in.	sun	hardy	July-Oct.
		*Carmine Ball	carmine	6 in.	sun	hardy	July-Oct.
ZINNIA	<i>Zinnia</i>	Crown of Gold	yellow	30 in.	sun	half hardy	July-Sept.
		Dream	lavender	30 in.	sun	half hardy	July-Sept.
		Meteor	red	30 in.	sun	half hardy	July-Sept.
		Polar Bear	white	30 in.	sun	half hardy	July-Sept.
		Grenadier	yellow	30 in.	sun	half hardy	July-Sept.
		Cerise Queen	rose	36 in.	sun	half hardy	July-Sept.
		Orange King	orange	36 in.	sun	half hardy	July-Sept.
		Fantasy (Star Dust)	yellow	30 in.	sun	half hardy	July-Sept.
		*Pompom (Lilliput)	mixed	15 in.	sun	half hardy	July-Sept.
		Scabiosa flowered	mixed	30 in.	sun	half hardy	July-Sept.

PERENNIALS

Common Name	Generic Name	Species or Varieties	Color	Height	Exposure	Hardiness	Season
ALYSSUM	<i>Alyssum</i>	*Saxatile compactum	golden	9 in.	sun	half hardy	May-June
		*Saxatile sulphureum	yellow	12-16 in.	sun	half hardy	May-June
ASTERS	<i>Aster</i>	*Alpinus Goliath	white	6-10 in.	sun	hardy	May-June
		*Farrei	blue	12 in.	sun	hardy	June-July
		Climax	violet	5 ft.	sun	hardy	Sept.
		Red Rover	lavender	3-4 ft.	sun	hardy	Sept.
		Snowdrift	rose	3 ft.	sun	hardy	Sept.

* Plants Suitable for Rock Gardens.

PERENNIALS (Continued)

Common Name	Generic Name	Species or Varieties	Color	Height	Exposure	Hardiness	Season
BABYS-BREATH	<i>Gypsophila</i>	Paniculata	white	2-3 ft.	sun	half hardy	June-Aug.
BALLOON FLOWER	<i>Platycodon</i>	Grandiflorum Album	blue white	2-3 ft. 2-3 ft.	sun sun	hardy hardy	June-Sept. June-Sept.
BEARDED TONGUE	<i>Pentstemon</i>	Digitalis Pubescens Barbatus	white rose scarlet	2 ft. 2 ft. 3½ ft.	sun sun sun	hardy hardy hardy	June-July June-July July-Aug.
BLANKET FLOWER	<i>Gaillardia</i>	Bremen Dazzler Tangerine Burgandy	scarlet yellow orange red	2 ft. 2 ft. 2 ft. 2 ft.	sun sun sun sun	hardy hardy hardy hardy	June-Oct. June-Oct. June-Oct. June-Oct.
BLEEDING HEART	<i>Dicentra</i>	*Spectabilis	pink	24 in.	shade	hardy	May
BUTTERCUP	<i>Ranunculus</i>	*Acris Fl. Pl.	yellow	24 in.	sun	hardy	May-June
BUTTERFLY BUSH	<i>Buddleia</i>	Ile de France	lilac	3-6 ft.	sun	tender	July-Sept.
CANTERBURY BELL	<i>Campanula</i>	Corpatica	blue	9 in.	half shade	half hardy	June-Aug.
COLUMBINE	<i>Aquilegia</i>	*Coerulea	violet	24 in.	sun or half shade	hardy	May-July
		*Longissima	yellow	24 in.	sun or half shade	hardy	May-July
		*Crimson Star	crimson	24 in.	sun or half shade	hardy	May-July
		*Edelweiss	white	24 in.	sun or half shade	hardy	May-July
		*Hybrids	mixed	24 in.	sun or half shade	hardy	May-July
		*Canadensis	scarlet- orange	24 in.	sun or half shade	hardy	May-July
COREOPSIS	<i>Coreopsis</i>	*Diadem (Grandiflora auriculata superba)	yellow & maroon	2 ft.	sun	hardy	June-Aug.
		*Double flowering	yellow	2 ft.	sun	hardy	June-Aug.
		*Mayfield Giant	golden	2 ft.	sun	hardy	June-Aug.
GAS PLANT	<i>Dictamnus</i>	Fraxinella Albus	pink white	3 ft. 3 ft.	semi shade semi shade	hardy hardy	May-June May-June
GEUM	<i>Geum</i>	Lady Stratheden Mrs. Bradshaw	yellow scarlet	20 in. 20 in.	sun sun	tender tender	June-Sept. June-Sept.
GOLDEN MAR-GUERITE	<i>Anthemis</i>	Kelwayia	yellow	2 ft.	sun	hardy	July-Oct.
		Tinctoria	yellow	2 ft.	sun	hardy	July-Oct.

