CONSTANT WATER LEVEL VS. SURFACE WATERING OF ROSES

Kenneth Post and John G. Seeley*
Department of Floriculture and Ornamental Horticulture
Cornell University, Ithaca, New York

To compare the growth of roses in soil with a constant water level (method described in New York State Flower Growers bulletin #7) with the growth of roses surface watered in the usual manner, budded plants of the variety Better Times which had been growing for three years in a composted silt loam were cut back and dug on June 8, 1945. They were heeled in out of doors until replanted in new soil on June 18. The soil of all plots was wet thoroughly by surface watering and from that time on the constant water level plots received no further surface waterings except when fertilizer was applied. The surface watered plots were watered when the capillary tension was at 1 inch until July 17 when some of these plots were watered at 6 and 10 inches of capillary tension. Therefore, in the three surface watered treatments the soil was saturated when the tensiometers indicated 1, 6 or 10 inches in the respective treatments. The water table of the constant water level plots was adjusted to the junction of the soil and gravel and maintained there by means of a poultry float valve in a tank on the side of the bench and piped to the center of each plot.

Superphosphate (20%) was incorporated in the composted soil at the rate of 5 pounds per 100 square feet before planting. The soils were tested twice a month and fertilizer applications were made to maintain the nitrate levels between 25 and 100, phosphorous 3 - 8, and potassium 10 - 40 ppm, Spurway test values. (Spurway, 1932). Fertilizers were applied to the surface of the soil in all treatments and washed into the soil by means of a heavy surface watering.

For the soil tests a representative sample was obtained twice a month by removing from each plot six cores of soil 1/2 inch in diameter vertically from the top to the bottom of the bench. Each core was divided into halves, one half representing the upper three inches of the bench and the other half representing the lower three inches. Each six parts were then mixed giving two composite samples for each plot. The samples were air-dried, screened, and analyzed. Nitrates were extracted with the Spurway extracting solution and determined by the phenoldisulfonic method. The results are expressed as parts per million of nitrate in the soil extract.

Flowers were cut each morning and graded by 3-inch increments. The average production of salable flowers and the stem length are presented in Table 1.

There is little difference in production and stem length with the various treatments, and none of the differences are statistically significant.

In order to determine whether the different water treatments had any effect on production at different times during the year, the monthly production is presented graphically in Figure 1. There was a slight tendency for the wettest plots (constant water level and surface watering at 1 inch) to produce more flowers in August, September, March and April than the drier plots (surface watering at 6 and 10 inches). The drier plots averaged slightly more production during October, December and January. The differences for any one month are not significantly large and may be due to the cropping tendency of roses.

TABLE I

Rose Production August 1, 1945 - April 30, 1946

	Salable Flowers per Sq. Foot	Average Stem Length, Inches	Average Number of Nitrogen Fertilizer Applications July 1, 1945-April 30, 1946
Constant water level	21.8	20.3	4.0
Surface watering at 1 inch	22.4	19.7	8.0
Surface watering at 6 inches	19.7	19.7	6.5
Surface watering at 10 inches	21.0	19.6	6.0

Fertilizer Applications

In addition to the initial superphosphate application (5 pounds per 100 sq. ft.), superphosphate was again applied on March 23, 1946. Muriate of potash at the rate of 1/2 pound per 100 square feet was applied February 5. Applications of nitrogen in the form of ammonium sulphate at 1 pound per 100 square feet or ammonium nitrate at half this rate were applied more frequently. The average number of applications are presented in Table 1. The plots with a constant water level required only half as many applications of fertilizer as the surface watered plots. The number of fertilizer applications to the surface watered plots decreased as the tension maintained increased because the drier plots (6 and 10 inches of tension) required fewer waterings than the wettest plots (1 inch) and therefore less fertilizer was leached from the soil.

Summary

1. No significant difference in production and stem length of roses whether watered by constant water level or surface watered at 1, 6, or 10 inches of tension.

2. No great difference in the individual monthly production with the four watering treatments.

3. More nitrogen fertilizer required for surface watered plots than those watered with constant water level.

* This project was started by J. E. Howland and completed by John G. Seeley. Fred F. Horton was the grower and Iva E. Piper the soil technician. The work was under the direction of Kenneth Post.