



ROSE GROWING IN HAWAII

UNIVERSITY OF HAWAII • COOPERATIVE EXTENSION SERVICE • CIRCULAR 468



Typical hybrid tea (AARS photo)

ROSE GROWING IN HAWAII

Donald P. Watson, Specialist in Horticulture

Philip E. Parvin, Associate Specialist in Horticulture

Richard A. Criley, Assistant Professor of Horticulture

*Cover photo: All-America Award Winner 'Mister Lincoln' ® plant patent 2370
Courtesy Conrad Pyle Company*

CONTENTS

Types of Roses	1
Recommended Cultivars	4
Selecting Roses	7
All-America Awards	7
Buying Plants	9
Propagating	10
Planting	11
Building the Young Plant	14
Mulching	14
Watering	14
Fertilizing	15
Pruning	16
Disbudding	19
Replanting	20
All-Purpose Spray Program	20
Rose Pests	20
To Diagnose Rose Problems	22
Defects in Flowering	23
Cutting the Flowers	24
To Make Roses Last Longer	25
Exhibiting	26

ROSE GROWING IN HAWAII

The rose has been of great significance to man throughout history. It was used as a symbol on coins in central Asia as far back as 4000 B.C.

Although usually thought of as a plant for temperate regions, the rose thrives in a wide variety of climates in Hawaii. The pink rose, commonly grown at Kilauea on Hawaii, has long been known as the "volcano rose" (Loke-o-ka-lua-Pele). Other old-fashioned types are the cabbage, moss, damask, and brier roses. Early missionaries brought damask and brier roses, typified by the flower of Maui, "Lokelani," a deep pink fading to pale pink and almost white. Most of the older types are distinct species rather than hybrids that commonly are planted today.

In our warm climate at sea level, roses grow and flower throughout the year. Plants produce flowers in cycles. They bloom for a few weeks, after which vegetative growth continues before another flowering cycle begins. So rose production in Hawaii at low elevations is similar to that of the mainland greenhouse grower who has flowers year round yet builds, maintains, and rests the plants.

Roses can be in continuous bloom in cooler climates of highland communities such as Kula, Maui, Volcano, and Kamuela on the Big Island. It takes only 5 to 7 weeks from the time one rose is cut until the next blossom appears on the same stock. Many gardeners cut back their bushes to within 24 inches of the ground in early January. This temporarily eliminates all bloom but creates a spectacular burst of color 3 months later.

TYPES OF ROSES

Roses are divided into two main types: Bush roses grow 1 to 6 feet high and require no support; climbing roses produce long stems that require some support. Bush roses are grouped primarily on the basis of their flowering habits.

Hybrid Teas

Teas, the most widely grown of all roses, produce successive waves of flowers on 2- to 6-foot bushes. Usually, the flowerbuds are long and pointed, and the flowers are borne on single stems or in clusters

of three or more stems. Some hybrid teas have single flowers with very few petals; others have extremely large double flowers with many petals. Most hybrid teas have some fragrance, especially in the early morning, and are available in a wide range of colors ('Tropicana,' 'Charlotte Armstrong').

Floribundas

Floribunda roses tend to produce smaller flowers in clusters, although the individual flowers resemble the hybrid teas in form. They are more often used in beds for displays than as cut flowers ('Ma Perkins,' 'Circus').

Grandifloras

Grandiflora is a term used to describe roses that tend to combine the best qualities of hybrid teas and floribundas. They are often difficult to distinguish from hybrid teas, but usually produce long-stemmed medium-sized flowers singly or in small clusters ('Buccaneer,' 'Queen Elizabeth').

Polyanthas

Polyanthas produce large clusters of small flowers on bushes. They are especially useful for massing in borders or for making small corsages ('Cecile Brunner,' 'Margo Koster').

Miniatures

Miniatures produce tiny leaves and flowers on plants that are usually only 6 to 12 inches high. Flowers are borne in masses. The plants are often used in containers or in rock gardens ('Tom Thumb,' 'Red Elf').

Tree Roses

Tree roses are produced by budding bush-type roses on upright or standard 2½- to 4-foot stems. Most of the better known roses are available as tree roses. They are used in formal plantings or where space is limited so that flowers can be produced at two levels in the same planting.

Climbers

Climbing roses produce long canes that require the support of fences or trellises. As in bush roses, climbers exhibit a variety of flowering characteristics, ranging from large flowering types, everblooming, climbing hybrid teas to climbing polyanthas and floribundas.



Typical floribunda (AARS photo)

RECOMMENDED CULTIVARS

It is difficult to compose a comprehensive list of all roses that could be recommended. Not all roses perform the same in every section of the State. No listing can compare with the information gained by testing a selection locally. The following list includes those that should perform satisfactorily throughout Hawaii. The American Rose Society, 40-48 Roselea Place, Columbus, Ohio 43214, provides lists of thousands of roses with ratings based on preference of its many thousand members. This rating, along with observations of performance in Hawaii, has provided a basis for the following list. Because of the wide range of conditions within the State, many other roses might prove to be outstanding. Every year new roses are named and introduced. Many are worthy of trial on a small scale until their performance warrants further planting.

