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A handbook for rose growers

Griffith J. Buck
Iowa State College

E. C. Volz
Iowa State College

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Buck and Volz: A handbook for rose growers

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a handbook for

ROSE GROWERS

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prepared by Griffith J. Buck and E. C. Volz

Department of Horticulture
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Although the current wave of popularity enjoyed by the rose began in the nineteenth century under the sponsorship of the Empress Josephine of France, the rose has been a cherished inhabitant of gardens since earliest times. In this respect it shares the esteem of gardeners with the lily and violet. However, unlike those flowers, its popularity has never waned. Its close association with mankind has led to its inclusion in the customs, languages and cultures of the peoples of the western world. In tribute to its beauty the Greeks gave it the title “Queen of Flowers”—a title which it well deserves if we are to credit the many attempts to grow it in the myriad climates and soils of the earth.

The genus *Rosa* is widely distributed over the north temperate zone. In a plant group whose members are adapted to the many different climates of this broad geographical area, it would be strange indeed if there were not at least one rose which would flourish in almost any given climatic condition.

Because the climate of Iowa and its neighboring states is rigorous and highly changeable, certain handicaps are presented to the rose grower living in this area. However, it is possible to select rose varieties that may be grown with a minimum of care in locations suitable for other sun-loving plants. The experienced gardener will carefully study the requirements of his particular situation before choosing the roses to grow in his garden.
PART 1. ROSE CULTURE

WHERE TO GROW ROSES

Many of the difficulties associated with the growing of roses can be reduced to a minimum if the site where they are to be grown is carefully selected. A sunny, open area, shaded during part of the day, preferably from noon on, sheltered from strong winds and having good drainage is considered ideal. The beginning rose grower should not be discouraged if his location possesses few of the requirements of the ideal site, providing it receives a minimum of 6 hours of sunshine daily. Good roses can be (and are) grown in many unpromising sites. Unfavorable soils can be modified or replaced; drainage can be provided by one of several methods; and the injurious effects of high winds can be reduced by planting on the leeside of buildings or shrubbery or by utilizing the features of a sunken garden.

When space is not at a premium, or it is desired to have roses dominate the planting, the most pleasing method of displaying roses is in a separate garden. It may be as large or small as circumstances and the gardener's desires permit. A rose garden whose beds are simple rectangles arranged in an uncomplicated pattern will present a pleasing appearance combined with low maintenance. Elaborately designed beds require space and perspective to seem other than ridiculous.

A rose bed should not be so wide that the gardener would be forced to step into the bed to care for the plants. Neither should it be too narrow. A bed 3 feet wide will permit the planting of two rows of plants, allowing 9 inches between the edge of the bed and the first row of plants and 18 inches between rows. A rose bed wider than 5 feet makes it difficult to give the roses in the center of the bed the cultural attention they require.

Roses present their best appearance when planted in groups of not less than three plants of one variety. Although modern roses tend to be more or less everblooming, each plant seldom produces more than a few flowers at one time except at the height of the season. So, the more plants, the more roses.

For the same reason one should limit the number of varieties. It is better to have several plants of each of a few good varieties which have similar growth habits and bloom together than a few plants of each of many varieties having differing growth habits and little concurrence of bloom. The beds will present a better appearance, the flowers will be better, and there will be more of them. In the little rose garden one should grow things well.

If followed strictly, the traditional advice to grow roses in beds or borders apart from other flowers, where there is no necessity for competition with other plants, would deprive many home gardeners of roses, for they often have a limited amount of planting space and a desire to grow several kinds of flowers. If roses cannot be grown in a garden or bed to themselves, the possibility of growing roses need not be abandoned. Many varieties lend themselves to culture in the mixed border, gaining in health and attractiveness from the association with other plants. Those everblooming varieties which have a mass blooming habit and a bushy plant are the better choices for a planting of this type. In general, varieties adapted to this use are found in the Polyantha, Floribunda and Grandiflora classes.

Roses used in a planting with other types of plants should not be neglected. Care should be taken to provide roses so planted with an abundance of water and fertilizer. A deficiency of either will tend to produce weak, stunted plants and anemic flowers. Then, too, the roots of other plants will tend to develop in the area occupied by the roses due to the higher moisture and fertility levels, so that the roses may exist on a deficiency diet almost before the gardener is aware of it.

One other caution to be observed in a mixed planting is to allow the roses sufficient space in which to develop. A well-grown rose plant of the everblooming classes will require at least 3 square feet of space. To provide less space results in crowding, with deterioration in growth and flowering. A satisfactory spacing, under conditions peculiar to Iowa and the upper Mississippi and Missouri River valleys, is 18 x 24 or 24 x 24 inches.
Regardless of the planting plan that the rose gardener has decided upon, there is always the problem of planting close to large established plants such as trees or large shrubs. Tree and shrub roots will compete strongly for the available moisture and nutrients to the detriment of the rose planting. A good rule of thumb is to place the rose planting a minimum of 5 feet beyond the outer rim of foliage of a tree; 5 feet from the greatest circumference of a shrub.

KINDS OF ROSES

The prospective rose grower has many types and varieties of roses from which to choose. Indeed, he may often become confused and either make a poor choice or make no choice at all. The following groups or classes, each with its typical varieties, are dependable roses available for planting in rose gardens in Iowa and its neighboring states. Descriptions are given where none is commonly available.

The Shrub Roses

Traditionally June has been the month of roses by reason of the fact that they are the predominating flowering woody plant of that month. The roses which have given June this reputation are not those commonly planted in modern rose gardens, but the wild, or species, roses and the host of old-fashioned roses which are collected together under the heading “Shrub roses.” No little share of the past and present popularity of the rose is due to the color, the fragrance, the sturdiness and the dependability of the shrub roses. Their usefulness is chiefly in the shrub planting. The varied shades and textures of their foliage, the brightly colored seed pods, or hips, and the vivid or subtle tints of their winter canes give them a season of attractiveness hard to match.

There are many rose varieties and species which may with all propriety be called shrub roses. For convenience in discussing them, we may group them into four principal classes: the Species, or Wild roses; Species Rose Hybrids; the Old-Fashioned roses; and the Repeat-Blooming Shrub roses.

THE SPECIES ROSES

Species roses are the native roses. With single flowers and usually only one season of bloom each year, they are best adapted for use in the shrub border where their brief flowering period, finely textured foliage, colorful seed pods and subtle winter cane coloring add variety to the usual shrub planting. Useful species roses, hardy without protection in Iowa, are:

Rosa beggeriana. The graceful, fountain-shaped plant is well-covered with gray-green, persistent foliage and bears large quantities of small, white flowers in June which are followed by black seed pods the size and shape of a pea. 6-10 feet tall; 6-10 feet wide.

Rosa blanda. This is the Prairie rose and the state flower of Iowa. Its tall, arching stems are sparsely thorny and bear a veritable cloud of pink flowers in the spring which are followed by small, brilliant red fruits which persist until after the first of the year. The winter canes are brilliant red, rivaling some of the red-stemmed dogwoods. 6-8 feet high; 5-6 feet wide.

Rosa foetida. The Austrian Briers are a colorful lot and have been garden residents for several centuries. In addition to the brilliant coloring of their flowers, they have the added merit of being the parent of the majority of our present garden roses. R. foetida—Austrian Yellow—bears many small, brilliant yellow flowers in mid-June. The somewhat globe-shaped plant has fern-like foliage which needs careful attention to prevent its early loss from foliage diseases. R. foetida bicolor—Austrian Copper—is even more brilliant than Austrian Yellow, from which it is a sport and to which it reverts on occasion; the flowers are brilliant orange-scarlet on the inner face of the petals, the outer face being brilliant yellow. R. foetida persiana—Persian's Yellow—bears double, deep yellow flowers in unbelievable quantities. For years it was the only satisfactory double yellow garden rose. 4-6 feet high; 4-6 feet wide.

Rosa Hugonis is a native of central China. It forms a large, arching shrub with an abundance of fine, fern-like foliage. The large creamy-yellow, single flowers are borne in profusion in late May. The fruits are flattened globes, deep scarlet-brown in color. 4-6 feet high; 4-6 feet wide.

Rosa laxa is a variable species. There are two forms, both of which are desirable shrubs. Morden, which came from the Morden Experiment Station, Morden, Manitoba, is a strongly upright plant with viciously thorny, yellow-green canes and an abundance of blue-green foliage. The 3-inch, single, white flowers appear in late May and
are followed by large, flask-shaped orange-scarlet hips. It grows 6 feet tall and 4 feet wide. *R. laxa*, Fall Blooming Form, is similar to the Morden selection except that the plant is much more dwarf, and the flowers are pale pink changing to pure white after opening. 3-4 feet high; 3-4 feet wide.

*Rosa multiflora* is a native of Japan which has been building up a reputation as a hedge plant. It makes a large, arching shrub which is covered by large clusters of small, white flowers in early June. The brilliant red seed pods are borne in such numbers as to cover the plant with red in the fall. It will kill back badly in severe winters. 10-15 feet high; 10-15 feet wide.

*Rosa nitida*. This is a dwarf native rose with very prickly branches. The rose-pink flowers are followed by small, scarlet hips. The glossy foliage changes to red and purple in the fall. 1½-3 feet high; 2-3 feet wide.

*Rosa rugosa alba*. All of the Rugosa roses closely related to the original species are hardy, but the white flowered forms, *R. rugosa alba* and *R. rugosa alba plena*, are the most desirable be-

caused of their large, white flowers, which are followed by bright red, tomato-like seed pods, and the bright green, rugosa, healthy foliage. 4-5 feet high; 4-6 feet wide.

*Rosa rugosa repens alba* (R. Paulii). Mask-querading under this long and unwieldy name is a splendid trailing shrub. It has small, glossy green foliage, very spiny green canes, which are almost impossible to train upright, and in early June, many large single white flowers which resemble those of a clematis. 2-3 feet high; 10-15 feet wide.

