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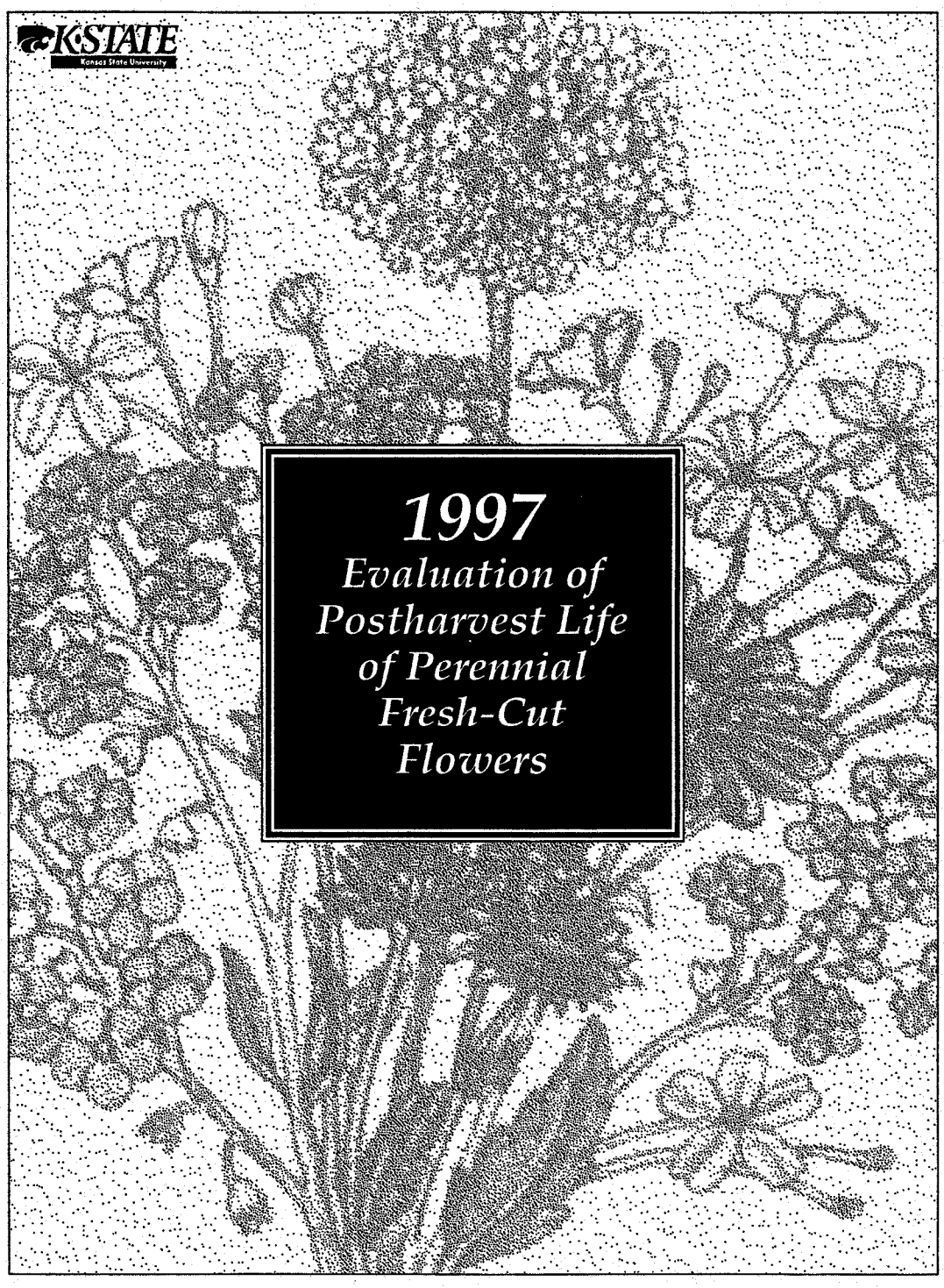

1997 Evaluation of Postharvest Life of Perennial Fresh-Cut Flowers

Report of Progress **805**

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

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1997 Evaluation of Postharvest Life of Perennial Fresh-Cut Flowers