Hybrid Teas

K - Superior in Kula
H - Superior in Honolulu

Red

Bacaara K
Chrysler Imperial
Command Performance
Charlotte Armstrong
Christian Dior K
Crimson Glory
El Capitan K
El Cid
Firelight H
First Prize H
Fragrant Cloud H
Grand Slam
Happiness K
John S. Armstrong
Mister Lincoln
Red Chief
Red Radiance
Viking K

Orange

Floriade K
Hawaii
Lady Elgin H
Mojave
Sierra Dawn
Tanya
Tropicana K,H
Yellow
Champagne
Eclipse
Golden Chalice K
Golden Sceptre K
Golden Gate K
Irish Gold K,H
King's Ransom
Lemon Spice
Town Crier K
Summer Sunshine K

Hybrid Teas (Continued)

Pink

Bewitched
Century Two
Columbus Queen
Countess Vandal K
Day Dream
Dixie Belle
Duet K
Eiffel Tower K
First Love K
Marie Antoinette
Miss All American Beauty
Pink Duchess
Pink Peace H
Portrait K
Royal Highness K

Show Girl
South Seas K
Tiffany K
White
Garden Party
J.F. Kennedy K
Matterhorn K
Pascali K
Sincere K
Virgo K
White Knight
White Masterpiece K
Mauve
Heirloom K
Lady X H
Song of Paris
Sterling Silver K

Blends

American Heritage (ivory tinged carmine)
Apollo (yellow and red) K
Chicago Peace (pink coppery blend) H
Fortyniner (chinese red with creamy yellow on reverse of petals) K
Duet (salmon pink, orange red)
Flaming Peace (red and yellow)
Granada (shades of red, orange and yellow)
Helen Traubel (apricot pink) K,H
Peace (cream yellow pink edged petals) K,H
San Diego (cream yellow with pink tinge)
Touch of Venus (white with pink blush)

Floribundas

Red

Con Tempo
Europeana
Frensham H
Fusilier
Garnette K
Jazz Fest
Red Cushion
Roman Holiday H
Ruby Lips
Torchy
Valentine
World's Fair

Floribundas (Continued)

Orange

Fashion
Floradora
Spartan

Yellow

All Gold
Golden Garnette K
Moon Sprite
Yellow Cushion
Yellow Pinocchio

Pink

Capri K
Fabergé K
Gay Princess
Gene Boerner
Little Princess K
Pink Bountiful
Pinkie
White
Saratoga
Summer Snow
Snow Fairy

Blends

Angel Face (lavender)
Apéritif (ivory and deep rose) K
Apricot Nectar (apricot)
Circus (yellow and orange)
Golden Slippers (orange and gold)
Jimminy Cricket (tangerine red opening to coral orange)
Masquerade (yellow, ages to pink and red)
Redgold (red edge on yellow) K, H

Grandifloras

Red

Carousel
Merry Widow
Olé
San Antonio
Scarlet Knight

Orange

Comanche
Montezuma

Yellow

Buccaneer
Golden Girl

Pink

Aquarius H
Camelot
Lucky Lady
Pink Parfait
Queen Elizabeth

Polyanthas

Carroll Ann (rust salmon pink)
Cecile Brunner (pale pink)
Charlie McCarthy (white)
Fairy (waxy pink)
Happy (brilliant red)

Polyanthas (Continued)

Koster's Fulgens (red)
Margo Koster (salmon with orange and pink shading)
Mother's Day (deep red)
Snow White (white)

Miniatures

Baby Masquerade (multicolor)
Cinderella (white)
Pixie (white)
Red Elf (red)
Roulette (pink)
Sweet Fairy (pink)
Tom Thumb (red)

The address of the Miniature Rose Society is P. O. Box 1481, Kansas City, Missouri 64141.

SELECTING ROSES

Homeowners often are puzzled when faced with the multitude of roses available and the wide range of prices. Although many other roses might be included, any of those on the above list are worth trying.

For cutting, for size, and for enjoyment in the garden, hybrid teas are the most satisfactory. They make the biggest showiest flowers. If quantity of flowers and ease of maintenance are more important to you, plant floribundas and polyanthas.

ALL-AMERICA AWARDS

For the past 30 years the All-America Rose Selections have accepted rose entries for trial gardens throughout the United States. Several judges score the entries for a 2-year period, and the best rose or roses are honored with an All-America Award. Usually, All-America Award winners carry a metal insignia indicating the year in which the award was received. Recent All-America Award winners are:

	Award Winner	Originator
1972	Apollo Portrait	D. L. Armstrong Carl Meyer
1971	Aquarius Command Performance Redgold	D. L. Armstrong Lindquist Dickson
1970	First Prize	Boerner
1969	Angel Face Comanche Gene Boerner Pascali	Swim & Weeks Swim & Weeks Boerner Louis Lens
1968	Europeana Miss All American Beauty Scarlet Knight	G. deRuiter Meilland Meilland
1967	Bewitched Gay Princess Lucky Lady Roman Holiday	Lammerts Boerner D. L. Armstrong & Swim Lindquist
1966	American Heritage Apricot Nectar Matterhorn	Lammerts Boerner D. L. Armstrong & Swim
1965	Camelot Mister Lincoln	Swim & Weeks Swim & Weeks
1964	Granada Saratoga	Lindquist Boerner
1963	Royal Highness Tropicana	Swim & Weeks Math. Tantau
1962	Christian Dior Golden Slippers John S. Armstrong King's Ransom	F. Meilland Von Abrams Swim Morey

Rose gardens can be observed at sea level in Kapiolani Park, Honolulu, and at the University of Hawaii Experiment Station at Kula on Maui. Since 1971, the Kula Garden has been an official All-America Rose Selection Public Garden. Current winners as well as advanced previews of the winners for the coming year may be evaluated by visitors.