*Rosa spinosissima altaica* has been called the Northern Cherokee in tribute to the beauty of the large, single, creamy-white flowers, which are borne in June. The large, globular purple-black seed pods are very conspicuous in the fall. 8-10 feet tall; 6-8 feet wide.

**SPECIES ROSE HYBRIDS**

Hybrids of different species roses with various garden roses are among the most valuable shrub roses. Although there are degrees of hardiness, the majority of them, especially those listed below, are sufficiently hardy to survive Iowa winters without special protection. Like the species roses and other June-blooming roses, the roses of this group bloom best on 2-year-old, or older, wood. The flowers of many of these varieties are the equal of those of the everblooming roses in size, form, color and fragrance. By proper training, many of these rose varieties can be trained to form truly hardy climbing roses.

**Betty Bland.** (*R. blanda* x Hybrid Perpetual). This Canadian hybrid has double, soft-pink flowers of good size and form. The brilliant red winter cane color is especially attractive. 5-6 feet high; 4-5 feet wide.

**Frühlingsduft.** (*R. spinosissima altaica* x Joanna Hill). This is one of Wilhelm Kordes' new shrub roses. The large, 4-inch, double flowers are a blend of light yellow, pale orange and salmon-pink, are well shaped and have a most delightful fragrance. The bushy plant is well furnished with blue-green, disease-resistant foliage. 4-5 feet high; 4-5 feet wide.

**Frühlingsgold.** (*R. spinosissima altaica* x Joanna Hill). This is more robust growing than the preceding variety. The flowers are large, semi-double, very fragrant, and soft canary-yellow. 6-8 feet high; 5-6 feet wide.

**Frühlingserwachen.** This is similar to the foregoing. However, the well-shaped, fragrant flowers are snow white. 4-5 feet high; 4-5 feet wide.

**Karl Foerster.** (Frau Karl Druschki x *R. spinosissima altaica*). The very large, double
white flowers are borne at intervals through the summer. The plant is vigorous although not quite so tall as the other varieties of similar origin. 3-4 feet high; 3-4 feet wide.

**Lillian Gibson.** (Red Star x R. blanda). This rose produces 3-inch double flowers of delicate salmon-pink in large clusters. The foliage is healthy, but it is lost early in the fall, permitting the brilliant red winter canes to be seen. Can be used either as a shrub of Spirea Van Houttei type or as a pillar or low climbing rose. 5 feet high; 5 feet wide.

**Mrs. John McNab.** (R. rugosa x R. beggeriana). The husky bush produces large, double, white flowers in June, and with favorable weather, will produce a second crop in the fall. 3-4 feet high; 3-4 feet wide.

**Pax Apollo.** (R. blanda x R. sempervirens pallida). This plant is as nearly thornless as a rose plant can be. The 2-inch, double flowers are borne in large clusters in mid-June. The opening flower color is clear rose-red aging to an attractive amethyst. The plant is easily trained as a climber. 6-8 feet high; 4-6 feet wide.

**THE OLD-FASHIONED ROSES**

These are the garden roses of colonial days which were developed from four species roses found growing in western Europe—Rosa gallica, the French rose; R. centifolia, the Cabbage rose; R. damascena, the Damask rose; and R. alba, the York rose. Rose growers of past generations held their Gallicas, Damasks, Moss roses and Albas in as high esteem as we moderns do our Hybrid Teas and Floribundas. These old roses have an almost amazing way of flourishing in conditions under which most roses would die. While not immune to rose ills, they are very tolerant of them.

**The Gallica Roses**

Perhaps the most numerous of the Old-Fashioned roses are the Gallica, or French, roses. They have been found in gardens since the earliest times. Their tolerance of poor cultural conditions, free seeding characteristics and fertile pollen have had an enormous influence on garden rose development. The large, sparsely double flowers, usually in shades of pink, rose-red and purple-red, are borne on a stiffly upright bush which is well clothed with small, dark-green leaves. There is a light fragrance which becomes more intense as the flowers age.

Suggested varieties are: R. gallica conditorum—double, flesh-pink; Désirée Parmentier—rich carmine-violet; Gros Provins Panachee—creamy-white, semi-double flowers, striped with raspberry-red; Splendens—brilliant crimson; and Cardinal de Richelieu—velvety purple-maroon.

**The Damask Roses**

In the days when rose culture was in its infancy, every red rose was commonly called the Damask rose, but there were many red roses which were not Damasks and many Damasks which were not red. It is commonly believed that the first Damask rose was brought to Europe from Palestine by the returning Crusaders. However, it is pretty well established that these roses were grown in Europe long before the period of the Crusades.

The Damask roses are very hardy, robust plants, clothed with large, rough, light-green leaves. Their flowers are freely produced and are generally borne in clusters of three or more. The fame of their powerful fragrance is second only to that of the Cabbage roses and lingers on in such modern rose varieties as Crimson Glory and President Eisenhower.

The Damask rose was not as prolific in producing varieties as Gallica, but a selection from the following would add variety to the rose planting: Hebe's Lip—white, semi-double flowers, the petals of which are edged with deep rose-red, followed by many brilliant orange-red seed pods in September and October; La Ville de Bruxelles—large, many-petalled rose-pink blooms with incurved centers; Leda—the Painted Damask—the flowers, which are borne in clusters, are the palest blush-pink with the edges of the petals tipped with vivid crimson; Mme. Hardy—in its prime, this white rose was considered the standard of excellence for all white roses. It is still good.

**The Centifolia Roses**

Like the Gallica roses, the origin of the Centifolia, the Hundred-Leaved or Cabbage rose, is lost in antiquity. The type is characterized by large, very double, deliciously scented flowers which are borne on vigorous, upright plants, well-clothed with large, medium-green foliage. Typical varieties are: R. centifolia—soft rose-pink; Mme. d'Hebray—pink; Variegata di Bologna—creamy-white, striped with crimson, a veritable peppermint stick candy rose.

**The Moss Roses**

The first Moss rose originated as a bud-sport from the Centifolia rose. Varieties vary in the amount of “mossiness” covering the buds and
flower stems. The mossy appendages give off a pungent scent which blends pleasantly with the intense rose scent of the flowers. Dependable Moss roses are: Golden Moss—apricot-yellow; Chapeau de Napoleon (Crested Moss)—rose-pink; Nuit de Young—very dark brownish-maroon; and three which have a tendency to bloom again in the fall, Alfred de Dalmas—pale pink; Deuil de Paul Fontaine—deep crimson; and Salet—rose-pink.

The Alba Roses

These are the aristocrats of the Old-Fashioned roses. The plant and flower of the typical Alba variety have a refinement that other Old-Fashioned roses do not have. Their strong, upright growth, gray-green foliage, and large, flat, white or pale pink, fragrant flowers, coupled with a long flowering season and display of colorful seed pods in the fall, make them ornamental plants of high merit.

Alba roses which have been distinctive and dependable in Iowa are: *R. alba suaveolens*—semi-double, pure white and intensely fragrant; *R. alba incarnata maxima* (The Great Maiden’s Blush)—soft salmon-pink, double, very fragrant, not to be confused with the Common Maiden’s Blush; Celestial—deep salmon-pink, semi-double flowers; Common Maiden’s Blush—very double, blush-pink flowers which frequently fail to open; not the same as the Great Maiden’s Blush.

THE REPEAT-BLOOMING SHRUB ROSES

The shrub roses which bloom at intervals throughout the season have a variable ancestry.

In addition to blooming from canes produced the previous season, these roses also bloom on current season’s wood. The following roses have been satisfactory in Iowa:

**Birdie Blye.** (Helene x Bon Silene). This rose was introduced in 1906. It produces a well-shaped rounded plant 3-5 feet tall and 3-5 feet wide. The olive-green foliage is a good foil for the Carmine-pink flowers which are borne in clusters all through the season.

**Nearly Wild.** The name is descriptive of this rose. The 3-inch, single flowers are borne in clusters on a compact plant 3 feet high and wide. The plant is as nearly everblooming as a plant can be.

**Stanwell Perpetual.** This Scotch rose derivative ranks high on the list of desirable rose shrubs. It produces its 4-inch, pale-pink and white double blooms profusely in June and at intervals through the balance of the season. The blue-green foliage is disease-resistant and persists until freezing weather. The stems tend to have a lax growth habit, making a low, mound-like plant 2-3 feet high and 3-4 feet wide.

**Hybrid Perpetual Roses**

These roses are characterized by their upright growth, usually very thorny stems, and large, rough, dull-green foliage. The flowers, in shades of white, pink, rose, red and maroon, are large; very substantial; and in many varieties, very fragrant. These roses bloom in early June. A few varieties tend to bloom again in the fall. The Hybrid Perpetuals were the first roses to show a reblooming tendency, from which they were
enthusiastically called Hybrid Perpetual. The French, who were the principal developers of this class, called them Hybrid Remontant because the sap was said to remount the stems in the fall to produce flower buds. These roses are recommended to the beginner because they are very dependable and easy to grow. Their best blooms are produced from canes of the previous season’s growth, so that if profuse flowering is desired, they will require winter protection in cold climates such as that of Iowa and its neighboring states. Generally, they are harder than the everblooming roses, the Hybrid Tea and Floribunda roses, and do not suffer as much damage in the average winter as do the everblooming types.

Examples of the Hybrid Perpetual roses are: Frau Karl Druschki—snow-white, scentless, flowers all season; General Jacqueminot—brilliant scarlet-crimson flowers which are highly fragrant; George Arends—soft china-pink, very fragrant; Henry Nevard—the very fragrant double, dark red blooms are borne at intervals through the summer on established plants; Marshall P. Wilder—has a large, double, dark red flower borne on a husky plant, famous for being the only worthwhile Hybrid Perpetual produced in America; Mrs. John Laing—soft rose-pink, fragrant and nearly everblooming; Paul Neyron—the almost thornless plants produce the largest roses in rosedom, lavender-pink.