Karen L.B. Gast, Ph.D.
Department of Horticulture, Forestry and Recreation Resources
Kansas State University

As consumers acquire a taste for more new and different flowers or specialty cut flowers, growers and vendors need postharvest information to determine the expected vase life of these flowers and the best way to extend it. Postharvest evaluations were conducted on autumn sedum, blue spirea, hardy amaryllis, lobelia, oregano, and sunflowers. Included at the end of this report is a section on other perennials that were planted in 1996 at the Kansas State University Horticulture Research Center, Manhattan for determination of plant survival and postharvest evaluations. These did not survive very well, so postharvest evaluations were not done.

Procedures

The objective of most postharvest evaluations was to determine whether silver thiosulfate (STS) and floral preservatives improved the vase life of the flowers. A 2 by 2 factorial design was used. The flower stems were either treated (pulsed) with STS for 30 minutes or not and then either held in water or floral preservative, giving four treatments: 1) water with STS, 2) water without STS, 3) floral preservative with STS, and 4) floral preservative without STS. No STS was used with hardy amaryllis or sunflowers; only water and floral preservative were compared. Pulsing is a term used in the floral industry to describe fresh flower handling procedures where the fresh-cut flowers are placed in a special solution for a giving period of time, usually 20 minutes to a couple of hours.

Autumn Sedum

Autumn sedum is an herbaceous perennial that blooms in late August and September. The umbels of pinkish purple flowers and succulent leaves make it an interesting new fresh-cut flower.

The sepals of the individual flowers withered before the rest of the flowers, but this though did not detract from the total appearance of the umbel of flowers. This is why the vase life of these flowers is 3 to 4 weeks long (Table 1).

Flowers treated with STS lasted longer than those not treated. Without STS, no difference occurred between water and floral preservative. Flowers in floral preservative with STS lasted almost a week longer than those in water with STS.

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Table 1. Postharvest life of autumn sedum with or without silver thiosulfate (STS) treatment and held in water or floral preservative.

Treatment	Postharvest Life (days)*
Floral preservative + STS	32.5 a
Water + STS	26.3 b
Floral preservative	23.9 c
Water	23.0 c

*Means followed by different letters are significantly different at the 5% level of probability.

Blue Spirea, *Caryopteris x clandonensis* 'Blue Mist'

Blue spirea is a woody shrub that is marginally hardy in Kansas. It usually dies back to the ground each winter, or it may be pruned back to 4-5 inches above the ground like an herbaceous perennial. This procedure is recommended, because the new growth produced each year promotes better flowering and desirable long stems. This cultivar has small blue flowers. The undersides of the foliage are covered with white hair, which give it a silvery appearance. It can be used as a filler flower for arrangements.

During postharvest evaluations, stems were checked daily to determine whether they were showing signs of senescence, which included dropping of leaves and flowers, wilting of flowers, and/or discoloration of leaves and flowers.

The STS-treated stems showed less shattering of leaves and flowers whether they were held in water or floral preservative. Flowers held in water with or without STS lasted at least 2-3 days longer than those in floral preservative with STS(Table 2). Flowers held in floral preservative without STS lasted almost 2 days longer than those treated with STS. Thus, the STS treatment appeared to be beneficial, but floral preservative did not.

Table 2. Postharvest life of blue spirea with or without silver thiosulfate (STS) treatment and held in water or floral preservative.

Treatment	Postharvest Life (days)*
Water + STS	11.3 a
Water	10.1 a
Floral preservative	10.0 a
Floral preservative + STS	8.1 b

*Means followed by different letters are significantly different at the 5% level of probability.

Hardy Amaryllis

Hardy amaryllis is a true amaryllis and a hardy perennial bulb. It also is called surprise lily, resurrection lily, and naked lady. The plant produces copious foliage in the spring, which dies back. In July and August, it produces a leafless stem with 5-9 flowers on it, hence the name surprise or naked lily.

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For postharvest evaluations, stems were placed in either water or floral preservative. The number of flowers open, the number of flowers dead, and fresh weights were recorded daily.

