



IN COOPERATION WITH COLORADO STATE UNIVERSITY

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Bulletin 216

April 1968

The Effects of Reduced Stress on Rose Yeild and Grade

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Strong evidence obtained by Hanan and Jasper (CFGGA Bull. 204) indicated that maximum carnation growth will occur when the plants are subjected to least stress. Their results pointed to a change in rooting medium to permit the free use of water without root damage from insufficient aeration. Following these findings, work was expanded at CSU on the use of several inert media.

Forever Yours XXX grade roses were planted in a medium grade Idealite and in 5/8" minus grade scoria on May 9, 1966. Idealite is a lightweight concrete aggregate manufactured by the Idealite Company, a subsidiary of Ideal Cement Company. The material is made by heating illite shale and screening it into fractions. The fraction used in this experiment contained particle sizes between 1/8 and 5/8 inches. This fraction holds about 0.7 pounds of free water per gallon of medium. The scoria used is produced by crushing volcanic rock. The fraction used was all particle sizes below 5/8". This medium holds approximately 2 1/4 lbs. of free water per gallon of medium. Winandy V-bottom beds were filled with the respective media to depths of 6" at sides and 8" in the center. Each bed had drain tile in the center and drained freely to either end.

Periphery watering on the bed of Idealite was controlled by a solenoid and automatic time switches. Water was applied for 1 1/2 minutes at 8 am and 12 noon, year around. This application was just sufficient to drip the bench freely at each watering. Previous experience had indicated that scoria could be watered on alternate days so this was done with the same type of sprinkler system.

Results

The rose plants were pinched once and began producing flowers on July 15, 1966. Flowers were sorted in stem lengths of 3" intervals up to 24". Roses with longer stems than 24" were counted in the 24" grade. Yield and stem length are shown in Table 1 for the period from planting through the calendar year 1967. Growth of roses in both media appeared excellent throughout the period. The Idealite bed occupied a slightly better position in the house, being second bed from the south side whereas the scoria bed was second from the north side in a 6-bed house. However, the covering of fiberglass has been found previously to minimize light variation within a greenhouse.

The one thousand more roses produced by the Idealite medium (Table 1) on 125 ft² of bed area is attributed primarily to reduced water stress. An even greater difference is the 38% increase in the

Table 1. Yield and grade of Forever Yours rose in two inert media from July 15, 1966, to January 1, 1968.^{a/}

	Grade						Total yield
	9"	12"	15"	18"	21"	24"	
Scoria	375	517	1138	1689	1645	1846	7210
Idealite	341	562	1264	1755	1790	2543	8255

^{a/}125 ft² of each medium

longest grade roses attributed also to a free and readily available water supply.

This grade of scoria holds about three times as much water as the grade of Idealite used, hence should be irrigated one-third as often. Irrigating one-fourth as often as Idealite in this experiment placed somewhat more water stress on the plants in scoria. Had the plants in scoria been watered more, results in the two media would probably have been the same.

The nutrient solution applied with each irrigation was designed for carnation and probably was not optimum for roses. Growth was excellent and plants appeared healthy throughout. Tissue tests are now being made as a matter of record. The nutrient solution used on these roses was 3 lbs. potassium nitrate, 2.7 lbs. ammonium nitrate, 0.5 lbs. magnesium sulfate, 0.75 lbs 11-37-0, 1 ounce of borax and 0.25 lbs. sodium nitrate per 1000 gallons.

The rose plants for this experiment were donated by Amling-DeVor Nurseries of Livermore, California, with the permission of E. G. Hill Co., Inc. of Richmond, Indiana.