Any rose that carries a plant patent is protected by the nurseryman who produced it, so it is illegal to propagate it for commercial sale without the permission of the patent holder.

BUYING PLANTS

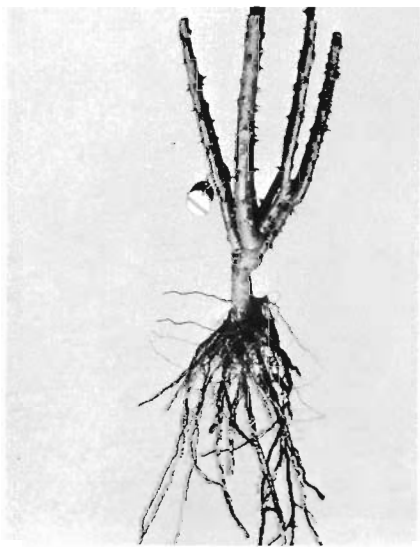
Rose plants are available in local nurseries, garden centers, drug-stores, supermarkets, and department stores. They can be ordered directly from the well-illustrated catalogs of Mainland nurseries. When buying plants, it is well to remember that an extra dollar or two for higher quality can be a good investment in a purchase that will last for several years.

Grades

Although roses differ in vigor, the strongest growing varieties should meet the following standards:

- No. 1 —Three canes, two or more of which are 18 inches long (hybrid teas and grandifloras), 15 inches (floribundas).
- No. 1½—Two or more canes 15 inches long (hybrid teas and grandifloras), 14 inches (floribundas).
- No. 2 —Two or more canes 12 inches long (hybrid teas and grandifloras).

Weaker growing varieties may have shorter canes. Some strong-growing varieties may have more of the cane removed to reduce the cost of air shipment to Hawaii. In general, the longer the cane the greater its diameter.



Good quality dormant bush

Illustrated catalogs are printed by:

Armstrong Nurseries
Box 473
Ontario, California 91764

Jackson & Perkins
Medford, Oregon 97501

Starr Roses
Box 237
West Grove, Pennsylvania 19390

Weeks (wholesale)
Ontario, California 91762

Howard Rose Company
P. O. Box 1287
Hemet, California 92343

Melvin E. Wyant
206 Johnny Cake Ridge
Mentor, Ohio 44060

Wayside Gardens
Mentor, Ohio 44060

Dormant bare-root plants are usually available in the spring of the year, but they can be planted at any time. A good dormant plant should have dormant buds and strong vigorous green stems the diameter of a lead pencil, not withered or covered with mildew. The roots should not be dry.

Container-grown plants may be purchased in full leaf, often in flower. There is an advantage in seeing the flower at the garden center and checking its trueness to name. Plants grown in containers can be transplanted without disturbing the roots. Growth will usually be more rapid if the aboveground stems are pruned back to about one-half their length at the time of planting. This reduces water loss and hastens the production of new root growth.

It makes little difference if a new rose bush comes in with moist bare roots packed in peat moss or sawdust, or if it is potted or packaged, so long as it is a sturdy bush with healthy, light-brown or white roots and three to five strong canes more than $\frac{1}{2}$ inch in diameter.

PROPAGATING

Some gardeners prefer to root their own cuttings of some of their best roses. This can be done by making cuttings 8 inches long from recently matured green wood. Make a cut just below the bud, stir the cut end in a rooting powder (No. 2 Rootone, or Hormodin No. 2) and plunge the cutting into a well-drained rooting medium, leaving at least two buds exposed at the top of the cutting. After the cutting has developed a root system, it may be transplanted into a permanent location.

All roses will not root easily from cuttings; many need to be budded on vigorous rootstock, as is done commercially. The nurseryman selects rootstock that is resistant to drought and summer heat. He considers the length of the life of the plant, the tendency for suckering, resistance to nematodes, continuity of growth, ease of budding, distribution of the root system, compatibility of the stock and the bud, as well as the vigor of the plant.

Research in Hawaii suggests that, at sea level, roses budded on a *Rosa fortuniana* rootstock are best prepared to withstand the high temperatures and lack of dormancy. At higher altitudes there is no difference between roses budded on *R. fortuniana* and other rootstocks. Nurserymen, through many years of experience, have improved the quality of available plants. It is seldom worthwhile for a homeowner to root his own cuttings unless it is merely for the satisfaction of doing it.

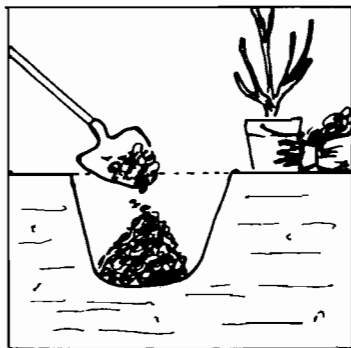
PLANTING

Roses will grow best in a sunny location protected from constant strong winds. Flowers will open more rapidly in a hot dry location than in a cool location. Roses will grow in almost any well-drained fertile soil. To improve soil that is too heavy and has poor drainage, put a layer of gravel covered with a layer of peat moss in the bottom of the hole before planting.

