Title Influence of the postharvest environment on the storage potential and propagation performance of unrooted cuttings of herbaceous ornamentals

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Abstract

Plants propagated from vegetative cuttings have become an increasingly important market in the United States. Significant economic losses occur annually due to poor performance, damage or death of cuttings. This occurs in large part due to the industry's lack of knowledge of the proper postharvest environments to provide to cuttings. This project was conducted to improve the understanding of the postharvest physiology of unrooted cuttings in order to optimize performance and longevity. Experiments were conducted to quantify the effect of temperature on respiration and ethylene production rates of unrooted cuttings. Additionally, the effect of the stock plant environment on the initial carbohydrate concentration of cuttings and the subsequent postharvest performance was also explored. Respiration rates of vegetative cuttings were greatest 2 h after harvest and decreased rapidly during the first 24 h. As postharvest temperature increased, the initial respiration rate increased. Regardless of how long poinsettia cuttings were stored at 10°, when they were transferred to 20° respiration rates increased. A decline in rooting quality was noticeable 2 to 4 d prior to a decline in shoot quality. Storage potential of poinsettia cuttings was maximal at 10°. Ethylene production in vegetative cuttings was directly correlated to storage temperature. As storage temperature increased, ethylene production increased. Poinsettia cuttings harvested in the evening produced more ethylene than cuttings harvested in the morning. Stock plant growing environment also impacts cutting postharvest performance. Adventitious root formation in propagation is related to the carbohydrate status of the unrooted cuttings. Carbohydrate levels were 2.5-times greater in plants that were grown in high-light than plants grown in low-light conditions. Carbohydrate status was not significantly correlated with ethylene production; however, rooting performance was positively correlated with carbohydrate status, as carbohydrate concentrations increased, rooting increased.