The Response of

GARDEN ROSES

to a
Planned Planting
and Maintenance
Program

TEXAS A&M UNIVERSITY
TEXAS AGRICULTURAL EXPERIMENT STATION - - - TEXAS AGRICULTURAL EXTENSION SERVICE
College Station, Texas

Summary and Recommendations

Anyone can grow good garden roses under Texas conditions by following a preplanned simple schedule of planting and maintenance operations.

A garden location that will receive at least 6 hours of sunlight per day is highly desirable. In most Texas areas a location that is shaded during the afternoon is probably ideal. When dormant plants are preferred, they may be planted any time that the plants are in good condition and dormant. Most Texas areas, except the Panhandle, have a brief dormant period in late January or during February which is the most desirable planting period. Container grown plants can be successfully planted at any time during the year if the plants are in active growth when they are transplanted.

When the planting location has adequate drainage, extensive bed and soil preparation are not required. In very heavy clay soils where drainage does not occur readily, this condition should be corrected by standard methods before the soil and plantings beds are prepared. Under all other conditions the following procedures will provide an excellent soil environment for garden roses.

Prepare the area to be planted by spading or tilling the existing soil to a depth of 12 inches. Spread a mixture of 50 percent horticultural grade perlite and 50 percent coarse peat moss over the area to a depth of 4 inches. Then mix this material thoroughly with the existing soil.

If past experience indicates the possibility that soil-borne diseases, nematodes, or weeds may be troublesome, the beds can be fumigated with a liquid carbamate soil fumigant according to the procedure used in these studies. Allow the soil to settle for several weeks after preparation before planting.

Select only top-quality plants for planting, and do not allow the tops or roots of the plants to dry out during handling or planting. Prepare planting holes in the bed 2 feet apart, about 14 inches in diameter and about 10 inches deep. Leave a mound of soil about 4 inches high in the center of each hole.

Prune the roots on the plants to a length not to exceed 12 inches, making sure that all roots are pruned to this same length or less. Prune the tops to an outside eye or bud 6 to 8 inches above the bud union of the plants. Set the plants down firmly on the mound of soil left in the holes so that the roots spread out naturally in all directions in the hole. Control the depth of planting so that the bud union will be about an inch below the soil surface. Fill the hole with soil and tamp it firmly and tightly all around the plant.

When all the plants have been set, water the bed thoroughly with tap water. When the surface of the soil shows signs of drying, water the bed with a commercial root-stimulator at the rate recommended by the manufacturer. Apply a 2-inch mulch to the beds as soon as the root-stimulator has been applied using an organic mulch similar to that used in these trials.

After 2 weeks scratch below the mulch to see if any drying has occurred in the soil below. When this soil shows signs of dryness, water the entire planted area thoroughly. Watering will not be required oftener than every 2 weeks or longer, depending on the duration between rains. Never apply additional water when the mulch or the soil below it is wet.

Thirty days after planting apply a fungicide as outlined in this program at 2-week intervals. Discontinue the application when active growth ceases in the fall or early winter. Begin the program the second year, as soon as the buds begin to break on the plants in the spring. Spray the plants every 30 days with an all-purpose insecticide for insect control.

Remove the old flowers from the plants as soon as the first petal falls, by cutting the stem just above the first five-leaflet leaf that occurs below the flower. Do no prune the plants in any other way during the growing season. Flowers should be cut with longer stems only if they are to be used as cut-flowers.

The following spring, in all areas where mild winters prevail, remove any dead or broken branches from the plants. Prune the remainder back to 8 to 10 inches from the ground and begin the same growing schedule again.

In the colder areas of Texas, delay the pruning of the plantings until the new buds begin to turn red or until the danger of the last killing frost is over. Then begin the planned maintenance program for the second year.

The Response of Garden Roses To a Planned Planting and Maintenance Program

A. F. DeWerth
Department of Soil and Crop Sciences

Contents

THE CULTURE OF GARDEN ROSES has long been considered a specialized undertaking. Considerable scientific information about the cultural requirements necessary for producing good rose plants under nursery and greenhouse conditions is available, but these findings have not been applied to the culture of roses in garden or landscape environments. Many of the cultural practices recommended in the past for the growth and development of garden roses are timeworn procedures that might now be discarded in favor of a predetermined and planned schedule for the planting and maintenance of these garden subjects. Much of the information available that deals with growing garden roses is based on results obtained in climatic regions where the seasonal changes are not closely related to those experienced in the various situations encountered in Texas and the Southwest. It is exceedingly difficult to adapt these recommendations to Texas conditions with any success.

