

# BUD OPENING AND OVERNIGHT CONDITIONING OF *Gypsophila* 'BRISTOL FAIRY'

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## SUMMARY

Bud-opening procedures can be used to develop *Gypsophila* 'Bristol Fairy' flowers with better size and quality than those opened on the plant in the field. Among opening solutions tested, those containing 25 ppm silver nitrate yielded the best quality blooms. Sugar was required to successfully open the buds.

Overnight conditioning of commercial-open *Gypsophila* 'Bristol Fairy' also improved flower quality. Better flowers developed in solutions containing 5 or 10 percent sugar than in solutions with 2.5 percent or no sugar. The use of 25 ppm silver nitrate in deionized water effectively prevented stem plugging.

The silver nitrate treatment allowed commercial-open blooms to draw water effectively after conditioning and simulated shipment. Adding sugar to the conditioning treatment increased flower size.

Treated *Gypsophila* was dried and rated after 3 months. The highest quality dried *Gypsophila* occurred where buds had been opened in deionized water containing 25 ppm silver nitrate to which 5 to 10 percent sugar had been added. Everbloom® at 2 ounces per gallon yielded bud-opened flowers of similar quality to those obtained with 25 ppm silver nitrate. However, the flowers were distinctly yellow in color.

Growers and wholesalers have encountered problems in marketing *Gypsophila* 'Bristol Fairy.' The flowers often wilt and fail to draw water when received in eastern markets. Experiments were conducted to determine if overnight conditioning treatments would prevent stem plugging and would increase acceptability of the flowers at the consumer level. Bud opening was attempted in the same solutions to determine if that practice would be feasible.

### PROCEDURES

*Gypsophila* 'Bristol Fairy' was harvested from the field and bunched, three stems per bunch, for the treatments investigated (table 1). All flowers used in the experiment were harvested from the same plant. Flowers at two stages of development were separately field-bunched for the studies: commercial-open flowers (numerous unopened buds) and those at a tight-bud stage with no open flowers.

Stems of both developmental stages were placed in solutions (table 1) at 5:00 p.m. on July 29. Each solution was prepared with deionized water at four sugar concentrations (0, 2.5, 5.0, and 10 percent sugar). The commercial-open flowers were transferred from the conditioning solutions after a 26-hour treatment. They were held dry in a packing box for an additional 26 hours to simulate shipment, then placed in clean Mason jars of deionized water to determine vase life.

The bud-stage *Gypsophila* was maintained in the opening solutions (table 1) for 8 days until August 6, then transferred to a shipping box for a simulated 2-day shipment. Bud-opened *Gypsophila* were ready for transfer after 4 days but were left in solution 8 days to accentuate any phytotoxic effects due to preservative chemicals or sugar concentration.

### RESULTS: COMMERCIAL-OPEN GYPSOPHILA

Commercial-open *Gypsophila* 'Bristol Fairy,' when evaluated after 7 days in the vase (9 days after harvest), showed a definite response to both chemical conditioning treatment and sugar concentration (table 2). Flowers conditioned overnight in deionized water containing 25 ppm silver nitrate maintained good foliage and were in a turgid condition 1 week after being placed in the vase. All flowers conditioned overnight in 25 ppm silver nitrate were judged commercially acceptable. Most secondary blooms and buds opened after harvest in the conditioning solution with sugar but failed to do so without sugar.

The 1,000 ppm silver nitrate, 10-second stem dip did not prove as beneficial in maintaining foliage as the 25 ppm silver nitrate continuous submersion. In previous experiments (Farnham, 1973) silver nitrate stem dips of 1,000 ppm or more effectively prevented stem plugging of chrysanthemums.

TABLE 1. DEIONIZED WATER SOLUTIONS USED FOR OVERNIGHT CONDITIONING AND BUD OPENING OF *GYPSOPHILA* 'BRISTOL FAIRY' — JULY 29, 1974

Overnight conditioning or bud opening treatment	Ingredients <sup>1</sup>	Exposure time
Modified Cornell Solution	200 ppm 8-quinoline citrate (HQC), 25 ppm silver nitrate (Ag), 50 ppm aluminum (Al) ion from aluminum sulfate	continuous
25 ppm silver nitrate	25 ppm silver nitrate	continuous
1000 ppm silver nitrate stem dip	1000 ppm silver nitrate	10-second stem dip <sup>2</sup>
200 ppm 8-quinoline citrate (HQC)	200 ppm 8-quinoline citrate (HQC)	continuous
100 ppm SDT from Guardex®	100 ppm SDT—sodium dichloro-s-triazine-trione	continuous
Everbloom® 2 oz. / gal.	Everbloom® 2 oz. / gal.	continuous

<sup>1</sup>Each solution prepared with four sugar concentrations (0, 2.5, 5, and 10 percent sugar).