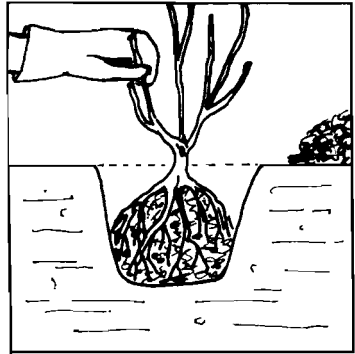
Roses planted too close together are difficult to care for adequately. On the average, hybrid teas and floribundas should be planted 2 feet apart, polyanthas 1½ to 2 feet, and climbing roses up to 8 feet.

If plants appear to have dried out during shipment, soak them in a pail of water for a few hours before planting. After planting, the tops will benefit from frequent, light sprays with water, using a mist nozzle on a hose.

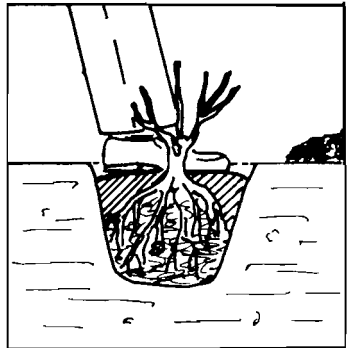
Roses require a well-prepared, deeply spaded bed in a well-drained area. Dig each hole 15 to 18 inches wide and as deep. Add 1 quart of peat moss or compost, and mix well with the existing soil. Form blunt cone of the mixture in planting hole for bare-root plants. Place plant food tablets as recommended on the container 3 to 5 inches below the root system to provide food directly to the roots as they grow.



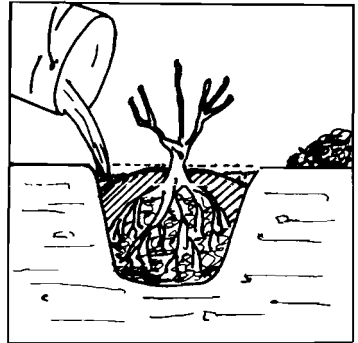
Prune all rose canes to 12 inches and remove any broken or injured roots. Position rose on soil cone so that bud union (swelling at base of stem) is just above the ground level after the ground settles.



Work in soil around roots to eliminate any air pockets. Firm soil about roots and add more soil until hole is three-fourths full, then firm with foot or tamper, using care not to injure roots.



Fill remainder of hole with water and allow it all to soak in, then refill. After water drains, see that bud union remains at proper level and tamp. Head canes back to about 8 inches, making cuts $\frac{1}{4}$ inch above an outside bud. Loosen name tag so that it does not constrict cane. When vigorous growth starts, apply plant food according to manufacturer's specifications.



(AARS diagrams)



Standard or tree roses

All standard or tree roses should be staked and tied at the time of planting. When transplanting balled or canned rose plants, dampen the soil ball thoroughly, disturb the roots as little as possible. Prune and thin the top of the plant to prevent excess evaporation while the root system is being established in its new location.

BUILDING THE YOUNG PLANT

Too often we are tempted to permit the first new shoots on the plant to come into flower. The flowerbud should be pinched out while the size of a pea or smaller. The plant then develops more and stronger “breaks” on which to build the best scaffolding of branches. Even these secondary laterals should have the tips pinched while the bush is being built up. At least two pinches are recommended before allowing flowers to develop.

At the Maui Branch Experiment Station, a program of gradual cutback is practiced. The vigorous shoots rising from the base of the plant are pinched to induce branching. “Blind wood” (the less vigorous shoot with no flowers) is removed monthly. Four times a year the rose is cut below the point from which the shoot arose, gradually reducing the height of the plant. In this way, there is bloom throughout the year.

MULCHING

In Hawaii a mulch will help reduce the temperature of the roots, improve the physical condition and water holding capacity of the soil, and prevent weed growth. Suitable mulches include grass clippings, pineapple waste, sugarcane bagasse, well-rotted manure, peat moss, ground hapuu, wood chips, and tanbark. The mulch should be at least 4 inches deep and preferably 6 inches. As the mulch decays, add more organic matter to the surface. During this process of decomposition, extra applications of nitrogen are beneficial. Some inorganic mulches, such as coral chips, black volcanic sand, and clay-based aggregates spread over plastic, are easily applied, yet meet the basic requirements of a mulch.

If the rose garden is not mulched, give the soil a shallow cultivation every 2 weeks to help control weeds and improve the physical condition. Deep cultivation may damage the feeding roots.

WATERING

Roses cannot grow in dry soil and need a moderate supply of moisture to make good growth. If there is a week without a reasonably good rain, rose plants will require heavy watering. Watering too lightly and too frequently favors the development of shallow roots that leave the plant susceptible to water stress during dry periods.

Sandy soil that does not hold a large amount of water must be irrigated at least every 3 days. Heavier soil that retains more moisture may not need to be irrigated more than once every week. Extremely heavy soil with a high water holding capacity may not need to be irrigated more than every other week. The ideal method is to maintain a soil moisture between the point of full capacity and the point when the leaves begin to wilt. It is best to irrigate directly into a saucer around the base of the plant. This is a more economical use of water than overhead sprinkling. Overhead sprinkling will not harm the plants if it is done early enough for the leaves to dry before night-fall. Water thoroughly the day you apply a pesticide.