* Plants Suitable for Rock Gardens.

PERENNIALS (Continued)

Common Name	Generic Name	Species or Varieties	Color	Height	Exposure	Hardiness	Season
ICELAND POPPY	<i>Papaver</i>	*Coonara	pink	12 in.	half shade	hardy	July-Sept.
		*Gartref	shades	12 in.	half shade	hardy	July-Sept.
		*El Monte	orange	12 in.	half shade	hardy	July-Sept.
IRIS, GERMAN	<i>Iris germanica</i>	Gold Imperial	yellow	33 in.	sun	hardy	May-June
		Morning Splendor	lavender	40 in.	sun	hardy	May-June
		Rameses	rose	36 in.	sun	hardy	May-June
		Susan Bliss	rose	42 in.	sun	hardy	May-June
		Indian Chief	red	40 in.	sun	hardy	May-June
IRIS, JAPANESE	<i>Iris laevigata</i> var. <i>Kaempferi</i>	Gold bound	white and gold	40 in.	sun	tender	June-July
		Mahogany Momigi-No-Taki	red crimson	40 in.	sun	tender	June-July
IRIS, DWARF	<i>Iris Pumilla</i>	*Cristata	blue	8 in.	sun	hardy	April-May
IRIS, SIBERIAN	<i>Iris Siberica</i>	*Emperor	violet	48 in.	sun	hardy	May-June
		*Orientalis	purple	24 in.	sun	hardy	May-June
		*Perry's blue	blue	48 in.	sun	hardy	May-June
IRIS, SIBERIAN	<i>Iris dichotama</i>	Shilka	violet	48 in.	sun	hardy	June-July
LARKSPUR	<i>Delphinium</i>	Belladonna	light blue	2 ft.	sun	hardy	June-July
		Bellamosum	dark blue	3 ft.	sun	hardy	June-July
		Blue Grotto	indigo	3 ft.	sun	hardy	June-July
		Wrexham	mixed	6 ft.	sun	hardy	June-July
		Hybrids	mixed	3-6 ft.	sun	hardy	June-July
LEMON OR DAY LILY	<i>Hemerocallis</i>	*Bay State	yellow	4 ft.	sun	hardy	June-July
		*Calypto	lemon	3 ft.	sun	hardy	July
		*Ophier	golden	4 ft.	sun	hardy	July-Aug.
		*Aureole	orange	3 ft.	sun	hardy	May-June
LILY OF THE VALLEY	<i>Convallaria</i>	*Majulus	white pink	12 in.	shade	hardy	May
LOBELIA	<i>Lobelia</i>	Cardinalis	scarlet	24 in.	sun or half shade	hardy	July-Oct.
LUPINE	<i>Lupinus</i>	Chocolate Soldier	yellow	3 ft.	sun	half hardy	June-July
		Blue	blue	3 ft.	sun	half hardy	June-July
		Lavender Queen	lavender	3 ft.	sun	half hardy	June-July
		Sunshine	yellow	3 ft.	sun	half hardy	June-July
		Roseus	rose	3 ft.	sun	half hardy	June-July
		Hybrids	mixed	3 ft.	sun	half hardy	June-July
		Albus	white	3 ft.	sun	half hardy	June-July
MEADOW RUE	<i>Thalictrum</i>	*Adiantifolium	white	18 in.	sun or half shade	hardy	June-July

* Plants Suitable for Rock Gardens.