The lower pH of the floral preservative solution caused the flower petals to turn bluish. Flower stems in the water split and curled. No difference occurred between the treatments in the number of days until all the flowers were dead or when the first flower died (Table 3). All the flowers opened a day sooner in the water than in the floral preservative. The only other difference between treatments was that the stems in floral preservative had a greater loss of fresh weight overall than those in the water. The number of days that all the flowers were open, the last day all flowers were open, and the day all flowers were dead did not differ between the treatments.

Table 3. Postharvest life of hardy amaryllis held in water or floral preservative [z] .

Treatment	Total Postharvest Life (days)	Day All Flowers Open	Number of Days All Flowers Open	Last Day All Flowers Open	Percent Fresh Weight Loss	Percent Fresh Weight Gain
Floral preservative	11.0[NS]	4.9*	2.1[NS]	6.0[NS]	36.0***	10.5[NS]
Water	10.9	3.8	2.9	5.7	16.9	18.7

[z] *, *** and [NS] mean means are different at the 5% and 0.1% level of probability and not significantly different.

***Lobelia cardinalis*, 'Compliment Scarlet'**

Lobelia cardinalis produces a spike inflorescence. Cultivars like 'Compliment Scarlet' have been developed that produce a true red. Few red spike flowers are available in the trade, so this will be a welcome addition.

During postharvest evaluations, number of flowers open, number of flowers dead, stem length, and fresh weight were recorded daily.

More than double the number of flowers opened with the floral preservative treatments (Table 4). The total postharvest life, the time when all flowers were dead, was longest with the floral preservative. The vase life (defined as when half the flowers on the spike were dead) was significantly longer with the floral preservative with STS treatment. The treatments had no effect on the final stem length, but stems in the floral preservative treatments took 2-3 days longer to reach their maximum length. Although no difference occurred in fresh weight gained, stems in the floral preservative treatment took 4 ½ to 7 days longer to reach their maximum fresh weight. The STS-treated stems took 2 ½ days longer to reach maximum fresh weight than those without it. The fact that lobelia benefitted from the use of a floral preservative and STS is not surprising, because it is a member of the bellflower family. Members of this plant family are sensitive to ethylene. Their flowers wilt when exposed to endogenous and exogenous ethylene sources. STS inhibits the toxic effect of ethylene on the flowers.

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Table 4. Postharvest life of *Lobelia cardinalis*, 'Compliment Scarlet' with or without silver thiosulfate (STS) treatment and held in water or floral preservative.

Treatment	Number of Flowers Opened	Total Postharvest Life (days)	Marketable Postharvest Life (days)	First Day at Maximum Stem Length	First Day at Maximum Fresh Weight
Floral preservative + STS	28.8 a	20.6 a	14.0 a	6.8 a	10.2 a
Water + STS	12.7 b	15.5 bc	9.8 bc	4.0 b	3.3 c
Floral preservative	24.3 a	18.1 ab	10.7 b	5.9 a	7.7 b
Water	10.3 b	12.8 c	8.5 c	3.9 b	3.3 c

*Means followed by different letters are significantly different at the 5% level of probability.

Oregano

Oregano is most commonly known as a perennial culinary herb. Its aggressive growth habit makes gardeners think carefully about where to plant it so it can be contained and what it can be used for. It produces 18- to 24- inch flowering stems above the lower vegetative growth. These are covered with clusters of small mauve to purple flowers. They make a good purple/lavender filler for both fresh and dried bouquets.

During postharvest evaluations, fresh weights and vase life were evaluated and recorded daily. Vase life ended when more than 50% of the flowers were dead.

The leaves on the stems in floral preservative developed brown necrotic spots. Stems in floral preservative with STS lasted almost 1 ½ days longer than those without STS (Table 5). The STS did not make a difference in vase life for the flowers held in water. Floral preservative alone produced the shortest vase life, whereas the other treatments did not differ from each other. Water alone gave an acceptable vase life. A continual increase in fresh weight is usually an indication that the flower's vascular system is active and the vase life will be prolonged. This was not the case for oregano. Stems in floral preservative with STS took the longest time to reach their greatest fresh weight but had the shortest vase life.