For many years Texas ranked second in the production of garden rose plants in the United States. During recent years the reputation for the production of quality rose plants has been disminishing, even though the top-graded plants produced have continued to be of high quality. This concept may be due, to some extent at least, to poor cultural practices applied to these plants after they are received and are placed in garden or landscape plantings. These practices are also uneconomical and disappointing to the home gardener.

No available records of any scientific investigations in Texas during recent years have been directed specifically to the problems involved in growing roses in landscape or garden locations. Past problems related to growing garden roses

successfully indicated that a need existed for a reliable schedule of cultural procedures, including soil preparation, method of planting, spacing of plants, rapid establishment after planting, proper application of nutrients, control of insect and disease problems and the pruning, mulching and moisture requirements involved.

Research with roses and other woody plants grown in containers and under garden conditions at the Texas Agricultural Experiment Station and elsewhere indicates that the usual recommendations for planting, for soil preparation, for soil structural requirements and for other cultural practices may be greatly modified. Studies were initiated at College Station in 1960 to evaluate the response of hybrid rose plants to various cultural practices applied to these plants under landscape and garden conditions. In addition, some information was obtained on the effect of heavy winter mulches on the performance of garden roses under prevailing climatic conditions.

METHODS AND MATERIALS

Three planting beds, 96 feet long and 6 feet wide, were constructed in the open field in full sun. The experimental beds were enclosed in 2 x 6-inch redwood curbs that extended 4 inches above the existing grade. Each of the beds was divided, with redwood dividers, into 12 equal 6 x 8-foot plots. This established a randomized block design consisting of 36 plots, with an area of 48 square feet in each plot.

Twelve rose plants, spaced 2 feet apart on centers, were planted in each plot. Four varieties of hybrid tea and one variety of hybrid floribunda roses were included in the trials. Each plot contained 4 plants each of three varieties randomized throughout the experiment that was composed of 87 plants of each variety, making a total of 435 plants.

Twelve treatments were used in the study. Each treatment was replicated three times. The treatments were composed of the four following materials that were coded with the indicated letters.

N = nutrients	R = root-starter solution
M = mulch	X = no treatment (control)
F = fungicide	

These materials were used as 12 treatments alone and in combinations as numbered and listed below:

1. MNF	5. NF	9. R
2. F	6. N	10. M
3. MN	7. RN	11. NMFR
4. RFN	8. MRF	12. X

The rose plants used were obtained from a source of commercial nursery plants and were No. 1 grade on *Rosa multiflora* understock. No varieties were designated when the plants were ordered. Those sent by the source were considered as representative varieties for garden use. The varieties planted were hybrid tea-variety Peace, hybrid tea-variety Alamo, hybrid floribunda-variety Pinocchio, hybrid tea-variety The Doctor, hybrid tea-variety Charlotte Armstrong.

Soil Preparation

The existing soil type in the area where the trials were conducted is Lufkin fine sandy loam. The area within the experimental plots was rototilled to a depth of 12 inches. Four inches of a mixture of 50 percent horticultural grade perlite and 50 percent sphagnum peat moss by volume, were evenly spread on the surface and the area was again rototilled until these materials were thoroughly incorporated with the existing soil. The experimental area was then fumigated with a liquid carbamate soil fumigant at the rate of 1 quart per 100 square feet of area. The soil was rototilled again 7 days after this application to aerate the soil. Then the soil was aerated for an additional 14 days before the plants were planted.

Planting Procedures

The plants were prepared for planting as soon as they were received from the nursery by pruning the roots not to exceed 12 inches in length. The tops were pruned to approximately 8 inches above the bud union.

Holes not larger than 14 inches in diameter were prepared in the plots, with a mound of earth piled in the center of the hole. The plants were set on this mound so that the roots extended evenly in all directions over the mound. The depth of planting was controlled so the bud union was set at, or just below, the existing soil level after the soil was settled after planting.

Treatment Applications

The various treatments were applied to the plots according to the following procedures.

ROOT-STARTER SOLUTION: A commercial root-starter solution was applied to all plots designated for this treatment at the time of planting. No further applications were made.