PERENNIALS (Continued)

Common Name	Generic Name	Species or Varieties	Color	Height	Exposure	Hardiness	Season
MEADOW RUE (Con't.)	<i>Thalictrum</i>	<i>Aquilegifolium</i>	purple	36 in.	sun or half shade	hardy	June-July
		<i>Dipterocarpum</i>	purple	36 in.	sun or half shade	hardy	Aug.-Sept.
MILFOIL or YARROW	<i>Achillea</i>	The Pearl	white	24 in.	sun	hardy	June-July
		* <i>Rosea</i>	pink	12 in.	sun	hardy	June-July
ORIENTAL POPPY	<i>Papaver</i>	Perry's white	white	3 ft.	sun	hardy	May-June
		Salmon Queen	salmon	3 ft.	sun	hardy	May-June
		The Feltham	scarlet, crimson & orange	3 ft.	sun	hardy	May-June
OXEYE DAISY	<i>Chrysanthemum</i>	Early Flowering Chinese	mixed	24 in.	sun	half hardy	Sept.-Oct.
		* <i>Mawii</i>	pink	12 in.	sun	half hardy	Sept.-Oct.
PAINTED DAISY or PYRETHRUM	<i>Chrysanthemum</i>	<i>Grandiflorum</i>	pink	24 in.	sun	hardy	June
		<i>Roseum</i>	rose	24 in.	sun	hardy	June
PEONY	<i>Paeonia</i>	<i>Festiva Maxima</i>	white	36 in.	sun	hardy	May-June
		<i>Claire Dubois</i>	pink	36 in.	sun	hardy	May-June
		<i>Felix Crousse</i>	red	36 in.	sun	hardy	May-June
		<i>Karl Rosenfield</i>	red	36 in.	sun	hardy	May-June
		<i>Avalanche</i>	white	36 in.	sun	hardy	May-June
		<i>Eugenie Verdier</i>	pink	36 in.	sun	hardy	May-June
		<i>Primevere</i>	yellow	36 in.	sun	hardy	May-June
PERENNIAL FLAX	<i>Linum</i>	<i>Perenne Blue</i>	blue	2 ft.	sun	hardy	May-Aug.
		* <i>Compactum nanum</i>	yellow	1 ft.	sun	hardy	June-Aug.
PHLOX	<i>Phlox</i>	<i>Augusta</i>	red	30 in.	sun	hardy	Aug.-Sept.
		<i>Border Queen</i>	pink	20 in.	sun	hardy	Aug.-Sept.
		<i>Enchantress</i>	pink	24 in.	sun	hardy	Aug.-Sept.
		<i>Leo Schlageter</i>	scarlet	20 in.	sun	hardy	Aug.-Sept.
		<i>Miss Lingard</i>	white	30 in.	sun	hardy	Aug.-Sept.
		* <i>Subulata alba</i>	white	8 in.	sun	hardy	Aug.-Sept.
		* <i>Subulata lilacena</i>	lilac	8 in.	sun	hardy	Aug.-Sept.
		* <i>Subulata rosea</i>	rose	8 in.	sun	hardy	Aug.-Sept.
PINKS	<i>Dianthus</i>	* <i>Allwoodii</i>	mixed	12 in.	sun	half hardy	May-Sept.
		* <i>Allwoodii alpinus</i>	mixed	6 in.	sun	half hardy	July-Aug.
		* <i>Caesius splendens</i>	pink	10 in.	sun	half hardy	May-June
		* <i>Crimson Bedder</i>	crimson	12 in.	sun	half hardy	May-Sept.
		<i>Latifolia</i>	blue	24 in.	sun	half hardy	July-Aug.
SEA LAVENDER	<i>Statice</i>	<i>Latifolia</i>	blue	24 in.	sun	half hardy	July-Aug.
SEDUM	<i>Sedum</i>	<i>Spectabile</i>	pink	18 in.	sun	half hardy	Sept.-Oct.
		* <i>Acre</i>	yellow	3 in.	sun	half hardy	June
		* <i>Spurium</i>	pink	4 in.	sun	half hardy	July-Aug.
SHASTA DAISY	<i>Chrysanthemum</i>	<i>Alaska maximum</i>	white	24 in.	sun	half hardy	June-July