Recently several varieties, resembling in many respects the Hybrid Perpetuals, have been produced. They are virtually Hybrid Perpetuals in which the reblooming tendency has been intensified. Good examples of these new Hybrid Perpetuals are: Autumn Bouquet—double, rose-pink, very fragrant flowers borne in clusters all summer; Fragrant Beauty—similar to the preceding but rose-red; Hon. Lady Lindsay—clear salmon-pink flowers, borne all summer on a low, spreading plant.

The Tea Rose (Rosa odorata)

At the turn of the nineteenth century tea merchants brought plants of a pale pink, weak-growing, everblooming rose to England from southern China. Shortly after, a sister sort, bearing pale yellow flowers, found its way into European trade channels. Arriving in Europe at a time when interest in roses and rose-growing was at a high level, these roses achieved instant popularity. The new roses were called Tea roses. Several authors of the period assert the flowers were so named because they had the scent of fresh tea leaves; others say they received their name from their being imported by the tea merchants. From the two original Tea roses was derived a large group of everblooming roses boasting large, sweetly scented, delicately colored flowers borne at the tip of each shoot.

Tea roses are not generally satisfactory in Midwest gardens because of their sensitivity to cold. However, interest in this class is reviving and the hardier sorts might find a place in sheltered locations. Tea roses which might do well under such conditions are: Mrs. Dudley Cross—nearly thornless plants, large, pale yellow flowers tinged rose-pink; William R. Smith—pale blush-
pink; Lady Hillingdon—long-pointed buds, deep yellow flowers; Harry Kirk—primrose yellow; and Catherine Mermet—peach-blossom pink.

The China Rose (Rosa chinensis)

The Chinese, or Bengal, roses were introduced into Europe before the Tea rose. They are credited with igniting the flame of rose interest which was to sweep the Continent in the last century. They were the first roses to bloom all season—a trait which insured their popularity among rose growers of that era. In time, the descendants of the Chinese rose formed a group of roses bearing small, usually scentless, blooms in clusters on compact, low-growing plants. While frost-tender, they are less so than the Tea rose. In recent years interest in this class has been revived through the introduction of very small varieties which have been termed Miniature roses.

Examples of the Chinese rose are: Old Blush—rose-pink; Cramois Superieur—rosy-scarlet; Mme. Laurette Messimy—flesh-pink; Archduke Charles—opens pale pink, darkening to crimson with age. Miniature roses are: Pixie—white; Baby Gold Star—yellow; Bo-Peep—rose-pink; Tom-Thumb—crimson; Red Elfe—red.

Hybrid Tea Roses

The Hybrid Tea rose is the most popular of the everblooming rose types if their use in modern gardens is any indication of popularity. This prominence is rightfully deserved, for the Hybrid Tea was the first of the everblooming roses to flower more or less continuously, present a variety of color, fragrance and form, and be dependably hardy, with winter protection, under Midwest climatic conditions. Roses of this group combine the high quality of the Tea rose flower, the everblooming habit of both the Chinese rose and the Tea rose, and the dependability and greater hardiness of the Hybrid Perpetual. With such a combination of desirable traits, it was only natural that the Hybrid Tea would supersede the three classes from which it sprang. The Hybrid Tea is used extensively by florists for the production of high-quality flowers the year round.

The Hybrid Tea class came into being in 1867 with the introduction of the variety La France, which was the offspring of the Hybrid Perpetual rose Mme. Victor Verdier and the Tea rose Mme. Bravy. This new rose combined the dependability and the greater hardiness of the Hybrid Perpetual with the everblooming habit of the Tea rose. With the proper protection in cold regions, Hybrid Tea roses will live and prosper for years. Plants of
Hybrid Tea varieties which have withstood the difficulties of Iowa winters for more than a decade can be found in rose gardens throughout the state.

Typical Hybrid Tea varieties are: Allure—salmon-rose; Angels Mateu—orange-old-rose; Charlotte Armstrong—dark pink to blood-red; Christopher Stone—crimson-scarlet; Condesa de Sastago—scarlet and gold bicolor; Confidence—shell-pink and cream; Crimson Glory—maroon; Debonair—primrose-yellow; Editor McFarland—deep pink; Good News—salmon to coppery-pink; Kaiserin Auguste Viktoria—white; Lady Alice Stanley—coral-rose and light pink; Nellie E. Hillock—salmon-pink; New Yorker—scarlet; Nocturne—black-maroon; Peace—lemon yellow blended with carmine; Rose of Freedom—currant red; Show Girl—rose-pink; Soeur Therese—apricot-yellow; Taffeta—salmon-rose; Tallyho—rose and carmine bicolor.

**Polyantha Roses**

The Polyantha roses were originally known as Baby Ramblers, a name under which they became very popular. They originated from the crossing of everblooming roses—the Hybrid Tea, Chinese and Tea roses—with hardy climbers derived from *Rosa multiflora* and *R. wichuraliana*. The resulting plants were dwarf bushes, bearing large clusters of small flowers. These useful roses lacked fragrance, but in compensation they bloomed continuously and were reasonably hardy. Polyantha roses are especially valuable for massing in beds and borders and for edging beds of larger roses. Examples of this group adapted to Midwest conditions are: Cameo—orange-pink; Chatter—crimson-scarlet; China Doll—china-pink; Eutin—crimson; Mrs. Joseph Hiess—clear pink; Pinkie—shell-pink; Summer Snow—white; The Fairy—shell-pink; and Yvonne Rabier—white.

**Floribunda Roses** (Large-Flowering Polyantha)

Just as the Hybrid Tea superseded the Tea rose and the Hybrid Perpetual, so did the Floribunda replace the Polyantha rose. The Floribunda roses have arisen through continued breeding of the Polyantha roses with the Hybrid Tea roses. As a group, they combine the larger flower size of the Hybrid Tea with the bushy plant and large bloom clusters of the Polyantha, although this last trait tends to disappear with continued inbreeding with the Hybrid Tea. The first members of this class made their appearance in Denmark with the naming of the roses Karen Poulsen, Kirsten Poulsen and Else Poulsen. Subsequently, the same type of breeding was taken up by rose breeders in other countries.

In addition to the standard Hybrid Tea-Polyantha breeding, other hardy species have been bred into the group. These roses are very useful wherever mass color effects are desired throughout the growing season. The following are recommended varieties of this type: Betty Prior—two-tone light and rose-pink; Dagmar Spath—white, often striped with cherry-red; Donald Prior—dark red; Else Poulsen—rose-pink; Fashion—salmon-coral; Floradora—cinnabar-red; Goldilocks—yellow; Gruss an Aachen—pale copper pink; Independence—cinnabar-scarlet; Irene of Denmark—white; Masquerade—yellow changing to maroon with age; Pinocchio—salmon-pink; Red Pinocchio—crimson; Rosenelfe—two-tone rose-pink; Valentine—crimson; and World's Fair—maroon.
Grandiflora Roses (also called Flora-Tea Roses)

Continuation of the pattern of breeding which resulted in the formation of the Floribunda class has produced a group of rose varieties which partake even more strongly of the Hybrid Tea flower characteristics with a lessening of the large flower cluster of the Polyantha roses. The flowers are of the best Hybrid Tea flower form, but they are often borne in clusters numbering up to 10 buds and flowers. Usually each flower has a stem sufficiently long to lend it to use as a cut flower. At its inception this class was called Flora-Tea, but the name Grandiflora has now been accepted officially by the All-America Rose Selections, Inc., for this group.

Although the first varieties of this new class—Dean Collins, Queen Elizabeth and Roundelay—were derived from Charlotte Armstrong, a Hybrid Tea, and the Floradora, a Floribunda, there are other roses which, while presently classed with the Hybrid Tea roses, have more in common with the Grandiflora roses. One such group is the Brownell Sub-Zero Hybrid Tea roses. Old and new varieties of the Grandiflora roses are: Carousel—turkey-red shaded maroon; Curly Pink—pink bicolor; Dean Collins—rose-opal; Hector Deane—watermelon-pink; Lily Pons—lemon-white; Pink Princess—rose-pink; Queen Elizabeth—shell-pink, tinted orange; Red Duchess—rose-red, very fragrant; Roundelay—dark red; Shades of Autumn—red and gold bicolor; and V for Victory—chrome yellow.

Climbing Roses

All gardeners know and admire the effect produced by climbing roses in June. These roses are popular subjects for covering pillars, fences, walls and banks. Not all climbing roses are dependably hardy in areas with rigorous winter climates. In general, June-blooming climbers are harder than the everblooming climbers, but all climbers require winter protection in the upper Mississippi and Missouri River valleys. Climbing Hybrid Tea roses and Climbing Floribunda roses, which are climbing sports of bush roses, are not recommended for general planting in this area.
They are no hardier than the bush varieties from which they sprang.

Climbing roses are of three types: the Ramblers, the Large-Flowered Climbers and the Everblooming Climbers. The majority of our climbing roses have descended from two oriental species, *R. multiflora* and *R. wichuraiana* crossed and re-crossed with bush roses—both Hybrid Perpetuals and everblooming roses. The first type, the Ramblers, is the oldest of the climbers. They are the products of the first cross between *R. wichuraiana* (or *R. multiflora*) and bush roses. The plants are strong, more dependable than other groups of climbers, and produce very flexible canes. They are similar to the Polyantha roses in shape and size. The Large-Flowered Climbers are descended from the early hybrids of the Memorial rose (*R. wichuraiana*) and bush roses crossed again with bush roses. The flowers are large, often approaching the Hybrid Tea rose in shape and size, and are borne in relatively small clusters. With added size in the flower, the plant lost a measure of hardiness.