<sup>2</sup>Flower stems transferred to Mason jars containing deionized water with or without sugar as designated.

Similar treatments permitted carnation buds to be opened in sugar solutions without additional preservatives or bactericides. (Farnham and Barr, 1973).

With most of the preservatives tested, acceptance ratings of commercial-open *Gypsophila* (table 2) showed that the highest quality occurred where flowers were conditioned overnight in deionized water containing 10 percent sugar. An exception was flowers treated with the Modified Cornell Solution plus 10 percent sugar (table 1), which were excessively yellow. The yellow color and a high degree of foliage injury also occurred in the other Modified Cornell Solution treatments. Flower stems that received the overnight (26-hour) conditioning treatments generally had poor-quality foliage. The exception was those stems treated with 25 ppm silver nitrate, when rated after 7 days.

The data in table 2 demonstrate that overnight conditioning in deionized water containing 25 ppm silver nitrate prevented flower stem plugging at the consumer level.

#### RESULTS: BUD-OPENED GYPSOPHILA

The bud-opening data show that 25 ppm silver nitrate in deionized water was the most effective treatment used (table 3). The quality and size of blooms increased with sugar concentration. Most of the bud-opening solutions with added sugar produced acceptable-quality flowers. In general, flowers opened in 5 or 10 percent sugar were of better quality than those opened in 2.5 percent sugar. The data in table 3 do not show this because of limitations in the rating system.

The two most effective bud-opening solutions were 25 ppm silver nitrate and 2 ounces per gallon of Everbloom®. Flowers treated with Modified Cornell Solution developed a yellow cast, and the treatment was phytotoxic to the foliage. Commercial-acceptance ratings made 18 days after harvest (table 4) showed that flowers conditioned or opened in 25 ppm silver nitrate or Everbloom® (2 ounces per gallon) had the best quality. Flowers opened from buds were of better quality than those harvested at the commercial-open stage. Toxicity problems with the Modified Cornell Solution made it the least desirable material tested.

#### EFFECT ON QUALITY OF DRIED PRODUCT

*Gypsophila* treated in these experiments was dried in a cool shed and rated on October 24, 1974. Quality was best where buds were opened in deionized water containing 25 ppm silver nitrate (table 5). Solutions containing 5 or 10 percent sugar produced better quality blooms than those with 2.5 percent sugar. Open flowers conditioned overnight were acceptable from most treatments.

Everbloom® yielded good quality but caused considerable yellowing of blooms and foliage deterioration.

Quality of dried *Gypsophila* was similar for a given treatment whether the flowers were bud opened or harvested at the commercial stage. Open blooms conditioned overnight in SDT showed no treatment carryover in the vase. The SDT and sugar solutions did a reasonable job of bud opening. Less flower yellowing occurred in the SDT treatment than occurred when Everbloom® was used.

#### CONCLUSIONS

The bud-opening procedure can be used to improve the quality of *Gypsophila* 'Bristol Fairy.' Overnight conditioning in solutions containing 5 or 10 percent sugar can also improve quality. Conditioning the flower stems in 25 ppm silver nitrate in deionized water was most effective for preventing stem plugging. Under high evaporative conditions, excessive flower yellowing may occur from the use of solutions containing HQC.

#### ACKNOWLEDGMENT

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#### LITERATURE CITED

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TABLE 2. EFFECT OF SUGAR CONCENTRATION AND SELECTED OVERNIGHT CONDITIONING TREATMENTS ON PERFORMANCE OF *GYPSOPHILA* 'BRISTOL FAIRY' HARVESTED AT THE COMMERCIAL OPEN STAGE (9 DAYS AFTER HARVEST)

Overnight conditioning treatment	Percent sugar in deionized water											
	0			2.5			5			10		
	Percent good foliage	Turgid buds & blooms <sup>1</sup>	Comm. accept. <sup>1</sup>	Percent good foliage	Turgid buds & blooms <sup>1</sup>	Comm. accept. <sup>1</sup>	Percent good foliage	Turgid buds & blooms <sup>1</sup>	Comm. accept. <sup>1</sup>	Percent good foliage	Turgid buds & blooms <sup>1</sup>	Comm. accept. <sup>1</sup>
Modified Cornell Solution	0	-	-	0	-	+	0	+	+ -	0	-	-
25 ppm silver nitrate	100	+	+	100	+	+	100	+	+	100	+	+
1,000 ppm silver nitrate stem dip	0	-	+	50	+	+	10	-	-	0	+ -	+
200 ppm HQC	0	-	-	0	-	-	0	-	-	25	+ -	+
100 ppm SDT from Guardex®	0	-	-	0	-	-	0	-	-	0	+ -	+
Everbloom® 2 oz./gal.	0	-	-	0	-	-	0	-	+ -	50	+	+

<sup>1</sup> + = secondary buds developed (opened) in the vase.  
 - = secondary buds not open, stems often wilted.  
 + - = secondary buds not completely opened—some stem wilting.