* *Plants Suitable for Rock Gardens.*

PERENNIALS (Continued)

Common Name	Generic Name	Species or Varieties	Color	Height	Exposure	Hardiness	Season
SNOW-IN-SUMMER	<i>Cerastium</i>	*Tomentosum	white	4 in.	sun	hardy	June-July
SPEED-WELL	<i>Veronica</i>	*Amethystina	blue	12 in.	sun	half hardy	June-July
		Longifolia	blue	24 in.	sun	half hardy	July-Aug.
		Spicata	blue	24 in.	sun	half hardy	July-Aug.
SWEET ROCKET	<i>Hesperis</i>	Matronalis	purple	30 in.	sun	hardy	June-July
TUFTED PANSY	<i>Viola cornuta</i>	Admiration	blue	6 in.	semi shade	half hardy	June-Sept.
		Jersey Gem	violet	6 in.	semi shade	half hardy	June-Sept.
		Lutea Splendens	yellow	6 in.	semi shade	half hardy	June-Sept.
		White Perfection	white	6 in.	semi shade	half hardy	June-Sept.
WIND-FLOWER	<i>Anemone</i>	*Coronaria St. Brigid's	mixed	12 in.	sun	tender	May-June
		*Pusatilla rubra	red	9 in.	shade	tender	April-May
		*Sylvestris	white	12 in.	shade	tender	May-June

BIENNIALS

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
CANTERBURY BELL	<i>Campanula</i>	*Calycanthema (Cup and Saucer)	mixed	24 in.	sun	half hardy	June-Aug.
		*Canterbury Bell	mixed	24 in.	sun	half hardy	June-Aug.
FOXGLOVE	<i>Digitalis</i>	Isabellina	yellow	5 ft.	sun or half shade	tender	June-July
		Shirley hybrids	mixed	6 ft.	sun or half shade	tender	June-July
HOLLY-HOCK	<i>Althaea</i>	Lilac Beauty	lilac	5-6 ft.	sun	hardy	June-Aug.
		Newport Pink	pink	5-6 ft.	sun	hardy	June-Aug.
		Queen of Sheba	buff	5-6 ft.	sun	hardy	June-Aug.
		Alameda pink	pink	5-6 ft.	sun	hardy	June-Aug.
		Allegheny	mixed	5-6 ft.	sun	hardy	June-Aug.
SWEET WILLIAM	<i>Dianthus</i>	Copper red	red	24 in.	sun	half hardy	May-June
		Purple Beauty	purple	24 in.	sun	half hardy	May-June
		Pink Beauty	pink	24 in.	sun	half hardy	May-June
		Scarlet Beauty	scarlet	24 in.	sun	half hardy	May-June
		Giant White	white	24 in.	sun	half hardy	May-June
		Nigrescens	black	24 in.	sun	half hardy	May-June

BULBS AND ROOTS

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
CANNA	<i>Canna</i>	Eureka	white	4½ ft.	sun	tender	June-Sept.
		Hungaria	rose	3½ ft.	sun	tender	June-Sept.

* Plants Suitable for Rock Gardens.