The Everblooming Climbers are a polyglot group, possessing blooming habits ranging from the tiny, clustered bloom of the Ramblers to the large exhibition-type bloom of the more choice varieties of Hybrid Teas. While the first two groups of climbing roses bloom best on 2-year-old wood, the Everblooming Climbers bloom not only on old wood, but also on wood of the current season. They tend to repeat their bloom at intervals throughout the summer.

Climbing roses adapted to the upper Mississippi River and Missouri River valleys are the following:

**Ramblers:** Chevy Chase—crimson; Dorothy Perkins—shell-pink; Hiawatha—white-centered crimson flowers; White Dorothy Perkins—white.

**Large-Flowered Climbers:** Alida Lovett—shell-pink; American Pillar—scarlet-rose with white centers; Bess Lovett—crimson; Christine Wright—rose-pink; Climbing American Beauty—rose-carmine; Flash—orange-rose; Golden Glow—spectrum yellow; Golden Pyramid—cadmium-yellow; Mary Lovett—pure white; Mary Wallace—bright pink; Paul's Scarlet Climber—intensely scarlet-red; White Gold—white and cream.

**Everblooming Climbers:** Blaze—scarlet-crimson; Climbing Summer Snow—white; Dream Girl—salmon-pink; Dr. Burt—reddish orange; Dr. J. H. Nicolas—rose-pink; Gold Rush—golden yellow; Inspiration—rose-pink; New Dawn—apple-blossom pink; Orange Everglow—coppery orange; Prosperity—white; White Dawn—white.

### SOILS AND SOIL ACIDITY

Roses can be grown in almost any type of soil if it has good drainage, although a loam soil is to be preferred. A soil which produces satisfactory crops of vegetables or garden flowers will produce good roses. Spading or forking the soil to a depth of 18 inches and mixing organic material such as brown peat or *well-rotted* manure in the bottom 9 inches is beneficial when the soil in the lower part of the rose bed is deficient in organic material and poorly aerated.

If drainage is a problem, a special bed may be made by digging out all the soil to a depth of 2 or 3 feet. Break up the soil in the bottom by spading, then apply a 6-12-inch layer of coarse gravel, broken brick or similar coarse material. Cover this material with a layer of sod, then finish filling the excavation with a soil mixture consisting of two parts soil, one part sand and one part brown peat or *well-rotted* manure. A better solution would be to install drain tile in the bottom of the bed and let it empty into either a dry well or a sewer outlet. Drainage of the soil is improved when the soil in the beds is slightly elevated above the walk or path. However, in areas where lack of moisture can be a serious problem, putting the ground level of the bed slightly below the level of surrounding areas will help in retaining rainfall. The bed should be allowed to settle before planting roses. Many prefer to prepare rose beds in the late summer or fall before planting roses the next spring.

Roses are not especially sensitive to soil acidity as long as the bed is well-drained and contains a plentiful supply of organic material. Roses seem to do best in a slightly acid to neutral soil with a pH of 6.5, but soils ranging from pH 6.5 to 7.5 will grow good roses.
SPACING

Some thought should be given to the size of the rose bed. Roses appear to best advantage when they are planted in beds containing at least two or more rows of plants. However, the beds should not be so wide that the center of the bed cannot be reached from either side. Narrow beds have the added advantage of good air circulation. In planning rose beds it is helpful to consider the planting distances for the various types of roses. The Hybrid Perpetuáis and other strong-growing bush roses require 30 to 36 inches between plants; Hybrid Teas, Floribundas and Grandifloras should be planted 18 to 24 inches apart, depending upon the growth habit. Those varieties which grow strongly upright can be planted much closer together than can those which have a spreading plant habit. The use to which climbing roses are put will determine the planting distance. When used as pillars, climbing roses can be planted as close as 4 feet apart; if used as a large, rambling shrub or to cover fences or arbors, the plants can be spaced farther apart. A good rule of thumb to use in spacing climbing roses is to disregard the use to which the plant is put and space the plants 6 to 8 feet apart. This spacing permits the plant to develop normally.

SELECTING AND BUYING ROSE PLANTS

Dormant Plants

The average amateur rose grower usually is puzzled when the time comes to place an order for rose bushes. Rose plants, like trees and shrubs, are not as easily propagated as annuals and herbaceous perennials. For that reason, the home gardener will find it highly desirable to get his plants from a reliable nursery or rose specialist. In many localities there are nurserymen who can provide excellent plants. Experienced rose growers know that desirable results may be obtained by planting dormant, bare-root, field-grown, budded plants. The rose nurseryman produces such plants by grafting or budding the desired variety upon some hardy root stock such as the Multiflora rose, which has given splendid results under Iowa conditions. These budded plants usually will produce more and earlier blooms the first year than own-root roses.

Rose nurseries are located in many parts of the country. However, the place where a rose plant has been produced is of little importance to the home gardener. What is important is the skill and reliability of the nurseryman who produced it. A well-grown, mature, properly handled rose bush will give satisfaction, if treated properly when transplanted into the garden, regardless of where it was produced or the understock used in producing it. Varietal differences and cultural conditions in the home garden largely determine a rose plant’s performance under any given climatic condition.

Many rose growers use the term “2-year-old, field grown” to describe their plants. However, the term is meaningless in describing the size of the plants the purchaser may expect. Rose nurserymen grade their rose plants on a size basis. The top grade is No. 1; the lowest, No. 4. Reputable nurserymen prefer to sell only rose plants

Best results are obtained by planting dormant, 2-year-old, field-grown, budded rose plants.
grading No. 1 or No. 1½, which is a grade slightly smaller than the No. 1 grade. A well-grown plant of these grades should have two, preferably three, canes measuring \( \frac{3}{8} - \frac{3}{4} \) inch in diameter. The use of plants smaller than this is not recommended, for they will not produce results equal to those from the larger plants. Likewise, the use of oversized plants, frequently called “Jumbo” plants or “3-year-old” plants, does not produce results equal to those achieved with the standard No. 1 or No. 1½ plants.

**Own-Root Plants**

Some rose growing establishments prefer to propagate roses by means of cuttings so that it is possible to secure 2-year-old plants on their own roots. With certain varieties such plants will perform in a manner comparable to that of budded plants.

**Potted Plants**

Potted rose plants are growing in popularity with beginning rose growers. While dormant, these plants are potted in large composition pots and allowed to develop in a normal fashion. For planting after the season for dormant planting has passed, these plants are to be recommended. They will do well during their first season. However, because of their restricted root system, they will require careful attention to watering and fertilizing during their first season.

**Bench Roses**

Bench roses are plants which have been grown in commercial greenhouses for cut flower purposes for 1 or more years. They are limited in variety to those kinds which do well under glass, and are not necessarily varieties adapted to outdoor culture. When one understands the limitations of this type of rose plant, such plants can be used to advantage for one-season effects and are usually sold at a lower price than other types of rose plants.

**WHEN TO PLANT ROSES**

The general practices recommended for planting shrubs and trees are a fairly safe guide for planting roses. Early spring—that is, late in March or early in April—is the safest time, and plants should be ordered early enough to coincide with this schedule. Orders for roses should be placed in late fall or early winter. The rose nurseryman fills orders in rotation so that those received first are filled with the choicest plants while stocks of varieties are still complete.

Fall-ordered plants may be delivered in either fall or spring. Fall-delivered plants may easily be kept in condition for early spring planting by burying them in a specially constructed pit or trench (see diagram). Lay the plants on their sides in the bottom of the trench and cover with about 10 inches of soil. After the surface of the soil is frozen, mulch with excelsior, evergreen boughs, or a similar dry mulching material to maintain the soil in a frozen condition. Remove and plant in early spring as soon as the frost is out of the ground. In regions where fall planting is always safe for woody plants, it may be advisable, and advantageous, to include roses. However, this is not always safe in the upper Mississippi and Missouri River valleys.
HOW TO PLANT ROSES

In planting rose bushes it is essential to dig the hole large enough to permit spreading the roots laterally as well as vertically. A post-hole digger of the auger type can be used to advantage in digging the holes, especially if the plants are being replaced in an established planting. The following steps in the planting of rose bushes are important:

1. Preventing drying out. Handle the plants with the least exposure of the roots to air. If it is necessary to delay planting for a week or more, remove the plants from the packages and "heel in"—i.e., partially bury them in a shady, moist spot in the garden. Dipping the root system in a thin mud bath before planting is a good practice. This is known as "puddling" the roots. Occasionally plants will be received in a very dry condition. To plant them immediately is to risk failure. A better way is to bury the plants in moist soil for 4 or 5 days, after a preliminary soaking of the entire plant in water for not more than 24 hours. Handled in this manner, many badly dried-out plants will grow when planted in their permanent location.

2. Pruning and preparing plants. Examine each plant carefully, and cut away all broken and diseased branches and roots. If the plant was not pruned before shipping, cut back each cane to a length of 5 to 6 inches.

3. Planting. The plant should be set a little deeper than it grew in the nursery, and if it is a budded rose, the swollen joint caused by the budding operation should be slightly below ground level. For best results under Midwest conditions, the bud-union should be 2 inches under the surface of the soil after the soil has been allowed to settle around the plant. Spread the roots and fill in with soil, firming the soil with the hands as it is added. When all of the roots have been covered with soil, step into the hole and firm the soil around the plant well with the feet. Fill the hole with water, allow to drain well, and add enough loose soil to permit complete covering of the branches.

This temporary mounding of the pruned branches protects them from shriveling and drying out. After the buds have started to grow, which will be in about 10 days or 2 weeks, the mounded soil covering may be removed to expose the branches to ground level. Washing the soil mound away with water from a hose is a safe way to avoid unnecessary breaking of tender shoots.
Cultivation
Summer care of roses is designed to encourage growth, with a consequent increase in floral production, through weed control, watering and fertilization, and pest control. Cultivation such as is recommended for the vegetable garden is adequate for the rose bed, too. It should be remembered that roses have a relatively shallow root system so that if a hoe is used as a cultivating tool, cultivation much deeper than an inch will injure the root system. A substitute for cultivation may be attained by mulching the rose beds with a 2- to 3-inch layer of granulated peat moss, crushed corn cobs, well-rotted manure, shredded tobacco stems or other available mulching material. If the soil requires additional organic matter, the mulch may be worked into the soil in the spring.

