

Abscisic acid: a new management tool to improve quality and marketability of vegetable transplants[©]

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Abstract

Abscisic acid (ABA) is a plant hormone that triggers adaptive responses to water stress, including stomatal closure and shoot growth suppression. Our goal is to explore the potential of ABA in improving quality and marketability of vegetable transplants. First, we examined the stress control effect. In muskmelon (*Cucumis melo* L.) seedlings subjected to water withholding, pre-stress foliar spray of ABA improved the maintenance of leaf relative water content by limiting transpirational water loss. This effect was linear to ABA concentration (0.2 to 7.6 mM). Upon rewatering, the ABA-treated seedlings showed faster photosynthetic recovery and greater dry matter accumulation than the untreated seedlings. Second, we examined the height control effect for producing compact transplants. The effectiveness of height control by ABA varied among crops, cultivars, and growth stages: final transplant height was reduced by up to 20% in bell pepper (*Capsicum annuum* L.), whereas the benefit of height control was limited by overall growth delay in jalapeño and watermelon [*Citrullus lanatus* (Thunb.) Matsum & Nakai]. Overall growth suppression, however, may be of value as a growth holding strategy. When ABA was applied immediately before the maturity stage, all tested cultivars of bell pepper, jalapeño, and watermelon reduced excessive shoot growth (up to 29% 4 days after treatment) and prolonged the transplant marketability. One of the negative side effects observed across these experiments was leaf chlorosis, although it was concentration-dependent and mostly reversible within 7 days. Importantly, field evaluations demonstrated that the growth modulation by ABA was only transient with no negative impact on marketable yield. These results suggest that, with optimal concentration and application timing, ABA can be developed as a new management tool for vegetable transplants.

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