BULBS AND ROOTS (Continued)

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season
CANNA (Con't.)	<i>Canna</i>	King Humbert	orange	4½ ft.	sun	tender	June-Sept.
		Mrs. Alfred Conrad	salmon	4 ft.	sun	tender	June-Sept.
		Ambassador	red	5 ft.	sun	tender	June-Sept.
		The President	scarlet	4 ft.	sun	tender	June-Sept.
		Yellow King Humbert	yellow	4 ft.	sun	tender	June-Sept.
CROCUS	<i>Crocus</i>	*Amethyst	lavender	6 in.	sun	half hardy	April-May
		*Snowstorm	white	6 in.	sun	half hardy	April-May
		*Excelsior	lilac	6 in.	sun	half hardy	April-May
		*Grand yellow	yellow	6 in.	sun	half hardy	April-May
DAHLIA	<i>Dahlia</i>	Jersey Beauty	pink	36 in.	sun	half hardy	July-Oct.
		Marshall's Beauty	pink	36 in.	sun	half hardy	July-Oct.
		Kentucky red	red	36 in.	sun	half hardy	July-Oct.
		Franklin D. Roosevelt	red	36 in.	sun	half hardy	July-Oct.
		Kentucky	orange	36 in.	sun	half hardy	July-Oct.
		Honore Bright	orange	36 in.	sun	half hardy	July-Oct.
		Jean Kerr	white	36 in.	sun	half hardy	July-Oct.
		White King	white	36 in.	sun	half hardy	July-Oct.
		Avalon	yellow	36 in.	sun	half hardy	July-Oct.
		Jean Trimbee	lavender	36 in.	sun	half hardy	July-Oct.
		Baby Royal	salmon	12 in.	sun	half hardy	July-Oct.
		Bishop of Llandoff	red	12 in.	sun	half hardy	July-Oct.
		Easter Greeting	white	12 in.	sun	half hardy	July-Oct.
		Fairy	violet	12 in.	sun	half hardy	July-Oct.
		Nesthalschon	buff	12 in.	sun	half hardy	July-Oct.
		*Amber Queen	amber	24 in.	sun	half hardy	July-Oct.
		*Eureka	yellow	24 in.	sun	half hardy	July-Oct.
*Vivid	scarlet	24 in.	sun	half hardy	July-Oct.		
*Snowclad	white	24 in.	sun	half hardy	July-Oct.		
GLADIO- LUS	<i>Gladiolus</i>	Betty Nuthall	coral	36 in.	sun	tender	July-Sept.
		Picardy	pink	36 in.	sun	tender	July-Sept.
		La Paloma	orange	36 in.	sun	tender	July-Sept.
		Minuet	lavender	36 in.	sun	tender	July-Sept.
		Golden Dream	yellow	36 in.	sun	tender	July-Sept.
		Bagdad	smokey	36 in.	sun	tender	July-Sept.
		Emile Aubrun	bronze	36 in.	sun	tender	July-Sept.
		Commandor Koehl	scarlet	36 in.	sun	tender	July-Sept.
		Pfitzer's Triumph	salmon	36 in.	sun	tender	July-Sept.
		Pelegrina	blue	36 in.	sun	tender	July-Sept.
Mammoth white	white	36 in.	sun	tender	July-Sept.		
HYA- CINTH	<i>Hyacinthus</i>	King of Blues	blue	18 in.	sun or half shade	half hardy	April
		Lady Derby	pink	18 in.	sun or half shade	half hardy	April
		Oranjeboven	orange	18 in.	sun or half shade	half hardy	April

* Plants Suitable for Rock Gardens.