Fertilizing
Regular applications of fertilizer are recommended after the first year and are advisable if your rose plants are to do their best. A new rose bed should contain enough nutrient elements to maintain adequate growth the first season. If plants have been set into an old planting, it is advisable to fertilize the newly set plants lightly the first season. Half the fertilizer given to an established plant would be sufficient for a newly planted one. Well-rotted manure, reinforced with a cupful of superphosphate to each bushel of manure, may be worked into the topsoil in early spring after the plants have been pruned. If animal manures are not available, complete commercial fertilizers, such as 6-10-4 or 5-10-5 mixtures, will give satisfactory results if applied at not to exceed 2 pounds per 100 square feet of rose bed area. There are fertilizer mixtures designed especially for roses; these have given excellent results when used according to the manufacturer's directions.

Watering
To reinforce the fertilizer program, provision for watering should also be made. Roses should not lack for water. In the absence of rainfall, enough water to soak the soil to a depth of 8 inches should be applied each week. Be careful to avoid wetting the foliage. The fertilizing program and watering should be stopped by mid-August if the plants are to reach their maximum maturity before cold weather sets in.

Cutting Flowers
Removal of spent blooms aids in maintaining the good appearance of the garden and preventing seed formation. In cutting flowers, it is best to remove as few leaves as possible. Unless the flowers are wanted for decorative purposes, only the first leaf should be removed with the flower. To remove more foliage would unnecessarily deplete the foliage surface with a resulting decrease in the food-making ability of the plant. The decrease in food manufacture is reflected in the smaller size of the plant and the decreased number of flowers.

Winter Protection
With the exception of the hardy Species, Species Hybrids and Old-Fashioned roses (see pages 5-7), all roses discussed in this bulletin will require winter protection in Iowa and its neighboring states. To winter Hybrid Teas, Floribundas and Grandifloras successfully, complete covering is required. The treatment should begin in late fall before freezing weather sets in. First, tie canes of bush together with soft cord at two or three levels, making it easier to work among the plants. Then, cover the base of each plant with moist soil, which is hilled up around the plant in a cone 8 to 10 inches high. It is well to firm the moist soil around the bush with the hands. A 7- to 8-inch collar of ¼-inch mesh hardware cloth, heavy waterproof paper or roll roofing will hold the soil around the plant and keep it from spreading or washing down.

The soil for the hilling should not be taken from the rose bed but brought in from another part of the garden and removed from the rose beds in the spring. The soil mound prevents drying of the rose stems in that area where the new shoots arise in the spring and also prevents injury due to alternate freezing and thawing.

The second phase of the wintering process is complete covering of the bushes with a good mulching material. Although fall pruning is not
To provide winter protection for rose plants, first tie the canes together with soft cord at two or three levels, then cover the base of each plant with moist soil to a depth of 8 to 10 inches.

Soybean straw (left) is an excellent mulching material which does not blow away in windy weather. Evergreen branches (above) are another good material, readily obtainable from discarded Christmas trees.
generally successful, many rose growers prefer to shorten their plants to a height of 24 inches before applying winter protection. Plants treated in this way are more susceptible to winter injury than unpruned plants. However, if the bushes are too tall to work among conveniently, they may be pruned to a height of 24-30 inches with little resultant harm. Closer pruning is not advisable because the basal growth may not survive. When loose, fluffy material, such as dry leaves, is used on the rose beds, it should be held in place with a light covering of strawy manure, evergreen branches or cornstalks. Soybean straw is an excellent mulching material which does not blow away in windy weather. Another mulching material which gives excellent results is evergreen branches. These are readily obtained from discarded Christmas trees, which are available at the time such mulching material is best applied.

Where obtaining sufficient soil to mound roses is a problem, another method of winter protection has given excellent results. This method requires containers 18 inches longer and wider than the space occupied by the roses and 18 inches deep. These can be of lumber or heavy waterproof paper such as lightweight roofing material. After the containers have been placed over the plants which have been pruned to the height of the enclosing container, they are filled with coarsely ground corn cobs. A waterproof cover is then applied. We cannot emphasize too strongly that the cobs must be kept dry; otherwise they lose their insulating value and subject the plants to winter killing. Plants protected in this way should have the protection removed earlier than that from conventionally protected plants. Leaving the cobs piled around the base of the plants will provide some protection from late spring frosts.

As a group the Polyantha and Floribunda roses have more resistance to cold injury than the Hybrid Tea and Grandiflora roses. Hilling soil about the base of the plant is a safe precaution, but usually a covering of oak leaves or other light litter will winter them successfully. When the roses are grown in small beds for garden effect, an easy way to protect them is to place side boards around the bed in the fashion of a cold frame, filling the space between the plants with leaves or other litter. Of course, the plants should have some soil hilled around their bases.

In cold sections where climbing roses are killed back to the ground if the canes are left on the trellis, the only safe procedure is to remove the canes from the support, lay them on the ground, and cover the entire plant with soil and leaves. Straw is not to be recommended as it harbors mice, which often girdle the stems in their search for food. The task of removing rose canes from a trellis is not easy or pleasant. Leather gloves and thorn-resisting clothing are a definite help in removing unruly canes from an intricate rose support. The gardener can plant his climbers against a low fence from which the canes can be removed and laid on the ground for easy covering as previously described. A wooden fence about 3 feet high and of simple design is ideal for this purpose.

Removal of the winter mulch should be done gradually. Careful timing is essential. When weather permits, first remove the top covering which holds the leaves in place and allow air to circulate among the plants. This is not necessary if evergreen branches have been used. The normal dropping of needles as the stems dry out permits air and light to penetrate the winter protection. After a few days the remainder of the mulch may be taken away and, finally, the soil mound at the base of the plants. Sprouts may develop before the plants are completely uncovered, but no harm results if the delay in removing winter protection is not prolonged.

**WINTER INJURY**

Winter injury which results in outright killing of canes is readily seen upon removal of the winter protection. There is another type of winter injury which is difficult to diagnose. This type of injury begins appearing after growth starts. New growth, especially on climbers, will grow normally for a short time, then turn yellowish, wilt, and finally shrivel, after which the cane will turn black. If this condition exists for the entire length of the cane, investigation will show a blackened, dead area at the base of the cane, which has hitherto been unnoticed. If only the tip portion of the cane is affected, it will often be found that cold injury has been more extensive than the external appearance of the cane at pruning time indicated. In such cases, a second pruning will be necessary to remove the dead and drying wood.

Frequently winter injury in bush roses is slower
in appearing. Since it may appear in July and August, when the rigors of the past winter have been forgotten, other causes are frequently blamed. The plant grows normally as long as growth conditions remain favorable, but when high temperatures coupled with lack of moisture slow growth, the plant response is more erratic than it should be. Growth dwindles rapidly, leaves become pale green or yellow with dark green veins, and the canes begin to die at the tips. The die-back continues downward until the bud union is reached. In extreme cases, the entire plant dies. It is a good policy to suspect winter injury when an abnormal plant condition appears, especially if the preceding winter has been a severe one, and if the normal cultural routine and pest control program cannot offer a reasonable explanation.

**PRUNING**

Proper pruning of rose bushes largely determines the size and number of blooms the plant will produce. As explained under planting suggestions, the first pruning is made while the plants are dormant at planting time. All types except climbers should be cut back to within 6 or 8 inches of the ground to induce the growth of new shoots from the base of the plant. Climbers seem to get off to a better start if they are not pruned back to less than 10 to 12 inches at planting time.

**Everblooming Bush Roses**

The pruning of established plants 1 year old or older varies with the type. With Hybrid Tea roses and the new Grandiflora rose varieties, the first thing to do after removing the winter covering is to cut away the dead wood. In most cases, this is all the pruning required. Of course, all weak wood should be removed, leaving only the strong canes from the base of the plant upon which the first crop of blooms will be produced. The more wood which can be brought through the winter and left at pruning time, the larger will be the first crop of flowers. Also, the quality of these blooms will be higher.

Cut the branch with pruning shears, or a sharp knife, about ¼ inch above a bud, or eye. If at all possible, make the cut above an eye which points in the direction you desire growth to follow. It is always better to keep branches from crossing through the center of the plant. Careful selection of the cutting point will result in a better balanced plant. The pruning of Floribunda and Polyantha roses is similar to that of the Hybrid Tea roses.

**The Hybrid Perpetual Roses**

These roses differ from the types described in the previous section in that their flowers are produced on canes which arise from canes that grew the previous season. It is necessary, then, if a large crop of bloom is to be expected, that only the weak, diseased and dead canes be removed at pruning time. Pruning consists in cutting away, at the base of the plant, all wood older than that grown the previous season—2-year-old wood. The canes that are left after this removal of wood should be reduced in number to four or five. Cut these canes back one-half of their length.

**Species Roses and Species Rose Hybrids**

Pruning Shrub roses of this type is not greatly different from pruning other early-flowering hardy shrubs. The objective is to maintain the natural growth habit of the plant. In general, the wood of the Shrub roses should be considered more permanent than that of roses of other classes. These roses are hardy enough to withstand midwestern winters, so that each spring new growth starts from the terminal and lateral buds on the wood grown during the previous summer. As on most other shrubs, flowers are borne terminally on shoots which arise from buds on last year's, 2-year-old, wood. For these reasons only the oldest branches are removed. In order to maintain the natural growth habit of the plant, these branches are best removed at the base of the plant. Pruning—as in all other plants grown in this area—is done in late winter or early spring before growth begins. Dead, injured and diseased wood should be removed at any time.