FERTILIZING

The ideal method of accurately fertilizing roses in the garden is to obtain frequent soil analyses and apply fertilizer accordingly. Here are some general recommendations for gardeners who do not use soil analyses.

A fertilizing schedule will vary greatly, depending upon the time of year, the location, and the size of plants to be fertilized.

The three common fertilizer elements (nitrogen, phosphorus, and potash) that are present in most commercial fertilizers are identified by numbers on the label. For instance, a 10-10-10 fertilizer contains 10 percent nitrogen (N), 10 percent phosphorus (P_2O_5), and 10 percent potassium (K_2O). This represents a 1-1-1 ratio. An average application might be one-half of a 1-pound coffee can of 10-10-10 fertilizer (use a little less in winter) broadcast over 100 square feet of rose bed every 10 weeks. To prevent burning of the aboveground parts of the plants, water them immediately after broadcasting fertilizer.

Fertilizer labelled "Rose Food" should be applied exactly as directed on the container. Immediately incorporate the fertilizer into the soil and follow with a good watering to assure rapid penetration.

Organic fertilizers, including manure, are sometimes used to supplement commercial fertilizers. Organic fertilizers are applied at the rates of $3/4$ pound per 100 square feet every 4 to 6 weeks to keep an adequate nutrient supply available to the plant.

To prevent injury from deficiency of minor elements, such as iron, use a rose fertilizer that contains minor elements. Apply it to the soil or spray on the foliage, depending on the formulation.

PRUNING

Pruning is another method used to build a young plant, rejuvenate an old bush, and to lower plant height. Pruning is essential to stimulate the new growth that produces flowers. There is no agreement on the most desirable height for a rose bush, so the amount of corrective pruning can be a personal preference. However, unpruned roses become tall and ungainly, and the flowers are often small and of poor quality.

Cut back weak shoots to two buds, or eliminate completely if enough other foliage remains. Cut back strong shoots to four buds. The severity of pruning depends on whether tall, medium or low-growing plants are desired.

Undesirable stems that arise from the understock usually have smaller leaves than the main stems. Cut back shoots of this type to their point of origin.

At low elevations where there is no distinct dormant season, the plants will tend to be tall. One way of pruning such plants is to cut the flowers with longer stems than you normally would. When an old cane has reached its limit of good flower production, cut it back to the base of the plant. If the plant has been properly watered and fertilized, it will produce a new cane as a replacement.

Use sharp pruning shears and cut about $\frac{1}{4}$ inch above a bud so that it will not become dry. An upright bush may be forced to spread by cutting it back to outside buds and lateral branches that will grow away from the center of the plant. A spreading bush can be made more upright by cutting back to inside buds or more upright branches. Good pruning will eliminate crossing or weak branches and any that are diseased or broken.

Hybrid Teas

Hybrid teas usually respond to moderate or severe pruning by producing strong new breaks. Some cultivars are naturally more vigorous than others; the height to be maintained depends both on cultivar vigor and the environment. A good time to severely prune hybrid teas is after a heavy flush of bloom during which the flowers have been left on the bushes. The extra leaf surface provides more food to the rest of the plant, and this reserve energy is released to the bottom buds when the top is removed. When the plant is rejuvenated in this way, it should be handled as a newly planted bush with re-

spect to pinching and building a new framework. At higher elevations (to 3,000 feet) roses grow more vigorously because of cool night temperatures and a winter season when the plants are semidormant. Roses may be pruned to advantage during this rest period.

With so many attractive, vigorous roses available it is unnecessary to grow weak cultivars. If for some reason you wish to maintain such a plant, the pruning practices must be modified. Allow as much foliage to develop on the plant as possible before pruning it back. Unless the root system is weak, the plant should respond with new shoots that may be trained as for a young, new plant.

Floribundas

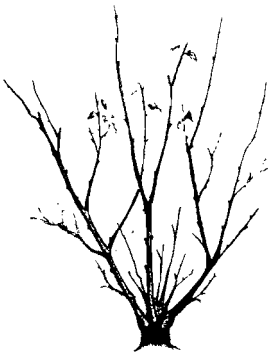
Floribunda bushes tend to vary considerably in vigor. Some are low and compact, others larger and more ungainly. Usually pruning does not need to be as severe because the object is to produce mass blooming. If the bushes have plenty of room to develop, they can be allowed to grow quite large.

Climbing Roses

Most climbing bushes need severe pruning after flowering to encourage new growth. Prune the flowering stems back to the upright canes and remove the oldest canes to encourage a bottom break.