BULBS AND ROOTS (Continued)

Common Name	Generic Name	Varieties	Color	Height	Exposure	Hardiness	Season	
HYACINTH (Con't.)	<i>Hyacinthus</i>	Tubergen's scarlet	scarlet	18 in.	sun or half shade	half hardy	April	
		La Grandesse	white	18 in.	sun or half shade	half hardy	April	
		City of Haarlem	yellow	18 in.	sun or half shade	half hardy	April	
LILY	<i>Lilium</i>	Hansoni	orange	3-4 ft.	half shade	half hardy	June-July	
		Henryi	salmon	3-4 ft.	half shade	hardy	July-Aug.	
		Regale	white	3-5 ft.	half shade	half hardy	July	
		Tigrinum	salmon	4 ft.	half shade	hardy	Aug-Sept.	
		Umbellatum	orange	2-3 ft.	half shade	hardy	July	
		Tenuifolium	scarlet	2 ft.	half shade	hardy	June	
NARCIS- SUS	<i>Narcissus-Pseudonarcissus</i>	King Alfred	yellow	24 in.	half shade or sun	half hardy	April	
		La Vestale	white	24 in.	half shade or sun	half hardy	April	
	<i>N. incomparabilis</i>	Croesus	orange & white	24 in.	half shade or sun	half hardy	April	
		Francisca Drake	white & orange	24 in.	half shade or sun	half hardy	Mar.-Apr.	
	<i>N. Barrie</i>	Mrs. Barclay	white & orange	24 in.	half shade or sun	half hardy	Mar.-Apr.	
		Mrs. Walter Brewster	white & orange	24 in.	half shade or sun	half hardy	Mar.-Apr.	
	<i>N. Leedsii</i>	Silverstar	white & primrose	24 in.	half shade or sun	half hardy	Mar.-Apr.	
		Nette O'Melvery	white & yellow	24 in.	half shade or sun	half hardy	Mar.-Apr.	
	<i>N. triandrus</i>	Agnes Harvey	white	24 in.	half shade or sun	half hardy	Mar.-Apr.	
		Moonshine	white	24 in.	half shade or sun	half hardy	Mar.-Apr.	
	<i>N. Clyclamineus</i>	February Gold	yellow & orange	24 in.	half shade or sun	half hardy	Mar.-Apr.	
	<i>N. Jonquilla</i>	*Campernelle	yellow	24 in.	half shade or sun	half hardy	April	
	<i>N. Tazetta</i>	Laurens Koster	white & yellow	24 in.	sun	tender	Mar.-Apr.	
	<i>N. Poeticus</i>	*Snow King	white	24 in.	half shade	half hardy	Mar.-Apr.	
	*TUBE-ROSES	<i>Polianthes</i>	Excelsior	white	30 in.	sun	tender	July-Oct.
			Mexicana	white	30 in.	sun	tender	July-Oct.
	SQUILL	<i>Scilla</i>	*Campanulata	blue	12 in.	sun	hardy	April
	TULIP	<i>Tulipa</i>	Anton Mauve	blue	29 in.	sun	hardy	May
			Dillenbury	salmon	27 in.	sun	hardy	May
			Louis XIV	violet	30 in.	sun	hardy	May
Indian Chief			red	36 in.	sun	hardy	May	

* Plants Suitable for Rock Gardens.

BULBS AND ROOTS (Continued)

<i>Common Name</i>	<i>Genetic Name</i>	<i>Varieties</i>	<i>Color</i>	<i>Height</i>	<i>Exposure</i>	<i>Hardiness</i>	<i>Season</i>
TULIP (Con't.)	<i>Tulipa</i>	The Bishop	violet	27 in.	sun	hardy	May
		Zwanenburg	white	32 in.	sun	hardy	May
		De Wet	orange	15 in.	sun	hardy	April
		Sunburst	yellow	15 in.	sun	hardy	April
		Van Der Neer	violet	15 in.	sun	hardy	April
		El Toreador	orange	12 in.	sun	hardy	April
		Fire glow	red	12 in.	sun	hardy	April
		Murillo	rose	12 in.	sun	hardy	April
		Dido	rose	28 in.	sun	hardy	May
Fantasy	red	15 in.	sun	hardy	May		

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