The material used was a commercial product formulated for this purpose. It contained 5 percent nitrogen, 20 percent phosphoric acid, 10 percent potash plus 0.0003 percent indole-butyric acid. This product was diluted to 1 part in 80 parts of water and was applied to the designated plots at the rate of approximately 1 gallon of the solution per square foot of soil surface. This application was equal to approximately 3 pints per rose plant.

NUTRIENTS: A commercial formulation of a complete fertilizer was used for all plots designated for nutri-

ent application during the trials. This commercial product was one especially formulated for the fertilization of garden rose plants, using the following components:

5 percent nitrogen (4 percent from ammonium sulphate, 1 percent from diammonium phosphate) 10 percent phosphoric acid (7.5 percent from 20 percent superphosphate and 2.5 percent from diammonium phosphate) 4 percent potash (from 60 percent muriate of potash). In addition to the above ingredients, the product also contained 1.0 percent organic nitrogen from cottonseed meal, plus chelated minor elements in the following amounts: iron 0.04 percent; manganese 0.012 percent; zinc 0.013 percent; copper 0.004 percent; boron 0.008 percent; and molybdenum 0.0008 percent.

The fertilizer was applied at the rate of 3 pounds per 100 square feet as a dry surface application. The first application was made 4 weeks after the planting date. Six more applications were made during the growing season at 4-week intervals. Care was taken to be certain that the soil was uniformly moist when the fertilizer was applied, and the plots were then thoroughly watered after the applications were made.

FUNGICIDE TREATMENTS: The fungicide used in these trials was a commercial formulation containing 50 percent N-trichloromethyl-thiophthalimide. Applications were made to the designated plots at the rate of 2 pounds of this material to 100 gallons of water at 2-week intervals during the growing season. The first application was made as soon as the buds began to swell after planting.

MULCH TREATMENTS: A commercial product composed of shredded pine bark prepared for this particular purpose was used in these trials as a mulching material. The material was applied to the surface of the plot to an approximate depth of 2 inches. The mulch was applied after the soil had been well watered following planting.

OTHER ROUTINE CULTURAL OPERATIONS: All plots were watered in accordance with tensiometer readings or other moisture testing methods, and were kept weed free. The paths between the trial plots were mowed, trimmed, and fertilized in accordance with good turf management practices.

Insect pests were controlled by a preventive spray program using a combination insecticide formulated especially for the control of major insect pests attacking roses. This material was applied at recommended rates at 30-day intervals during the growing season. No fungicidal materials were included in this formulation.

Records on the number of actively growing breaks and the number of flowers produced were made at about 30-day intervals. All flowers were removed to the first five-leaflet leaf at the time of first petal fall. No other pruning was performed.

Data on root-starter solution plots was taken 30 days from the date of planting by selecting representative plants from the plots receiving the root-starter solution treatment, digging them and comparing the number of roots produced on treated plots with the number of roots produced on plants on untreated plots. Root growth on representative plants was again compared at the end of the growing season.

Measurements on all other plots were taken at monthly intervals or as the growth and development of the plants indicated. The following criteria were used in accumulating data: number of healthy "breaks" produced per plant; number of flowers produced per plant; vigor and general condition of plants as observed by a panel of workers and recorded by photographs; number of leaves and stems expressing disease symptoms; evaluation of varietal and individual differences at the end of the growing season; and evaluation of the condition of all plants at the end of the first and second growing seasons.

RESULTS AND DISCUSSION

Present recommendations for planting garden roses in Texas stipulate that fall or winter planting is most desirable but garden conditions are unstable during the winter months and dormant roses are not always obtainable in good condition in the fall. The plants in this investigation were planted in early spring on February 20, 1962 to determine whether spring planting might not be desirable and satisfactory under Texas conditions.

The only application of the root-stimulator used was made on February 21. The first fertilizer application was made on March 5 and the mulch was applied on March 12. The fungicide applications were started on March 26. The spraying program with the all-purpose insecticide was started on April 2, 1962. The trials were continued until December 31, 1963.

Effect of Root-Stimulator

There was no significant difference in the number of flowers and the number of healthy breaks produced by the plots treated with root-stimulator when compared with the plots not receiving this treatment. However, data was taken on the average number of roots produced on the plants in plots treated with root-stimulator and the control plots by digging representative plants and counting the roots produced during the first 45 days after planting.