Standard Roses

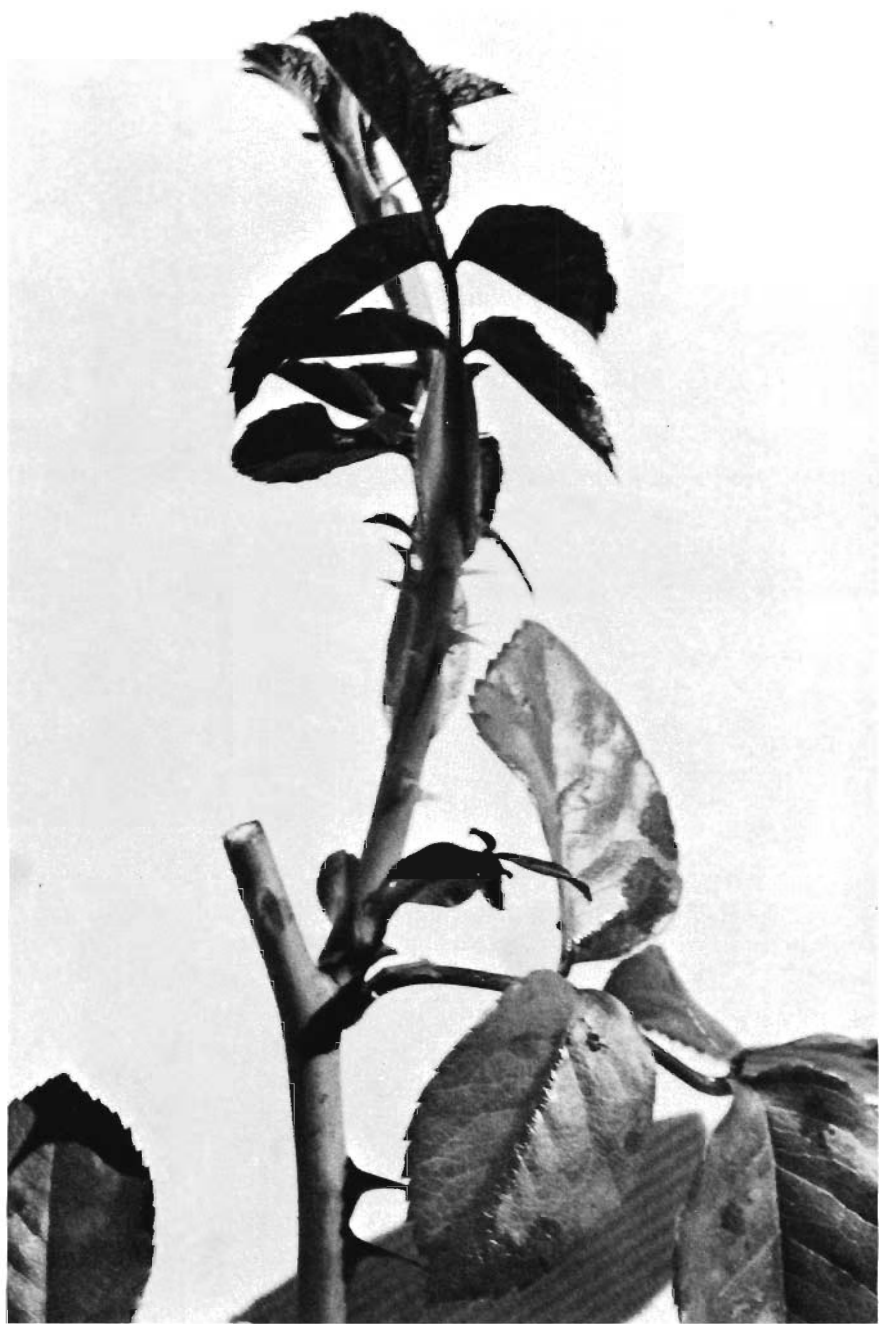
Immediately after flowering, remove crossed and crooked branches and cut back the remaining branches to 12 inches. Inside growing buds and sucker growth at the base of the plant may be rubbed off.



Before pruning



After pruning



New growth above five-leaflet leaf

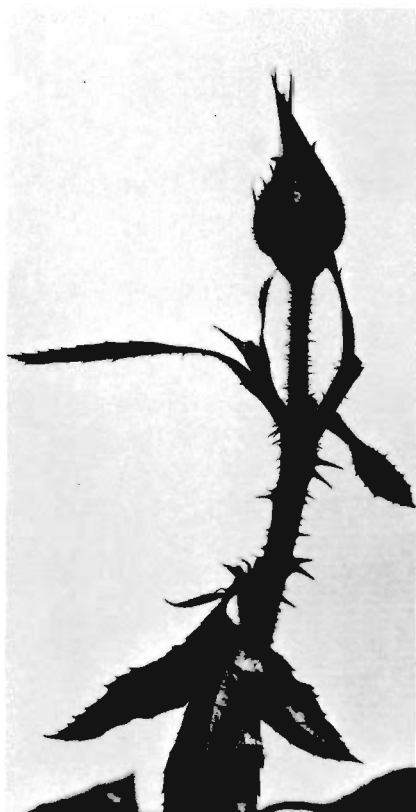
DISBUDDING

Disbudding is essential to produce extremely large flowers, especially those to be used for exhibition purposes. Allow only one terminal bud to bloom per stem. Remove the side buds when they are very small so that they will leave no scars. Hybrid teas are grown for the single flower on each stem, but multiflowered types also may be disbudded to produce specimen blossoms or to produce larger flowers on fewer stems.

Although some roses tend to have few side buds, others tend to bloom in clusters that make disbudding more necessary. Even the flowers of floribundas, polyanthas, and other roses that bear several flowers on one stem can be improved somewhat by disbudding. It may not be necessary to remove all of the side buds, only enough so that the flowers are evenly distributed in the cluster.