**Training Species and Species Hybrid roses as climbers and pillars.** Many Species roses and Species Rose Hybrids may be trained as really hardy climbing roses and pillar roses. The plants are trained to a support, either a post of the required height or a trellis, and strong canes originating at the base of the plant are tied to the support. Two or three canes should be sufficient for the average plant. After the selected canes have made enough growth to partially cover their
support, which should be in 2 or 3 years after training started, remove the rest of the plant. From then on, growth from the base of the plant is removed as fast as it appears. Training shrub roses to take the place of climbers is a slower process than using true climbing roses because the shrub roses are comparatively slow growing. However, by the end of the second season, the results obtained should be ample evidence of the results one can expect when training has been completed. During the process of training, careful fertilizing and watering will encourage more rapid growth.

**Pegging-down.** Another unusual way of using the Species roses and Species Rose Hybrids, and certain of the Old-Fashioned roses such as the Alba and Moss roses, is to “peg-down” in early spring. The long canes left after removal of excess wood are bent down and the tips secured by tying to either wires or pegs so that the canes lie parallel to the ground. Shoots, terminating in flower buds, will come from all the buds, or eyes, all along the canes, which in full bloom present a spectacular display.

**The Old-Fashioned Roses**

Rose authorities of the past century, when these roses were in their hey-day, advised severe pruning for the Gallica and Damask roses. The plants are pruned the same as the Hybrid Perpetuas except that the canes are shortened to five or six buds. This severe pruning, coupled with an application of fertilizer at flowering time, produces plants which are veritable bouquets when in bloom.

The Centifolia and Alba roses are best treated as the Species roses. They have a graceful, arching habit of growth when they reach maturity, which is more attractive than the growth resulting from the pruning dealt out to the Gallica and Damask roses.

Moss roses benefit from systematic summer pruning in addition to the dormant pruning given in the spring. The number of flowers produced in June is directly related to the number of canes which grew the previous season. To encourage production of the maximum number of new canes, each cane arising from the base of the plant should be cut back to four or five buds when it becomes 12 inches long. This summer pruning, or pinching, should not be continued past mid-July else the ensuing growth will not mature sufficiently to withstand the winter. In the spring remove only the dead, weak, diseased or injured wood. Moss roses are not difficult to grow, but the growth of short flower stems must be encouraged either by this means or by “pegging-down” (described earlier on this page) if they are to flower at their best.

**Climbing Roses**

The procedure for pruning hardy climbing roses is somewhat different after the first pruning. The small, cluster-flowering types, such as Crimson Rambler and Dorothy Perkins, produce flowers chiefly on canes which grew the previous season. Roses of this type are best pruned in midsummer after the flowering season. At that time remove all old canes and weak shoots. All of the canes which have withered flowers on them are cut out at the base of the plant. Healthy new shoots are then trained up to replace the branches which have been removed. The object is to make a complete new plant each year above the ground.

Large-Flowered Climbers, such as Dr. W. Van Fleet, Paul’s Scarlet Climber and Mary Wallace, are more tender than the small-flowered Rambler roses and should be pruned only to remove the winter-killed wood in the spring. After the plants have been in place 3 or 4 years, wood of that age should be taken out, at the base of the plant. Wood this old has become exhausted and should be removed.
PART 2. PEST CONTROL

There are a number of pests which appear from time to time to injure rose plants. The rose is not alone in having its full quota of pests, for most of the plants that we consider necessary for economic or ornamental purposes have their share.

The successful rose grower will adopt a program of prevention involving disease-resistant varieties, sanitation and protective chemicals. The chief objective of such programs is to prevent rose pests from becoming established in the garden by eradicating them as they appear.

DISEASE-RESISTANT VARIETIES

As an aid in controlling disease pests, the wise rose grower will select those varieties most resistant to the diseases prevalent in his area. In Iowa the two most common diseases are blackspot and powdery mildew. There are no roses immune to these diseases. However, there are roses which are less susceptible. These are the ones the gardener should choose. Such roses as Charlotte Armstrong, Confidence, Good News, Rose of Freedom, Rubaiyat, Chrysler Imperial, Orange Ruffles, Pink Princess and Red Duchess have shown a high degree of resistance to blackspot. Powdery mildew-resistant varieties are more difficult to find. Normally Charlotte Armstrong, Chrysler Imperial, Peace, Debonair, Good News, Pink Princess, Tiffany, Queen Elizabeth, Roundelay and Red Duchess are varieties that will be among the last to become infected.

SANITATION

Sanitation, although not an absolute preventative in pest control, is an important phase in the control of rose pests. By picking up and destroying (preferably by burning) all fallen leaves and faded blooms, sources of disease infection and hiding places for insect pests can be reduced to a minimum. Sanitation by itself cannot be depended upon to do the complete job of protecting roses. It must be coupled with the use of chemical controls.

CHEMICAL CONTROL

In order to achieve a reasonably pest-free garden, the rose grower must resort to the use of chemicals. The four principal points to keep in mind are (1) correct timing in the application of materials; (2) thorough coverage of the plant; (3) selection of the proper materials; and (4) proper concentration of the material to secure the desired results.

Protective Chemicals

The chemicals listed in the table are the ones most commonly available to the average gardener. The rose grower has an assortment of chemicals to aid him in controlling insect and disease pests. Each material has a limited range of pests against which it is effective, so selection should be made with these limitations in mind.

* This section has been prepared in cooperation with Arden Sherf, extension plant pathologist, and Harold Gunderson, extension entomologist.
<table>
<thead>
<tr>
<th>Chemical control</th>
<th>How used</th>
<th>Concentration</th>
<th>Pest controlled</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfur, wettable</td>
<td>Spray</td>
<td>3 tbs.; 1 gal. water</td>
<td>Powdery mildew, Blackspot</td>
<td>Will burn foliage during periods of high temperatures. If used in a dust-mixture the concentration of sulfur must be at least 60% to be effective.</td>
</tr>
<tr>
<td>Sulfur, dusting</td>
<td>Dust</td>
<td>Same as wettable sulfur</td>
<td>Same as wettable sulfur</td>
<td></td>
</tr>
<tr>
<td>Lime sulfur</td>
<td>Spray</td>
<td>1 pint; 1 gal. water</td>
<td>Powdery mildew, Blackspot, Brown canker, Stem canker</td>
<td>Should be used as a dormant spray only. It is too caustic for use on growing plants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1½ tsp.; 1 gal. water</td>
<td></td>
<td>Use this concentration during the growing season.</td>
</tr>
<tr>
<td>Ferbam (Fertane, Karbam, Ferradow, Nuleaf)</td>
<td>Spray or Dust</td>
<td>3 tbs.; 1 gal. water 10% dust</td>
<td>Blackspot, Leaf rust</td>
<td>Requires a sticking agent when used as a spray.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same as wettable sulfur</td>
<td>Same as wettable sulfur</td>
<td></td>
</tr>
<tr>
<td>Captan (50% wettable powder)</td>
<td>Spray Dust</td>
<td>8 tsp.; 1 gal. water</td>
<td>Blackspot</td>
<td>Garden fungicide orthocide available in 5, 7.5, 10 and 20% concentrations.</td>
</tr>
<tr>
<td>Sulfur-ferbam</td>
<td>Dust</td>
<td>Same as wettable sulfur</td>
<td>Same as wettable sulfur</td>
<td>May be available ready-mixed.</td>
</tr>
<tr>
<td>Sulfur-copper</td>
<td>Dust</td>
<td>90% sulfur 10% ferbam</td>
<td>Blackspot, Powdery mildew</td>
<td>May be available ready-mixed.</td>
</tr>
<tr>
<td>Bordeaux mixture</td>
<td>Spray</td>
<td>Use according to manufacturer’s instructions</td>
<td>Blackspot, Powdery mildew</td>
<td>The commercial bordeaux mixture prepared with a “fixed” copper is easier to use than the homemade product.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same as wettable sulfur</td>
<td>Blackspot, Powdery mildew</td>
<td></td>
</tr>
<tr>
<td>Lead arsenate</td>
<td>Spray Dust</td>
<td>3 tbs.; 1 gal. water</td>
<td>Rose slug, Rose beetles</td>
<td>Good control for chewing type insects. Leaves an objectionable gray residue.</td>
</tr>
<tr>
<td>Nicotine sulfate, 40%</td>
<td>Spray Dust</td>
<td>1 tsp.; 1 oz. laundry soap; 1 gal. water</td>
<td>Aphids</td>
<td>A good contact insecticide for sucking insects. Always use a spreader.</td>
</tr>
<tr>
<td>Rotenone</td>
<td>Spray</td>
<td>1 tsp.; 1 gal. water</td>
<td>Aphids, Thrips, Rose slug, Red spider</td>
<td>Rotenone preparations lose potency with age or if exposed to light or moisture and should never be used if over 1 year old.</td>
</tr>
<tr>
<td>Pyrethrum</td>
<td>Dust</td>
<td>2½ to 1% dust</td>
<td>Aphids</td>
<td>Loses potency with age. Must be used fresh.</td>
</tr>
<tr>
<td>DDT</td>
<td>Spray</td>
<td>2 tbs. 50% wettable (4 tbs. = 25%); 1 gal. water</td>
<td>Thrips, Aphids, Rose slug, Rose beetles, Rose curculio</td>
<td>DDT tends to be toxic to roses. Methoxychlor is a less toxic substitute.</td>
</tr>
<tr>
<td>Methoxychlor as 50% wettable powder or 25% emulsifiable concentrate</td>
<td>Dust Usually 2.5 to 5% DDT or methoxychlor</td>
<td>1 tbs.; 1 gal water</td>
<td>Thrips, Aphids, Rose slug</td>
<td></td>
</tr>
<tr>
<td>Lindane as 25% wettable powder or 20% emulsifiable concentrate</td>
<td>Spray Dust</td>
<td>1½ tsp.; 1 gal. water</td>
<td>2-spotted mite (red spider or spider mite)</td>
<td>Do not use with a spray or dust containing lime.</td>
</tr>
<tr>
<td>Aramite Niagramite Orthomite</td>
<td>Spray Dust</td>
<td>1½ tsp.; 1 gal. water</td>
<td>Thrips, Aphids, Rose slug, Rose beetles, Red spider (2-spotted mite or spider mite)</td>
<td>These materials should be used according to the manufacturer’s instructions.</td>
</tr>
<tr>
<td></td>
<td>DMT</td>
<td>1½ tsp.; 1 gal. water</td>
<td>2-spotted mite (red spider or spider mite)</td>
<td></td>
</tr>
<tr>
<td>Malathion</td>
<td>Spray</td>
<td>Red spider (spider mite or 2-spotted mite)</td>
<td>Aphids, Slugs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dust</td>
<td>Spiders, Aphids, Slugs</td>
<td>Aphids, Slugs</td>
<td></td>
</tr>
</tbody>
</table>