With the exception of the variety Alamo where no significant differences were noted, all of the plants treated with root-stimulator had produced approximately 25 percent more feeder roots than those in the untreated plots,

Figure 1. Comparison of rose plants (variety Peace) showing the effect of root starter solution on early root development. The plant on the left was treated with starter solution.

Figure 1—comparative photo. No further data was taken on these plots since the principal value to be derived from the use of the root stimulator is the early development of feeder roots to aid in the rapid establishment of a vigorous root system.

Effect of Fungicide Treatments

The plants to which the fungicide was applied produced an average of 11 percent more healthy breaks per plant than plants that were not sprayed. Data was also taken on the effectiveness of the fungicide treatments by actual leaf counts taken once every 30 days during the first 12 months of the trials.

The average number of leaves showing blackspot or mildew symptoms during the year 1962 are shown in Figure 2.

Effect of Mulching

The plants in the plots that received the mulch produced 13.3 percent more healthy breaks per plant than those in the unmulched plots. This differential is significant in this particular treatment since the plots under the mulch required watering only half as often as the unmulched plots to keep the soil uniformly moist during the growing season.

Effect of Fertilization

All of the plots to which the complete fertilizer was applied at 30-day intervals produced an average of 12 percent more healthy breaks per plant than those receiving no fertilization.

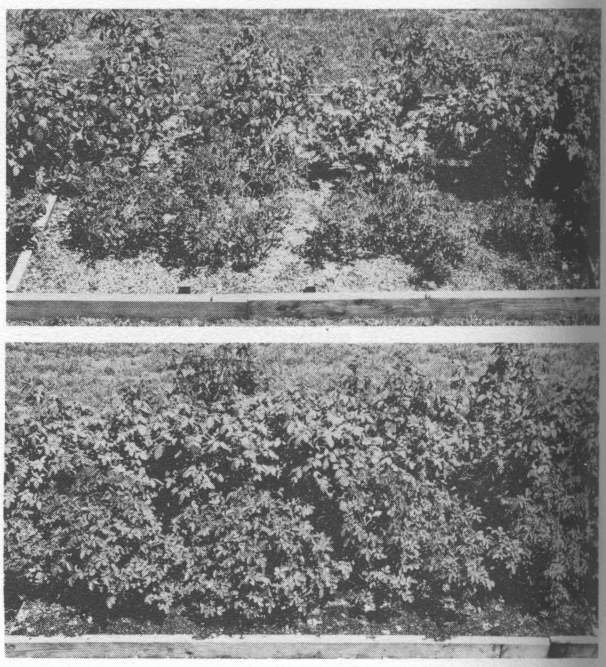


Figure 3. Comparison of fertilized and unfertilized plots of roses. Plants in the top photo received no treatment and those in the bottom photo received a combination of all treatments.

However, the qualitative effect of fertilization was much more evident throughout the growing season than those exhibited by the quantitative data. The difference in the health and vigor of the fertilized and unfertilized plots is illustrated in Figure 3.

Effect of a Combination of all Treatments

There was a significant difference among the plots receiving a combination of all treatments and the controls. Plants receiving all treatments produced an average of 16 more healthy breaks per plant. The vigor, foilage color and flower color were superior in the treated plots, while in the control plots the foliage was chlorotic, the stems weak and the flowers small.

The results of this 2-year study indicate that the performance of garden roses is not dependent on highly specialized and time-consuming cultural practices.

The method of securing data by counting the number of healthy breaks and the number of flowers produced at 30-day intervals was not entirely satisfactory since the qualitative factors of the amount and color of foliage produced, the size and color of the flowers and the overall

Treatment No.	1	2	3	4	5	6	7	8	9	10	11	12
Percent Blackspot	15%	15%	25%	0	0	15%	30%	Trace	56%	26%	Trace	56%
Percent Mildew	Trace	Trace	25%	Trace	Trace	0	0	0	0	0	Trace	Trace

Figure 2. Average number of leaves showing blackspot or mildew symptoms in 1962.