Table 5. Postharvest life and day at greatest fresh weight of oregano with or without silver thiosulfate (STS) treatment and held in water or floral preservative.

Treatment	Postharvest Life (days)*	Day at Maximum Fresh Weight
Floral preservative + STS	8.5 a	3.4 a
Floral preservative	7.0 b	2.5 b
Water + STS	8.1 a	1.8 b
Water	8.1 b	1.8 b

*Means followed by different letters are significantly different at the 5% level of probability.

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Sunflowers

Seven sunflower cultivars were evaluated, 'Sunbright', 'Moonbeam', 'Velvet Queen', 'Sunbeam', 'Pastiche', 'Sunrich Orange F1', and 'Prado Yellow'. Postharvest evaluations were conducted by holding the stems in water. Flowers were judged to be dead when the ray florets were wilted. A study comparing water vs. floral preservative was conducted with 'Pastiche', 'Prado Yellow', and 'Sunbright'.

Sunbright outperformed the other six cultivars with a vase life in water that was 3 ½ days longer (Table 6). The other six cultivars had similar vase lives of 6 to 7 ½ days. This gives the grower a choice of good cultivars.

In the comparison study of water vs. floral preservative as a holding solution, the results were mixed (Table 7). No difference occurred between the water and floral preservative for 'Pastiche'. However, 'Prado Yellow' flowers lasted more than 3 days longer in the floral preservative, whereas 'Sunbright' flowers lasted almost 2 days longer in water.

Table 6. Postharvest life of sunflower cultivars held in water.

Cultivars	Postharvest Life (days)*
Sunbright	11.1 a
Moonbeam	7.5 b
Velvet Queen	7.4 b
Sunbeam	7.1 b
Pastiche	6.7 b
Sunrich Orange F1	6.6 b
Prado Yellow.	6.1 b

*Means followed by different letters are significantly different at the 5% level of probability.

Table 7. Comparison of postharvest life of sunflower cultivars held in water and floral preservative.

Cultivars	Postharvest Life (days)[z]
Sunbright	
water	11.1*
floral preservative	7.9
Pastiche	
water	6.6[NS]
floral preservative	9.1
Prado Yellow	
water	6.0***
floral preservative	9.3

[z] *, *** and [NS] mean means are different at the 5% and 0.1% level of probability and not significantly different.

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Other Perennials

In 1996, several species of herbaceous perennials were planted at the Kansas State University Horticulture Research Center at Manhattan for postharvest evaluations and determination of plant survivability. They included *Veronica, Verbascum, Monarda, Asclepias,* and *Gaura*. Plants were set in well tilled beds and watered as needed for establishment. They were fertilized with a 13-13-13 fertilizer. They were not mulched for winter protection. The decision was made to see how hardy the plants were without protection.

Veronica 'Blue Bouquet'. More than 140 plants were transplanted in the autumn of 1996. Less than 20 plants survived the winter, and none produced flowers of marketable quality for postharvest evaluations. Spring planting and winter protection may help this species produce a marketable flower, but with the current cultivation, this cultivar and species does not appear to be a good field cut flower.

Verbascum 'Southern Comfort'. About 50 plants were transplanted in the spring of 1996. They produced flowers that summer, but only 27 plants survived the winter. Flower production was sparse and inconsistent in the plants. Individual flowers on the inflorescence opened and died over a period of time, such that they would not be suitable for the retail and wholesale market trade as a cut flower.

Monarda 'Lambada'. Very few plants survived the winter. The ones that did survive produced attractive lavender inflorescences. They lasted in floral preservative for almost 9 days.

Asclepias 'Silky Gold' and 'Soulmate'. These did not overwinter very well. Only 2 out of 51 plants of 'Silky Gold' survived. The flowers lasted about 5 days in water. No 'Soulmate' plants survived to flower.

Gaura 'The Bride'. This is a woody shrub that dies back to the ground in winter in Kansas. The current season's growth has attractive reddish stems, lance shaped leaves, and white flowers, ½ to ¾ inch wide. One hundred twenty plants were planted in the spring of 1996. Only 37 survived but spread to fill in the beds somewhat. The flowers shatter easily, but the leaved stems are attractive as a foliage filler.

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500