HortScience 26(3):314. 1991.

Postharvest Handling of *Alstroemeria*

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Additional index words. gibberellic acid, kinetin, benzyladenine, indole acetic acid

Petal shedding and leaf yellowing impair *Alstroemeria hybrida* flower postharvest vase life. Silver thiostrlfate (STS) pretreatment increases *Alstroemeria* flower vase life (Staby and Naegele, 1984; Vermeulen, 1986) by reducing flower shedding and leaf yellowing. Leaf yellowing can be prevented by the addition of a mixture of (in mg·liter^{-1}) 5 auxin, 2 cytokinin, and 7.5 gibberellin (GA_3) to the vase water (Staden, 1976, 1978). Gibberellin was regarded as the most active component of this solution. A pretreatment at 5C for 24 h is recommended (Vermeulen, 1986).

A grower on the island of Hawaii (≈1050-m elevation) has experienced leaf yellowing in some *Alstroemeria* lines when shipped to the continental United States. The objective of this study was to confirm the previous studies and to determine the optimal conditions to reduce leaf yellowing.

Alstroemeria ' Rosello #2' flowers, grown on a commercial farm at Volcano, Hawaii, were picked and packed in the morning and received the same day at our laboratory. The flowers were immediately unpacked, sorted, and 2 cm of stem was cut off. Ten stems were used per treatment. Some flowers were repacked the next day and held for 2 days, and others were repacked the same day and held in boxes for 3 days at 22C. All the flowers, whether repacked or not, were held in the test solution (see Table 1) at 22C and 60% relative humidity after unpacking. Days from harvest to 50% petal shed and 50% leaf yellowing were determined from daily observations. The data were tested by analysis of variance and means were compared by Wailer-Duncan multiple range test (SAS Inst., Cary, N.C.).

Flowers that had not been repacked and held in water showed 50% leaf yellowing and petal shedding after 10 days at 22C. Oasis floral preservative (OFP) (Smithers-Oasis, Kent, Ohio) increased flower longevity by 20% and the time to 50% leaf yellowing by 40% over the water control (Table 1). However, when flowers were held packed for 2 days, OFP did not have a significant effect in delaying leaf yellowing. OFP plus GA_3 was the best solution when both flower longevity and leaf quality are considered together following 2 days of holding.

Pulsing with the commercial *Alstromeria* solution Chrysal SVB-11 (Maroma, Miami) for 20 h increased the time to 50% flower shedding. When OFP or OFP plus GA_3 solutions were used upon unpacking, flower life was 1 day longer with pulsed than nonpulsed flowers. When Chrysal (10 g·liter^{-1}) was used after unpacking, pulsing with SVB-11 did not improve the flower life. We were unable to confirm any response to auxin or cytokinin reported to reduce leaf yellowing (Staden, 1976, 1978).

Packing the flowers for 2 days shortened flower life and also speeded leaf yellowing (Table 1). Zeatin riboside, benzyladenine (BA), and Chrysal increased time to 50% petal shedding by 22%, relative to the control. The OFP plus GA_3 combination more than doubled the time to 50% leaf yellowing. Pulsing for 24 h with STS (4 mM) did not improve petal life and accelerated leaf yellowing. Rogor RS (Silgard, Gard Products, Arlington Heights, Ill.) (1.5 ml·liter^{-1}) or Rogor Sustaining solution (1 ml·liter^{-1}), sucrose (2.5%), $CaCO_3$ (100 mg·liter^{-1}), kinetin (2 mg·liter^{-1}), lH-indole-3-acetic acid (IAA) (10 mg·liter^{-1}), and combinations increased the rate of petal shedding and leaf yellowing above the deionized water control (data not shown).

Postharvest leaf yellowing occurred in flowers held in the dark or packed for 2 days. Packing flowers for 5 days accelerated petal shedding by 20% and almost doubled the amount of leaf that yellowed above nonpacked controls (data not shown). When gibberellin was used before, during, and after packing, with or without OFP, leaf yellowing and flower shedding was slowed relative to flowers that received neither (Table 2).

Gibberellin and zeatin riboside were most effective in reducing yellowing and flower shedding. The addition of OFP to the mixture improved the effectiveness. Premature leaf yellowing was possibly associated with a low level of GA_3 in the leaves of certain cultivars of *Alstroemeria* and the length of darkness experienced during packing.

Table 1. Effects of various preservatives on days to 507. petal drop and 50% leaf yellowing for *Alstroemeria* 'Rosello #2' held continuously in vase solution or packed and held for 2 days at 22C before transfer to the solutions, also at 22C.

Preservative (all per liter)	50% Petal drop (days)	50% Leaf yellowing (days)
No packing		
None (deionized water)	10 de[z]	10 cde
20 g OFP[y]	12 b	14 b
4 ml Chrysal SVB-II (20 h) then 20 g OFP	13 a	14 b
20 g OFP + 100 mg GA_3	11 c	18 a
4 ml Chrysal SVB-II (20 h) then 20 g OFP + 100 mg GA_3	12 b	18 a
Packed for 2 days		
None (deionized water)	9 e	7 f
10 mg IAA	8 e	9 e
10 mg Zeatin riboside	12 a	14 b
100 μg GA_3	11 bc	13 b
2 mg Kinetin	9 e	8 f
100 mg BA	11 ab	11 c
20 g OFP	12 a	8 f
20 g OFP + 100 mg GA_3	11 ab	17 a
10 g Chrysal	11 ab	10 c
4 ml Chrysal SVB-II (20 h) then deionized water	11 b	8 e

[z]Mean separation within columns at $P = 0.05$, n = 12.
[y]OFP = Oasis floral preservative.

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Table 2. Effect of solutions during prepacking, packing, and postpacking on flower life. Flowers held for 18 h at 22C and 60% relative humidity, then held packed at 22C for 3 days. SVB-II concentration was 4 ml·liter^{-1}; Florever, 20 g·liter^{-1}; and GA_3 concentration, 100 mg·liter^{-1}.

Treatment			50% Petal drop (days)	50% Leaf yellowing (days)
Prepacking	Packing	Postpacking		
Control (no packing) distilled H_2O			11 bc[z]	14 a
OFP[y] + GA_3 (no packing)			12 a	14 a
Water	Dry	Water	9 d	8 e
GA_3	Dry	Water	8 d	11 cd
GA_3	GA_3	Water	11 cd	10 de
GA_3	GA_3	GA_3	11 bc	12 bc
OFP + GA_3	Dry	Water	9 d	9 e
OFP + GA_3	OFP + GA_3	OFP + GA_3	11 bc	12 bc

[z]Mean separation within columns at $P = 0.05$, n = 12.
[y]OFP = Oasis floral preservative.

Received for publication 25 May 1990. Hawaii Inst. of Tropical Agriculture and Human Resources Journal Series no. 3460. We appreciate the technical assistance provided by Wendy Kimura and the flowers provided by Bruce McCall, Woodell Farm, Volcano, Hawaii. The cost of publishing this paper was defrayed in part by the payment of page charges. Under postal regulations, this paper therefore must be hereby marked *advertisement* solely to indicate this fact.

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