Before disbudding



After disbudding

REPLANTING

A garden is like a room. Replanting to redecorate provides enjoyment in a new setting. On the average, a good rose bush that is well cared for may produce flowers for about 15 years. In time, however, all bushes need to be replaced. As older bushes begin to decline, varieties with improved characteristics become available. They may be larger, more productive, more resistant to diseases, or have other desirable characteristics.

If an old plant dies of an unknown cause, have the problem identified and the soil sterilized or replaced before planting a new bush into the same location. In any case, turn over the soil to a depth of 2 feet, and add organic matter, lime and superphosphate to revitalize the soil.

ALL-PURPOSE SPRAY PROGRAM

Most homeowners who have a reasonably small planting are well advised to buy manufactured "rose sprays" intended to control both insects and diseases. These can be used as dusts or sprays for application to the leaves, or as systemic materials that are applied either to the foliage or the soil. Sprays or dusts applied exactly as recommended by the manufacturer usually control most of the diseases and insects that seriously injure roses. Remember that new leaves are being produced constantly, so spray or dust to thoroughly cover both sides of these leaves at least once a week.

Some of the spray materials are less conspicuous on the foliage than others. Dust and wettable powders leave visible residues; emulsifiable concentrates do not. Systemic insecticides and fungicides have the decided advantage of being absorbed by the roots and translocated in the plant sap. These materials are most effective and do not distract from the appearance of the leaves or the flowers. Systemics are good to control sucking but not chewing insects.

ROSE PESTS

Healthy, vigorous, growing plants are essential for the production of good roses; therefore, it is necessary to prevent or control diseases, infections, and insect infestations.

Black spot appears as irregular dark brown or black spots within an even margin on the upper sides of older rose leaves, often caus-

ing them to turn yellow. Serious infestations can cause complete defoliation of plants.

Powdery and downy mildew produce a white deposit that distorts the young growth of leaves, stems, and flowerbuds; they also produce brown spots on the undersides of young leaves. Mildew is especially prevalent in humid locations. Many of the newly introduced roses are resistant to these diseases.

Rust may appear on the undersides of leaves as powdery pustules of bright orange spores. Temperatures of 65 F and at least 2 hours of continuous moisture are essential for the infection to become established.

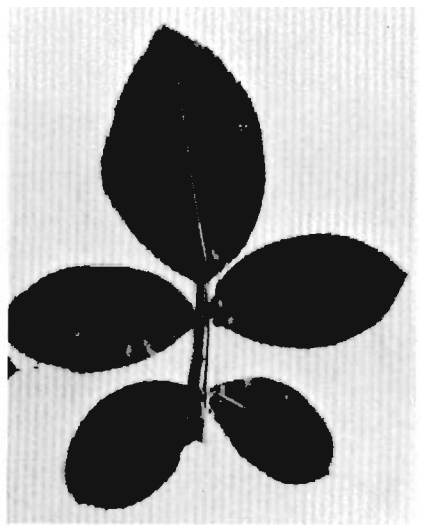
Sanitation in the form of removing and burning affected leaves will help control all of these diseases.

Regular applications of fungicides (captan, Karathane, Phaltan, zineb, Parzate, Dithane) according to the manufacturer's directions are recommended for the control of black spot, mildew, and rust.

Rose beetles are frequently a serious pest of roses in Hawaii. These beetles chew holes in the margins and through the blades of the leaves. A regular application of Malathion, diazinon, carbaryl or other insecticides is recommended for the control of rose beetles. Some rose growers believe that the use of electric lights above the bushes for the first 5 or 6 hours of darkness helps repel rose beetles.



Beetle injury



Normal leaf

Red spider mite is too small to be seen without a magnifying glass. This mite causes a bronze or stippled appearance of the leaves. It is usually more serious in dry locations. Preventive measures include frequent hosing of leaves with water and the application of a miticide (Tedion, Chlorobenzilate, Kelthane, Karathane, diazinon, sulfur) according to the manufacturer's directions.

Grasshoppers are often destructive to the foliage and the flowers of roses. The same insecticides recommended for rose beetles will help control grasshoppers.

Thrips and aphids are common pests that suck juices from young foliage, buds, and flower petals and cause distorted growth. Malathion, dimethoate (Cygon), naled (Dibrom), or diazinon (Spectracide) will control thrips and aphids. Since these insects may develop immunity to some pesticides after long continued use, it is wise to apply a different insecticide as soon as one material is no longer effective.

Other insects and diseases are troublesome at times. These should be identified at the time of their appearance, so that treatment can be recommended.

The information given herein is for educational purposes only. Reference to commercial products or firms or trade names is made with the understanding that no discrimination is intended and no indorsement by the Cooperative Extension Service or the College of Tropical Agriculture is implied.

TO DIAGNOSE ROSE PROBLEMS

Symptoms

Plant fails to grow or grows slowly.
Brown or black blotches on stems.
Upper leaves distorted with powdery white deposit that cannot be wiped off.
Dark brown spots with yellow zones on lower to middle foliage develop rapidly.

Causes

Dead before planting, roots dried out, poor soil preparation.
Stem canker.
Powdery mildew.
Black spot.

