Cut Flowers Have Added 'Vase Life'

When a flower is cut from a plant, its life is shortened considerably unless it is kept at a lower temperature than if it were still on the plant, say researchers Richard E. Bir and William J. Bramlage of the University of Massachusetts.

Growers and handlers can preserve cut flowers quite effectively by proper refrigeration, but the consumer wants flowers not in a refrigerator but where she can see and enjoy them—out in a warm room.

For years people have been searching for chemicals that will make cut flowers last longer at room temperatures and thereby increase the consumer's enjoyment of them. And indeed, these searches have not been fruitless.

Basic Components

Many chemicals have been found that will, when added to the water in which the flowers are placed, add considerably to the "vase life" of the flowers. There are a number of commercial preservatives on the market, and while each of these patented formulations contains its own specific chemicals, most of them have pretty much the same basic composition: a sugar, a metallic salt, a pH depressant, and chemicals to suppress microbial growth.

The sugar provides food for the flowers, which are alive and often still growing after cutting. The microbe suppressants prevent the buildup of large populations of bacteria and fungi in the solution, which would not only look and smell bad but which would also plug up the vascular systems of the flowers and cause them to wilt. The metallic salt and the pH depressant appear to function mainly in stabilizing the color of the flowers.

All of these commercial preservatives seem to add to the vase life of cut flowers, but according to research reports they do not appear to be equally effective on all crops.

For example, with the carnation variety 'Red Gayety', W. D. Holley found vase lives of 5.2 days in tap water, 8.4 days in Bloomlife, 8.9 days in Blomvigor (a European product), 9.5 days in both Floralife and Petalife, and 11.6 days in Everbloom. And with the varieties 'Red Gayety' and 'Scania', Holley and L. H. Cheng found vase lives of 15.8, 9.2 and 8.2 days in solutions of Everbloom, Floralife, and Petalife, respectively.

Test Preservatives

In contrast, W. E. Waters found that with the varieties 'Elegance' and 'White Elegance', Roselief, Everbloom, and Petalife all produced vase lives of 14.2-14.5 days. Waters has found Roselife to be most effective for asters and Everbloom to be most effective for chrysanthemums. It seems clear that to obtain maximum benefit from these commercial preservatives, one needs to test them on his particular crop and to determine which is most effective.

One problem with these preservatives is that they must be used by the consumer, who unfortunately often ignores them or fails to use them properly. It would be desirable to be able to treat flowers with a chemical prior to harvest or right after harvest, to either replace the need for preservatives or else add to the benefit from them.

Today there are many growth regulators being used on horticultural crops in attempts to solve all sorts of problems and not surprisingly researchers have looked to these materials for some post-harvest help. In numerous experiments, cut fowers have been sprayed, powdered, painted, and dipped with growth regulators to extend vase life. Among the many growth regulators available, those that have produced the most interesting results are Cycocel and B Nine.

A. H. Halevy and S. H. Wittwer found that for several varieties of carnations and snapdragons, 18 hours of immersion of stems in water containing 50 parts per million (ppm) of either B-Nine or Cycocel extended the vase life for 2-4 days over immersion continually in plain water.

F. E. Larsen and J. F. Scholes combined 10-25 ppm B-Nine with 1.5-2.0% sugar and 300 ppm 8-hydroxyquinoline citrate ("OC," an inhibitor of microorganisms), and found that not only was vase life of snapdragons greatly increased but also the quality of the flowers was markedly improved. A combination of 400 ppm OC, 500 ppm B-Nine, and 5% sugar doubled the vase life of carnations, adding 3 days to the vase life obtained with Everbloom.

A review of literature pointed out that while some interesting post-harvest results are being obtained from the use of growth regulators on some cut flowers, little attention has been given to their use on roses.

Help for Roses

Roses are in particular need of post-harvest help due to their very short and tremendously variable vase life. Therefore, a series of tests were undertook using Cycocel and B-Nine on 'Red American Beauty'[1] and 'Garnet'[2] roses.

