Title Desiccation-induced reduction in water uptake of gypsophila florets and its amelioration

Author Ilona Rot and Haya Friedman

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Abstract

Gypsophila flowering stems are treated with a commercial formula before shipment; however, it is not clear if this treatment is the best one to enhance floret water uptake. Moreover it is not clear if it can ameliorate damage caused by exposure to air that is encountered during harvest. Water uptake by individual gypsophila florets was measured by the apoplastic fluorescent dye 8-hydroxypyrene-1,3,6-trisulfonic acid (HPTS). By employing this dye, it was determined that desiccation of flowering stems of more than 15% of their fresh weight, followed by rehydration with water, decreased floret water uptake. Reduction in water uptake was not observed in whole stems; nevertheless, floret opening was reduced. To improve floret water uptake following desiccation, the effects of rehydration with the detergents polyoxyethylene (10) lauryl ether, mixture of quaternary ammoniums, sodium dodecyl sulfate and Triton X-100 were examined. Triton X-100 was the most effective detergent in enhancing floret water uptake and it was better than TOG3 (included in the commercial formula), which was also shown to improve floret water uptake. Since flower opening was correlated with higher floret water uptake, the TOG3 in the commercial formula was replaced with Triton X-100. These solutions were equally effective in improving flower opening; however, neither completely reversed the desiccation-enhancement of flower wilting. Our results support the notion that water absorption by florets is not the sole contributor to flower opening. Taken together, our results suggest that it is possible to replace TOG3 with Triton X-100 in the commercial formula and rehydration with this solution following desiccation can overcome the reduction in floret water uptake.