Buck and Volz: A handbook for rose growers
Published by Iowa State University Digital Repository, 1955
GENERAL-PURPOSE PESTICIDE

A pesticide is most efficient when used alone to combat the particular pest for which it is adapted. However, the average rose gardener does not have the time needed to combat pests in such fashion. For those gardeners there have been developed various combinations of insecticides and fungicides which will give good control of the common insects and diseases affecting roses. There are many excellent preparations, both dusts and sprays, on the market.

The typical general-purpose pesticide contains a fungicide, or fungicides, adapted to the control of blackspot and powdery mildew, the two most common rose diseases; an insecticide for the control of sucking insects; and one for chewing insects. In addition, many now include a miticide, or acaricide, for the control of two-spotted mite (red spider).

Most of the general-purpose sprays or dusts on the market contain various combinations of the following materials:

<table>
<thead>
<tr>
<th>Material</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDT</td>
<td>50% wettable</td>
</tr>
<tr>
<td>Methoxychlor</td>
<td></td>
</tr>
<tr>
<td>Lindane</td>
<td></td>
</tr>
<tr>
<td>Lead arsenate</td>
<td></td>
</tr>
<tr>
<td>Aramite</td>
<td></td>
</tr>
<tr>
<td>Micro-fine sulfur</td>
<td></td>
</tr>
<tr>
<td>Ferbam</td>
<td></td>
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<tr>
<td>Ammoniated copper</td>
<td></td>
</tr>
<tr>
<td>Potenone</td>
<td></td>
</tr>
<tr>
<td>Pyrethrins</td>
<td></td>
</tr>
</tbody>
</table>

While many general-purpose pesticides are available to the rose grower, some gardeners prefer to combine their own pest control materials. Such a plan permits the addition or deletion of materials as conditions require. If the gardener prefers dusting to spraying, it would be best to purchase a ready-mixed dust. It is difficult to mix dust materials to obtain a homogenous mixture without the use of special equipment.

A general-purpose spray which has given good results is this one recommended by the New York Botanical Garden:

1 tsp. Dreft
3 tbs. ferbam
1½ tbs. sulfur, wettable
1½ tbs. DDT (50 percent wettable)
3 gal. water

Three teaspoons of nicotine sulfate (40 percent solution) may be added as needed to control aphids. Since the spray mixture contains DDT, two-spotted mite (red spider) may become a problem after it has been used for a time. Should this happen, Aramite, at the rate of 1½ teaspoons to 1 gallon of water, may be added.

One caution should be observed in using all-purpose pesticides. Such mixtures are designed to combat the normal pest situation only. If one particular pest increases to the point that control with the all-purpose material becomes difficult, the use of a material specific for controlling that particular pest should be used to supplement the all-purpose material. After the emergency subsides, the supplemental pesticide may be discontinued.

APPLICATION

One of the first problems the rose grower must solve is that of applying pest control materials. He has his choice of two methods—spraying and dusting. Each method has its advantages and disadvantages.

Spraying

Spraying has many advocates because it permits a relatively accurate control of the amount of material applied to each plant. An additional advantage is that sprays permit a more flexible use of materials to meet emergencies as they arise. Because many chemicals used in combatting rose pests deteriorate upon standing, spray solutions should be freshly mixed each time spray applications are required. Any excess spray solution should be discarded after each spraying.

Spraying is a messy task, and the time required to prepare spray mixtures and clean equipment after spraying is important to the busy gardener. However, those who spray consider that the results obtained offset the disadvantages.

Dusting

The chief advantages of dusting are the ease with which it can be done and the time it saves. However, there is no adequate control over the amount of material applied to each plant, and unless the dust is applied on a still day, it is difficult to secure adequate coverage of the plant with the pesticide. Applying dusts while the foliage is wet often gives the plants an unsightly appearance. This can be avoided by dusting in the evening.
Equipment

Regardless of the method of application, the efficiency of any pesticide will be greatly increased by the use of proper equipment as well as by the timing of applications. In selecting a sprayer, care should be taken to get one capable of maintaining sufficient pressure to break up the spray solution into a fine mist. A good duster should produce a fog of fine pesticide particles. Nozzles should be at such an angle that the pesticide can be applied to the underside of the foliage. Needless to say, both pieces of equipment should be kept scrupulously clean. Equipment used in spraying or dusting roses should not be used for the application of weed-killers containing 2,4-D. Roses are very susceptible to injury from this material, and even very low concentrations, as often exist in sprayers used for applying 2,4-D, can result in serious injury.

In applying the pesticide, care should be taken to cover every part of the plant, especially the under surfaces of the leaves where many pests become established before the gardener is aware of their presence. The commercially prepared dusts contain materials which cause the pesticides to adhere to the foliage. Many sprays contain wetting agents which reduce surface tension of the liquid, permitting more thorough coverage of the plant surface.

Wetting Agents and Stickers

The glossiness of rose foliage, which adds to the plant's attractiveness, often makes effective coverage with pest control materials difficult. Manufacturers of ready-mixed sprays and dusts have recognized this situation by adding materials which increase the wetting ability of spray materials and add to the adhesiveness of dusts. These materials are called wetting agents and stickers. The gardener who prefers to mix his own spray materials can secure comparable results by adding one of the commercial wetting agents to the spray mixture. Mild soap flakes or powder or one of the mild detergents, used in sufficient quantity to produce sudsing, are excellent wetting agents available to the home gardener. One to four tablespoons of either soap flakes or detergent to each gallon of water will be required, depending upon the hardness of the water.

Timing

Selection of the proper fungicide or insecticide is important, but no less important is correct timing in applying the material. Too many gardeners blame the material for poor control when the fault actually lies in failure to apply the material at the proper time or in sloppy application. To obtain the most efficient protection, the rose plant should be kept covered with a coating of fungicide and insecticide.

The first application of pesticide should be made in the spring when the leaves are the size of a thumbnail. From then on, care should be taken to see that the plants never go through a rainy period without a protective covering. During the time the plants are growing most rapidly and during rainy weather, applications of fungicides and insecticides may be needed two or three times a week. Later in the season, when growth has slowed down or rains are less frequent, applications at intervals of a week or 10 days may be sufficient.

During hot weather, it may be advisable to syringe the plants from time to time to remove spray or dust residues. This not only improves the appearance of the plants, but also removes the possibility of injury to the plant from an accumulation of pesticide chemicals. Syringing should be done early in the day so that the foliage can be dry by noon. As soon as the foliage has dried, make a fresh application of fungicide.

DISEASES OF ROSES

Roses grown in Iowa and other Midwest gardens are subject to attack by several diseases, but only two are important enough to make control measures essential. These two most commonly occurring diseases are blackspot and powdery mildew. Other diseases, such as stem canker, brown canker, stem rust and leaf rust, may be troublesome in certain plantings and require attention. Usually the disease control program adopted to combat blackspot and powdery mildew will minimize the importance of the minor diseases. The rose grower should learn to recognize the more prevalent diseases. Then he may ask the plant pathologist for assistance in diagnosing troubles that may be due to diseases infrequently seen.

Blackspot

This disease, which produces premature leaf drop, is one of the most common diseases of roses.
Rose leaves affected by blackspot.
The top leaf is unaffected.

Practically all varieties are affected although they may vary in the degree of their susceptibility. The disease usually appears as circular black spots, with feathery margins, on the upper surfaces of the leaves, on leaf petioles and on stems. The spots usually appear in late spring and early summer although they may come at any time during the growing season. The spots may run together, forming larger areas, and in severe attacks the entire leaf may be covered. The leaf surface not covered by the black spots may become chlorotic before the leaf falls, and it is common for all the uninvaded tissue of the leaf to turn yellow before dropping prematurely. The yellowing may be confined to a narrow band outside the black spot, or the attacked leaflet may turn yellow in spots.

Premature defoliation is an outstanding characteristic of the disease and may weaken the plant in several ways. It prevents normal wood maturity, or it may stimulate growth from leaf buds, which would normally not grow until the next year, late in the season. In either case the plant will be so weakened that it will be especially susceptible to winter injury. Defoliated plants that do survive will produce fewer flowers the next year. Blackspot infections may occur on immature wood where they appear as raised, irregular blotches.

In controlling this disease, the destruction of all infected leaves by burning will be helpful. The spray or dust program should start in early spring. Fresh applications of spray or dust must be applied immediately after each rain. Keeping the plant growing vigorously by fertilizing and watering, being careful not to wet the foliage, will also help in controlling the disease. A further aid in controlling this pest is a 3-inch mulch of granulated peat, coarsely crushed corncobs, or similar material. Chemical controls for blackspot include sulfur, both wettable and dusting grades, ferbam and Captan.

