

Title Exogenous applications of abscisic acid improved the postharvest drought tolerance of several annual bedding plants

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Abstract

The commercial production of annual bedding plants comprises a large percentage of total floriculture crop sales in the United States. In post-production retail environments, plants are often subject to drought stress, which reduces plant quality and can prevent sales. We performed experiments to determine the effects of exogenous applications of abscisic acid (S-ABA) on the postharvest performance of flowering herbaceous bedding plants. In the first experiment, *Impatiens walleriana* were grown to flowering and a single foliar spray of ABA at 200 or 400 mg·L⁻¹ at a volume of 0.2 L·m⁻² was applied. Plants were subsequently transferred to a glass greenhouse with an average daily temperature (ADT) of 21.6°C and maximum photosynthetic photon flux (PPF) of 700 μmol·m⁻²·s⁻¹, or received 24 h of simulated shipping and then were placed in an environmental growth chamber with an ADT of 19.6°C and PPF of 150 μmol·m⁻²·s⁻¹. Water was withheld for 48, 72, 96, 120, or 144 h and then plant quality evaluations were recorded. Plants treated with ABA displayed fewer moisture stress symptoms and were of higher quality than nontreated (control) plants in both postharvest environments. In the second experiment, nine bedding plant species received a 30- or 60-ml srench (foliar spray with runoff into the growing media) of ABA at 125 or 250 mg·L⁻¹ per pot. Plants were subsequently shipped to a glass greenhouse with an ADT of 22.6°C and maximum PPF of 600 μmol·m⁻²·s⁻¹. Water was withheld and the day each plant became unmarketable due to moisture stress symptoms was recorded. ABA extended the marketability of *Catharanthus roseus*, *Impatiens hawkeri*, *Pelargonium × hortorum*, *Petunia × hybrida*, and *Verbena × hybrida* by a mean of 1.1 to 5.8 days. ABA had no effect on the postharvest performance of *Sutera cordata* and *Impatiens walleriana*, and elicited phototoxicity symptoms on *Viola × wittrockiana* and *Lobelia erinus*. These experiments indicate that an exogenous application of ABA before shipping can increase the drought tolerance and extend the postharvest longevity of several bedding plant species in a retail environment.