Water use on pot chrysanthemums can be cut

R.H. Sciaroni
Roy L. Branson
John M. Rible
Raymond F. Hasek
Robert S. Ayers

Many greenhouse growers in the Half Moon Bay area were faced with the need to conserve water in 1976. Because of the drought, growers were limited by the water company to the same amount of water used in 1975. The problem was to cope with an expansion of greenhouse space with no possible increase in water delivery.

Greenhouse growers, in general, probably use more water than necessary in heavy leaching for salinity control. To determine the potential of reduced leaching for significant water savings, a trial was conducted with pot chrysanthemums in a Half Moon Bay commercial greenhouse. Salt tolerance of the crop, fertilization rate, and quality of irrigation water were all taken into account in seeking a practical method to reduce leaching losses of water and fertilizer while maintaining suitable safety margins of salinity and plant nutrition.

In the trial, water application was reduced and plastic "saucers" were also placed under each pot to trap any leachate for reabsorption. Preliminary work had revealed that the last four weeks of chrysanthemum production was the best period to use the saucer system; it is also the period of highest water use.

Rooted cuttings of Yellow Mandalay chrysanthemums, in 6-inch standard plastic pots, were used in the trial. Differential treatments were established on 36-pot blocks after six weeks of growth under the grower's regular liquid feed program. This was four weeks before marketing. The treatments were: (1) continued use of regular or "full strength" liquid feed with no plastic saucers under the pots; (2) the same full strength liquid feed, but with saucers; (3) one-half strength feed with saucers; (4) one-quarter strength feed with saucers.

Treatment 1, the grower's regular liquid feed program, received a daily application of 32 ounces of solution containing 300 ppm nitrogen and 200 ppm potassium. The electrical conductivity of this solution was 2.1 millimhos. The other treatments with saucers were irrigated with 16 ounces of their respective solutions every other day. Thus, during the four weeks of the trial, treatments 2, 3, and 4 were given one-fourth the amount of water and only one-fourth, one-eighth, and one-sixteenth, respectively, of the total amount of liquid fertilizer received by treatment 1. Except for these differences, all blocks were managed in the regular commercial manner.

Leaf samples for N and K analysis were collected at initiation of treatments, midway, and just before marketing. The most recent fully matured leaf was selected from two of the plants in each of 10 pots, providing a total of 20 leaves per treatment.

Soil mix samples were taken at the end of the trial. Cores from four pots per treatment were combined for electrical conductivity (ECe) measurements.

At the end of the experiment, the plants were judged for marketability by both the Cooperative Extension investigators and the greenhouse operators. No differences in appearance due to any of the treatments could be discerned—all treatments produced marketable plants. No differences were detectable in keeping quality of the plants. Although there was no effect on outward appearance due to the treatments, leaf N and K levels did decrease with lower amounts of liquid fertilizer. Leaf nitrogen content (percent N) at maturity was 5.3, 5.0, 4.6, and 4.4, respectively, for treatments 1, 2, 3, and 4. Trends for potassium were similar but not as pronounced. Analysis of soil mix samples did not indicate any salinity buildup due to reduced water application. Saturation extract EC values ranged from 0.5 to 1.0 millimhos.

Water savings achieved

This trial showed that significant water savings could be achieved, without sacrificing either marketability or keeping quality, by reducing the amount of leaching normally practiced in growing pot chrysanthemums at this nursery. This was accomplished by both reduced water application and interception of essentially all drainage water for reabsorption during the last third of the crop's growing period.

A side benefit of the reduced leaching was the saving of fertilizer. It was possible to cut the amount of fertilizer applied by three-fourths during the last four weeks of growth and still maintain adequate nitrogen and potassium levels in the leaves. The possible advantage in helping control nitrate pollution of runoff water is obvious.

Encouraged by the results of this trial, the grower has since modified his commercial practices, reducing his water and fertilizer use in growing potted chrysanthemums. Plans are now underway to adapt the technique to other greenhouse crops.

Plastic saucer under pot intercepts drainage water for reabsorption.

R.H. Sciaroni is County Director, Cooperative Extension, San Mateo County; Roy L. Branson is Soils and Water Specialist and John M. Rible is Area Soils and Water Specialist, Cooperative Extension, U.C., Riverside; Raymond F. Hasek is Environmental Horticulturist, and Robert S. Ayers is Soils and Water Specialist, Cooperative Extension, U.C., Davis. *The contributions of greenhouse space, materials, and labor by McCahon and Dahlen Nursery Company, Half Moon Bay, are gratefully acknowledged.*