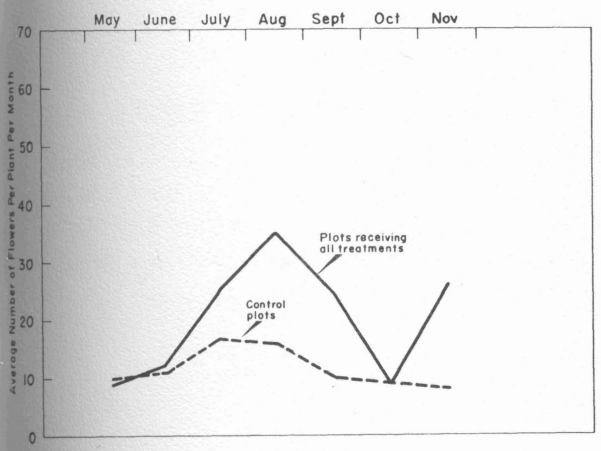


Figure 4. Chart of number of flowers produced by variety Charlotte Armstrong during the growing season.

vigor, or lack of vigor, of the plants used was not satisfactorily reflected by the data.

Taking the fresh weight and dry weight of the plants was not feasible because of the number of individuals used in the treatments and the duration of the study. Quantative data taken in this manner, however, would perhaps make the results obtained in this study more meaningful and statistically significant, and would more closely portray the qualitative results that were evident through visual observation and evaluation during the various periods of the growing season.

This study indicates that many of the timeworn practices now followed in growing garden roses may well be discarded in favor of a predetermined and well-planned schedule of less time-consuming maintenance practices.

The rose plants in this study responded well to all the treatments used during this 2-year period. The climatic conditions that prevailed during these growing seasons were not as favorable as those of normal years in this area, since a severe drouth occurred during the second

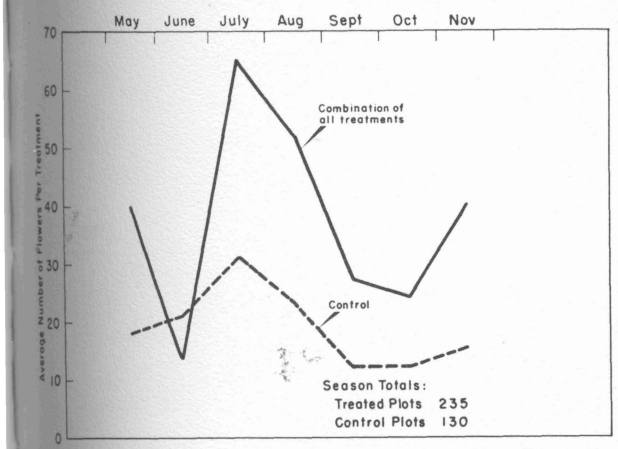
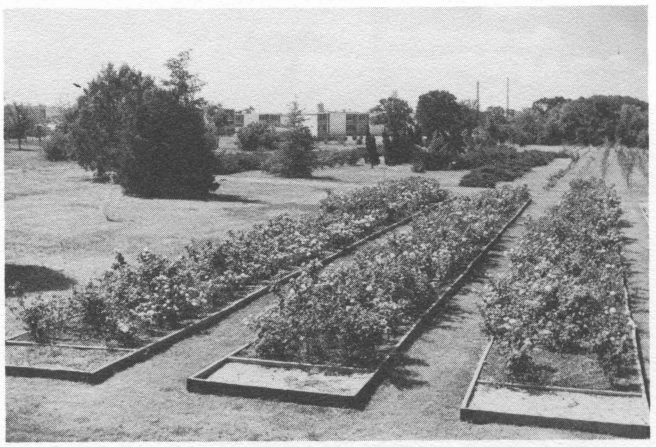


Figure 5. Difference in number of flowers produced for growing season among control plants and plants receiving all treatments is shown in this chart.

April, 1962

June, 1962



July, 1962

Figure 6. The growth and development of the garden roses during the first growing season is shown in these photos (and cover photo). From top to bottom: 2 months, 5 months and 6 months after planting. Cover photo shows condition of plants 7 months after planting.

year. All of the varieties used in these trials produced a considerable number of flowers during each month of the growing season. The comparative production of breaks during this period is shown in Figures 4 and 5. These data show that the production of flowers by the plants in the plots receiving only the scheduled amount of maintenance during the growing season produced significantly larger numbers of flowers, especially during the hot, dry months of the year.

Only 16 of the 435 plants included in this study died during the 2-year period and all of these were in the control plots.

All the plants showed very favorable responses to individual treatments such as bi-monthly applications of a fungicide, monthly fertilizer application, mulching, an application of root stimulator at planting time, and thorough watering at weekly intervals. A combination of these treatments produced results that were far more significant than those obtained by any of the individual treatments alone.

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