Symptoms

Causes

Bright orange pustules on lower surfaces of leaves.

Rust.

Greenish, soft-bodied insects, usually at stem tips.

Aphids.

Wild shoots from below ground line.

Sucker growth from rootstock.

Flowerbuds die without opening.

Bacterial spot, rose weevil, rose midge, botrytis.

Wartlike growth at base of stems.

Crown gall.

Brownish leaf margins.

Spray injury, lack of potassium, salt injury.

Light-green upper leaves, yellow lower leaves.

Lack of nitrogen.

Irregular mottling.

Virus.

Grayish or yellowish fine speckling of leaves (fine webs and leaf drop.)

Red spider.

Flower color change.

Stem originating below graft union.

No fragrance.

Less than 50 percent of varieties are fragrant.

Flowers droop from stem weakness just under flower.

Too much shade, typical of certain varieties, lack of water.

Color fading.

Bright sunlight, high temperatures; some varieties fade easily.

Brown petals.

Old flower, thrips damage, sunburn, desiccation, spray injury, botrytis.

DEFECTS IN FLOWERING

Flowers, especially of some pink and red roses, tend to change to an unattractive purplish color on exposure to too much sunlight or moderately alkaline soil conditions.

Some flowerbuds may appear stunted and produce thickened petals with blisters; others may show conspicuous green centers. Both of these defects are caused by extreme or sudden changes in temperature.

A moist browning of the petals is sometimes seen, especially during extended periods of damp weather. This defect usually disappears when the weather improves.

Failure of the petals to open on some flowers is a genetic characteristic of some roses. Infection by botrytis also may cause a bud to remain closed and decay inside. Hard, tight buds that do not open indicate that the particular rose is unsuitable for the location in which it is growing.

Tendency for petals to dehydrate and turn brown even under the best growing conditions is usually caused by overexposure of the plant to wind. Damage can be reduced considerably by cutting the roses early in the morning before they have opened. Roses that tend toward extreme dryness are usually not suited to their environment.

CUTTING THE FLOWERS

Always use sharp shears or a knife to cut flowers. The less stem and leaves that are removed at the time of cutting the flower the more vigor is retained by the plant. Foliage removal robs the plant of its food manufacturing equipment and reduces the growth and number of subsequent flowers. Short-stemmed larger flowers can be used in the lower part of an arrangement.

When the stem is weak, make the cut just above the topmost five-leaflet leaf. A three-leaflet leaf usually does not produce a bud in its axil to give rise to a new branch. If the stem is strong and thicker than a lead pencil, the cut may be made above any lower five-leaflet leaf; adjust the stem length to suit the purpose for which you wish to use the flower.

Rosebuds that are cut late in the afternoon will usually last longer than those cut in the morning. In warm climates at sea level, flowers left on the plant open rapidly. To enjoy good cut flowers, cut small budded cultivars as soon as the sepals have folded back toward the stem. Larger budded roses should be cut after the outside petals have started to unfurl. Tighter buds will often fail to open.

When cutting a number of flowers at one time, take a bucket of water with you and place the cut flowers in the water as soon as they are removed from the plant. Spots of spray deposited on the leaf can be removed by wiping with a dry cloth. The appearance of some buds can be improved by removing injured, malformed, or discolored outer petals.

TO MAKE ROSES LAST LONGER

Short vase life of cut roses is a frequent complaint. Often this is due to improper conditioning of the flowers. Roses can be made to last longer if properly handled.

Flowers wilt when water evaporates from them more rapidly than it is absorbed. Warm water is absorbed more rapidly and in greater quantity than cold water. As soon as possible after the flowers are cut, remove the lower one-third of the foliage. Condition the flowers by plunging the stems in warm (100 F) water with a chemical preservative, and store them in a cool place away from drafts for an hour or overnight.

Chemical preservatives usually contain sugar to supply carbohydrate to the cut flowers, a bactericide to kill the bacteria in the water, some acid to reduce the alkalinity of the water, respiratory inhibitors, and minerals to stabilize pigments. Do not use sugar alone, as it attracts insects and speeds up the growth of microorganisms that decay the stems. Aspirin, pennies and salt are almost worthless.

A slanting cut with a sharp knife (scissors may pinch the water conducting tubes inside the stem) exposes more surface to water and prevents the end of the stem from resting on the bottom of the container. Use a clean container, one that is as deep as possible. The water should be deep enough to cover the cut end of the stems. Deep water, with as large a surface as possible, will guard against the container's drying out rapidly and provide humidity to the surrounding air which reduces evaporation from the cut flowers.

If cut roses wilt prematurely, make a slanting cut an inch from the end of the stem; place the stem in water that was boiling but has been removed from the heat for 5 minutes, and to which a chemical preservative has been added. Protect the flowers from the heat with a paper cone. After the flowers have revived, place them in cold water with a preservative. This shock treatment will not revive flowers that are past their prime or those that have been wilted for some time.

Cut flowers that are stored in water will last longer if their stems are recut every other day and placed in fresh water. If a preservative is used, they may remain in the same solution without recutting for the life of the flower.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. C. Peairs Wilson, Director of Extension Service, College of Tropical Agriculture, University of Hawaii, Honolulu, Hawaii 96822.

CIRCULAR 468 JANUARY 1972—7M