# DRIP IRRIGATION ON STOCK BLOCK OF 'COPPER KING' GAZANIA

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Perry's Plants, Inc., La Puente, California, grows stock plants of 'Copper King' gazania outdoors generally spaced 12 by 12 inches, with four rows to each bed. Overhead sprinklers are used and plant mortality has been high.

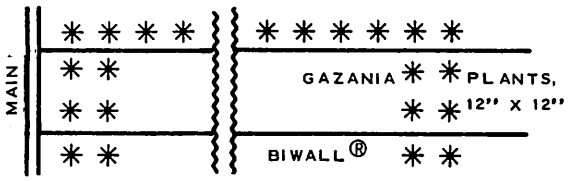
From July until October 1973, an experiment was conducted to determine the value of drip irrigation systems on plant growth and survival. Bob Perry and Kirk Clark of Perry's Plants were responsible for operating the irrigation systems. Aside from irrigation, all cultural practices, including fungicides for disease control, were those the nursery usually follows and were applied to all plants in the test area.

## THE IRRIGATION SYSTEMS

In addition to the overhead system, two drip irrigation systems donated by the manufacturers were used for the experiment.

Aquatic Couplers®, manufactured by the Aqua Data Corporation of Arcadia, California, have PVC plastic emitters and tubing. Thus they can be welded together with suitable liquid solvents. The 3/16-inch system was used in the study. Emitters were spaced 12 inches apart and a continuous loop was used. The bed length varied from approximately 55 to 70 feet. The system was placed on the soil surface.

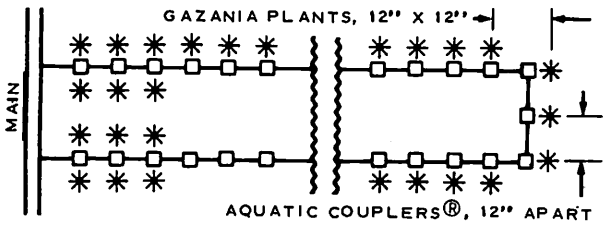
BiWall® (12 inches x 60 inches x .019 inch), manufactured by Anjac Plastics, Inc., El Monte, California, is a double-wall, continuous pipe made of polyethylene. The system used for this study had .019-inch holes every 12 inches in the outside wall and a hole every 60 inches in the inside wall. Two lines were used for each bed on the soil surface.

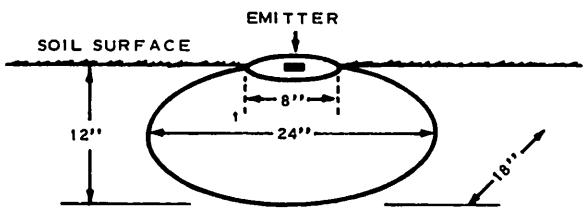



Both irrigation systems were connected to the same filtration system but were operated independently. Water pressure was 5 psi.

## SOIL WETTING CHARACTERISTICS

Before the systems were installed, a test was conducted to determine the soil's wetting characteristics. One gallon of water was dripped onto the ground through an Aquatic Coupler® emitter. The soil became



wet to a 12-inch depth in an elliptical pattern, 18 by 24 inches. The soil surface was wet approximately 4 inches on each side of the emitter.

## OPERATING THE SYSTEMS

Both drip irrigation systems were operated manually. Every 4 days the systems were turned on for 24 hours. Overhead sprinklers were operated as the nursery grower deemed necessary and were not on a set time schedule. No measurements were taken of the water volume applied by any system.

### Water Run-off

Even after the 24-hour drip irrigation there was no surface water run-off from the beds or from the test area. At all times before, during, and immediately after irrigation, it was possible to walk between the drip-irrigated beds; the soil surface remained dry and firm. This was not true of the overhead irrigation system.

## PLANT GROWTH

By October, the plants grown under drip irrigation were larger than those under the regular nursery practices. They had grown so that the foliage of adjacent plants touched; the plants under overhead irrigation were still distinct and separate.

During October, measurements of plant size and mortality revealed that those under drip irrigation were not only larger, but had more shoots. And fewer plants died under drip irrigation. Table 1 gives the data.

## SOME DIFFICULTIES

During the experiment, there were some difficulties with both drip irrigation systems. These were not major problems and can be corrected. It may be well to list them, however.

First, the flow of water from the Aquatic Coupler® emitters varied with distance from the main. This was because we tried to exceed the limits of distance one should observe with the 3/16-inch tubes. Using the large size and modifying the installation design will correct this problem.

Second, both systems were cut occasionally as workers hoed out weeds around the plants. The Aquatic Coupler® system was easily repaired by gluing in a connector. Repairing the BiWall® system was

TABLE 1. Comparison of Drip Irrigation Systems and Overhead Sprinkling in 'Copper King' Gazania Stock Plants.

| Irrigation System | Percent Mortality During Test Period | Diameter of Plant in Inches | Number of Shoots Per Plant |
|---|---|---|---|
| Overhead sprinkling | 9.8 | 11 | 61 |
| BiWall® | 3.1 | 15 | 95 |
| Aquatic Couplers® | 4.8 | 14 | 119 |

more difficult, requiring a rigid inset and clamps. Burying the systems would help prevent cutting.

Third, expansion and contraction of the polyethylene BiWall® tube caused the tube to move out of alignment and to kink in places. Underground installation would keep it in place.

Last, at the end of the experiment, a dog got into the test area and chewed up many of the BiWall® tubes. Underground installation would avoid this difficulty, too.

## ECONOMIC CONSIDERATIONS

The increased shoot production of plants grown under drip irrigation should result in a larger number of cuttings. Because mortality was also less, the number of cuttings possible per unit area would also increase. Assuming that all the shoots were made into cuttings and that all plants were alive at the start of this experiment, the number of cuttings per 100 square feet would be as follows:

| | |
|---|---|
| Overhead irrigation system | 5,600 |
| BiWall® system | 9,106 |
| Aquatic Coupler® system | 11,329 |

This increased production would justify the cost of the drip irrigation systems. It should be clearly understood however, that these figures are based on several assumptions that may not apply to all plantings.

## SUMMARY

Drip irrigation for 'Copper King' gazania at Perry's Plants during the summer and fall of 1973 resulted in fewer dead plants and more shoots per plant. This would tremendously increase the number of cuttings produced by a block of stock plants. The added income should more than offset the cost of the systems and their installation, as well as the high degree of management skill needed to operate the systems properly.