Roses were obtained from the starting day's morning cut and stems were cut to 12 inches. Four buds were selected at random and placed in 250 ml of test solution. These solutions contained a range of concentrations of Cycocel or B-Nine, and each test was replicated at least 3 times. The stems remained in these solutions for 18

Thanks To New Chemical Preservatives

hours at 70°F, after which they were transferred to 250 ml of Floralife solution. In each test a control sample was placed immediately into Floralife rather than into a growth regulator solution. Every 24 hours all flowers were transferred to a fresh Floralife solution and a fresh cut was made on each stem.

Floral condition was evaluated daily by rating each flower according to the following scale: 1 = excellene; 3 = good; 5 = fair; 7 = poor; 9 = worthless. Results were expressed as deviations from initial condition, which in all cases was 1 (excellent). Thus, the higher the value the shorter was the vase life.

Initial Testing

Initial tests examined a range of concentrations from 2 to 500 ppm for both materials. Following these tests a second series was conducted using 300, 400, and 500 ppm B-Nine and 200, 300, and 500 ppm Cycocel. The results of these tests with 'Red American Beauty' roses are summarized in Table 1.

It can be seen that 300 and 400 ppm B-Nine, and 200 and 300 ppm Cycocel significantly improved the condition of the roses; they added about 1 day to the vase life at 70°F. At 500 ppm there was no benefit from either material, and a slight toxic effect from B-Nine.

It should be noted that the quality of roses was not uniform during these tests, which is understandable since the tests were made mostly during late winter and early spring when environmental conditions vary greatly. Corresponding to this variation in quality, there was variation in results. Some runs showed very little effect of the growth regulators, while others showed very clear effects.

The best results appeared on the highest quality flowers. Although both chemicals significantly improved vase life of roses over Floralife alone, Cycocel produced the more noticeable effect, perhaps due to the fact that it was tested on higher quality roses than was B-Nine. (Note the reduced change over 5 days in the Cycocel series as compared with the B-Nine series.)

'Garnet' roses have a longer vase life than 'Red American Beauty', and were therefore evaluated over a 7-day period at 70°. Two, 10, and 100 ppm of both chemicals were tested, and there was no evidence of improved vase life. However, neither was there evidence of toxicity, so it is possible that higher concentrations might have shown some benefit.

Table 1. Change in condition of 'Red American Beauty' roses during 5 days at 70° F.

Treatment[1/]	Quality change[2/]
Floralife continually	7.44b/[3]
B-Nine, 300 ppm	5.33a
B-Nine, 400 ppm	5.64a
B-Nine, 500 ppm	6.33ab
Floralife continually	5.44b
Cycocel, 200 ppm	3.42a
Cycocel, 300 ppm	4.08a
Cycocel, 500 ppm	5.11ab

[1/]Flowers were held in growth regulator solution 18 hours at 70°F, then transferred to Floralife.

[2/]Deviations from initial (excellent) quality, according to ratings: 1 = excellent; 3 = good; 5 = fair; 7 = poor; 9 = worthless.

[3/]Values not followed by the same letter are significantly different at odds of 19:1.

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Use of Ethyl Alcohol

During the course of these tests, it was suggested to us that the addition of denatured ethyl alcohol to the holding vase life; therefore a test was conducted with 'Red American Beauty' buds placed in various concentrations of ethyl alcohol. Flowers in solutions of 0.5-1.0% alcohol did show increased water uptake and reduced weight loss, but had only slightly better vase life than flowers in water. Solutions of 3 or 5% alcholol were toxic to the flowers.

What significance do these tests have for the commercial flower grower? They did show that an 18-hour holding period in 200-400 ppm B-Nine or Cycocel increased vase life of roses, but this increase was both small and variable. This use of growth regulators does not present a breakthrough for the handling of roses, yet it could be employed apparently without any danger and with some benefit, particularly for the consumer not using preservatives or not using them properly. It should not be considered as a replacement for preservatives, however.

With the ever-increasing list of growth regulators finding use in agriculture, it is entirely possible that a material will be found that will ensure a satisfactory post-harvest life of flowers. It is certain that continued efforts will be made to find such a material. But in the meantime, the best approach to a satisfactory vase life for flowers appears to be production of high quality blooms and the use of the best commercial preservative for a particular crop.