TABLE 3. EFFECT OF SUGAR CONCENTRATION AND SELECTED CONDITIONING TREATMENTS ON BUD OPENING OF *GYPSOPHILA* 'BRISTOL FAIRY' (EVALUATED 9 DAYS AFTER HARVEST)

Bud opening treatment	Percent sugar in deionized water											
	0			2.5			5			10		
	Percent good foliage	Percent open	Comm. accept. <sup>1</sup>	Percent good foliage	Percent open	Comm. accept. <sup>1</sup>	Percent good foliage	Percent open	Comm. accept. <sup>1</sup>	Percent good foliage	Percent open	Comm. accept. <sup>1</sup>
Modified Cornell Solution	0	10	-	0	70	+	0	70	+	10	70	+
25 ppm silver nitrate	100	10	-	100	90	++	100	90	++	100	90	++
1000 ppm silver nitrate stem dip	60	10	-	100	80	+	60	80	+	50	80	+
200 ppm HQC	50	10	-	10	70	+ -	0	70	+ -	10	70	+ -
100 ppm SDT from Guardex®	70	10	-	80	70	+	40	80	+	50	80	+
Everbloom® 2 oz./gal.	90	60	-	80	90	+	80	90	+	40	90	+

<sup>1</sup> ++ = all buds developed into high quality white blooms.  
 + = blooms of good commercial quality.  
 + - = blooms satisfactorily developed. Downgraded for yellow flowers. Some secondary buds incompletely opened.  
 - = blooms did not develop.

TABLE 4. COMMERCIAL ACCEPTABILITY OF FRESH *GYPHOPHILA* AT END OF STUDY (18 DAYS AFTER HARVEST) AS AFFECTED BY SUGAR CONCENTRATION AND CHEMICAL TREATMENT

Overnight conditioning or bud-opening treatment	Percent sugar in delonized water <sup>1</sup>							
	0		2.5		5		10	
	Commercial harvest	Opened buds	Commercial harvest	Opened buds	Commercial harvest	Opened buds	Commercial harvest	Opened buds
Modified Cornell solution	-	-	-	-	-	-	-	-
25 ppm silver nitrate	-	-	-	+	+	+	+	+
1000 ppm silver nitrate stem dip	-	-	-	+	-	+	-	+
200 ppm HQC	-	-	-	+ -	-	+ -	-	+ -
100 ppm SDT from Guardex®	-	-	-	-	-	+	-	+
Everbloom® 2 oz./gal.	-	-	-	+	+	+	+	+

<sup>1</sup> + = flowers of good commercial quality.  
+ - = flowers of marginal quality.  
- = flowers not commercially acceptable.

TABLE 5. ACCEPTABILITY OF *GYPHOPHILA* 'BRISTOL FAIRY' AFTER BEING DRIED AT COOL SHED TEMPERATURE (OCTOBER 24, 1974)

Overnight conditioning or bud-opening treatment	Percent sugar in solution <sup>1</sup>							
	0		2.5		5		10	
	Commercial harvest	Opened buds	Commercial harvest	Opened buds	Commercial harvest	Opened buds	Commercial harvest	Opened buds
Modified Cornell solution	3	0	5	5 <sup>2</sup>	5	6 <sup>2</sup>	5	8 <sup>2</sup>
25 ppm silver nitrate	6	0	6	8	8	10	8	10
1000 ppm silver nitrate stem dip	5	1	5	5	5	9	6	7 <sup>2</sup>
200 ppm HQC	3	3	5	6	6	8	7	6 <sup>2</sup>
100 ppm SDT from Guardex®	4	0	5	7	5	7 <sup>2</sup>	5	9
Everbloom® 2 oz./gal.	5	6	7	9 <sup>2</sup>	8	8	8	9 <sup>2</sup>

<sup>1</sup>0 - buds not open, not acceptable and badly discolored.

<sup>1</sup>0 - secondary buds opened to clear white color.

<sup>2</sup>Flowers distinctly yellow in color.