Rose Rusts

The rose rusts are of two kinds, leaf rust and stem rust. Leaf rust produces premature defoliation. The disease first appears as a mottling of the upper leaf surface followed by bright orange pustules on the lower surface. Small green spots remain in the areas where the spores form while the rest of the leaf becomes chlorotic or yellowed. Stem rust produces a rough charcoal-like growth on the stems—orange-red first, then becoming black. It also attacks the foliage, causing large red spore masses to appear on the leaves, which become curled and distorted. The native roses are principally affected, but the disease may be spread from them to garden roses. These diseases do not become serious where control measures for blackspot and powdery mildew are in force. The use of dormant sprays, either lime sulfur or bordeaux mixture, and the removal of infected canes as they appear will be helpful in controlling this disease.

2, 4-D Injury or Shoestring Disease

This condition in roses is not strictly a disease. Rather it is the plants' response to exposure to compounds containing 2,4-D or its vapors. Roses are extremely sensitive to this material, and very low concentrations can cause serious injury or the death of the plant. The symptoms of 2,4-D injury are distinct and can be characterized by the term shoestring-like. In typical cases, the leaflets become elongated with pronounced, fringe-like margins. Upon maturity they become very brittle. If the flower buds are forming at the time of exposure, the flowers will more nearly resemble chrysanthemums than roses. Infected canes turn rubbery and die back to the base. If the plant is not killed immediately by the chemical, it will probably survive and grow normally the next season. In some cases, the early growth of the next spring will be chlorotic with pronounced green veins, but this condition will pass as growth continues. The only control is prevention from exposure.
Powdery Mildew

This is another common disease which is troublesome on practically all garden roses. There are several resistant varieties, but in seasons favorable for the development of powdery mildew, even these will be affected. The first symptoms of the disease appear as raised, blister-like areas on the flower buds, stems, leaves, petals and leaf petioles. These blister-like patches may be followed by a grayish-white, felt-like, powdery fungal growth. Older leaves may be attacked, usually without the accompanying distortion. Young growing tips may become completely covered with the mildew, resulting in dwarving and malformation of the leaves, stems and flower buds. Affected buds may not open or may produce malformed flowers, and in severe cases, defoliation may occur.

The disease is most prevalent during cloudy, damp weather, or in the fall when warm days are followed by cool nights, but it can be a serious problem at any time during the growing season. Roses grown in poorly ventilated areas are especially subject to powdery mildew attack. The same methods of control used for blackspot apply to this disease. Sulfur is especially effective.

Branch of rose bush injured by 2,4-D.

Stem, leaves and bud affected by powdery mildew.
Balling

This is another condition which is sometimes taken for a disease. The part affected is the developing flower bud. This condition is caused by a failure of the flowers to open due to a gluing together of the outer petals. Varieties whose flowers have very thin petals, lacking in substance, are particularly prone to this condition. Balling is more prevalent in damp, foggy weather than in the hot, dry summers of the Midwest. There is no control except to avoid planting those varieties which habitually “ball.”

Canker

The canker diseases, stem canker and brown canker, are seldom serious problems in those gardens where an effective disease control program is followed and the plants are given good culture. However, they do occur often enough to warrant including them here. Stem canker, often called “die-back,” first appears as a small pale yellow or reddish spot on the bark. The spots gradually run together, resulting in a large infected area which may encircle the cane. If this happens, the cane beyond the infected portion dies. As the diseased portion dries, the bark cracks and the canker becomes evident. Stem canker may start at the tip of a cut stem and produces a progressive downward killing of the cane, thus the term “die-back.”

The effect of brown canker is similar to that of stem canker. The cankers occur on any part of the plant above ground. They are usually cinnamon-buff in color, surrounded by a purple border. The foliage and flower buds may also be attacked. On the leaves the disease is first evident as tiny purple flecks which enlarge and take on the characteristic cinnamon-buff, purple-bordered color. On the flower, the petals may be figured by large, nearly circular, brown spots. Infected buds may fail to open.

Removing infected plant parts and destroying them by burning is the most successful means of control. This should be supplemented by the disease-control program in effect for other disease pests. Care should be taken to sterilize pruning instruments in alcohol or formaldehyde solution (1 ounce in 2 gallons of water) to prevent spread of the disease to other plants. Where the disease is especially prevalent, it may be advisable to protect cut surfaces made in pruning with a coating of asphalt-base tree paint or shellac. A dormant lime sulfur spray in early spring and fall is helpful in keeping down infection.

INSECT PESTS OF ROSES

As in the case where rose diseases are concerned, there are several insects which attack roses. Some of them are serious pests; others, while producing a degree of disfiguration, are of interest chiefly as a curiosity. Again, as with diseases, the majority of rose insect pests are susceptible to a carefully planned control program.

In the Midwest, combination or all-purpose rose sprays or dusts can be used effectively. Rotenone or lindane controls aphids and sawfly larvae (rose slugs), DDT controls sawfly larvae and rose beetles but may increase red spider (two-spotted mite) populations. DDT may repel leaf-cutter bees and gall-forming insects. Aramite and Ovotran are trade-named chemicals for two-spotted mite (red spider) control only. All of these chemicals are compatible with sulfur, ferbam and other common rose fungicides. Read the ingredient statement on the label as well as the manufacturer’s suggestion for use of the product. The following
concentrations are usually available: rotenone—0.75 percent; lindane—0.1 to 0.25 percent; DDT—2.5 to 5 percent.

**Aphids**

Aphids are probably the most common sucking insects attacking roses. They are usually green, but aphids of other colors have been found feeding on roses. They are usually clustered on the developing buds or tender growing tips of the canes, but they may also be found on and underneath young leaves. They reproduce very rapidly, so control measures should be put in force as soon as the first individuals appear. Whatever material (spray or dust) is used, it is important that it hits the insects to be destroyed. Aphids produce a distortion of the tips of the canes and malformation of the flower buds.

**Beetles**

There are many kinds of beetles which attack roses at intervals during the growing season. These pests feed on various portions of the plant, but usually the flower is the part affected. The petals and stamens have a peculiar fascination for these insects. In addition to chemical controls, handpicking early in the morning, while the beetles are sluggish, is effective in small plantings.

**Galls**

An insect group which does little actual harm, but produces a peculiar type of injury, is the gall-making insects. They sting canes and leaves, laying eggs in the process. The injured portion enlarges and may become quite hairy or thorny, and in some roses, develop a pronounced russet-apple scent. Some kinds of rose-galls are strongly sweetbriar scented. The French call this group of pests “Bedeguer” and use the gall-infested branches in dried arrangements. There is no known control although a good pest control program tends to discourage these pests.

**Rose Scale**

Rose scales are small, white, and rather easily dislodged pests. Under each scale is a motionless, sucking insect. Heavy infestations weaken the plant. They are most frequently found on the twigs and larger canes of climbers and shrub roses, and at the base of the plant in the vicinity of the bud-graft union on the everblooming bush roses. Control is achieved with dormant lime sulfur applied early in the spring and in the fall.
On the everblooming types it is advisable to remove the soil from around the bud-graft union to permit thorough coverage of this part of the plant and its scale.

Two-Spotted Mite (red spider, spider mite)

Commonly called red spiders from their color and web-making characteristics, two-spotted mites are the most serious pest affecting roses in Iowa. The tiny, speck-like mites infest the undersides of the leaves where they feed by inserting their sucking mouthparts. They produce a typical yellow or pale green stippling along the veins on the upper surface of the leaf. As the pest continues to feed, the leaves turn coppery-yellow and fall. In bad infestations the plant may become completely covered with grayish webs. In addition to being prematurely defoliated, plants seriously affected by two-spotted mite may fail to produce new shoots due to the feeding of the pest as the leaf buds swell.

Control with the usual insecticides is difficult. Recently materials specific for the control of two-spotted mite have been developed, which are termed miticides or acaricides. Several of these materials are hazardous to use, and the gardener must choose his materials with great care and follow the manufacturer's recommendations to the letter.

Thrips

The results of thrips attack are usually seen before the insect. The small insects worm their way into unopened flower buds where they feed by rasping the tender petals and sucking the sap which exudes. Injured buds turn brown and either fail to open or produce misshapen flowers with brownish areas on the edges of the petals. Thrips injury on foliage appears as speckled, silvery spots. Removal and destruction of faded blooms by burning is a necessary supplement to chemical control. Since there are several generations of thrips each year, chemical controls should be applied at weekly intervals throughout the season.
Rose Slugs

Rose slugs are the larvae of various rose sawflies, not the soft-bodied snails usually called slugs. They can be considered typical of the chewing insects that can be killed by a stomach poison—such as arsenate of lead. The damage done will depend upon the species of sawfly larvae. The leaf may be skeletonized, leaving only the veins and the thin, transparent upper layer, or portions of the leaf may be entirely eaten away. These pests may appear at any time throughout the growing season.

RODENTS

Mice and Rabbits

Roses in the Middle West suffer frequently from mouse and rabbit injury which occurs principally during the winter. Both animals injure roses by eating the bark from the canes. Rabbit injury is more serious on climbing roses and shrubs because these plants bloom best from old wood. Practically all rose plants are injured by mice. Mouse injury can be minimized by delaying the application of the litter mulch in winter protection until the surface of the ground is frozen. Choice plants may be encircled by a 3-foot poultry netting cylinder to keep rabbits away. A deep layer of litter will also prevent rabbit injury to canes at the base of the plant. Rodent-repellent paints may be of value in reducing the amount of rabbit and mouse injury.

Other aids in preventing injury of this type are:
(1) Cut and remove long grass and weeds which may harbor mice. (2) Expose dry warfarin bait in protected bait stations near rose plantings early in the fall. The mice will be killed before they can establish winter runs or damage the plants.

NOTE: In order that the information in this publication may be more easily understood, it is sometimes necessary to use trade names of products or equipment rather than complicated descriptive or chemical identifications. In so doing, it is unavoidable that in some cases similar products on the market under other trade names may not be mentioned. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.