

**Title** Low-temperature storage influences morphological and physiological characteristics of nonrooted cuttings of New Guinea impatiens (*Impatiens hawkeri*)

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### Abstract

Herbaceous shoot-tip cuttings of New Guinea impatiens (*Impatiens hawkeri*) are commonly harvested in equatorial countries and then packaged, shipped, and subsequently rooted by greenhouse growers in subtropical and temperate climates. We quantified how storage temperature (0–30 °C) and duration (0–5 d) influenced chlorophyll fluorescence, gas exchange, and visual quality of nonrooted cuttings of New Guinea impatiens ‘Harmony White’ and ‘Harmony Magenta’ and their subsequent survival, rooting, growth, and development. Stock plants were grown at  $23.2 \pm 1.7$  °C (mean  $\pm$  standard deviation) under a 16-h photoperiod and a mean photosynthetic daily light integral (DLI) of 9.2–12.3 mol m<sup>-2</sup>. Cuttings were harvested and stored for 0, 1, 2, 3, 4, or 5 d at  $0.7 \pm 2.2$ ,  $5.7 \pm 1.8$ ,  $10.9 \pm 1.2$ ,  $15.3 \pm 0.7$ ,  $21.0 \pm 0.5$ ,  $26.2 \pm 0.7$ , or  $30.0 \pm 0.6$  °C. Rooting occurred in a controlled greenhouse environment with overhead mist, a vapor-pressure deficit of 300 Pa, mean air and media temperatures of  $24.2 \pm 1.7$  and  $23.7 \pm 1.7$  °C, respectively, a mean DLI of 3.9 mol m<sup>-2</sup>, and natural photoperiods. As storage duration increased from 0 to 5 d at 0 °C, chlorophyll fluorescence and visual quality decreased by 65% and 80% in ‘Harmony White’ and by 76% and 80% in ‘Harmony Magenta’, respectively. In addition, net photosynthesis had decreased from 10.6 to 2.4  $\mu\text{mol m}^{-2} \text{s}^{-1}$  and respiration increased from 1.4 to 2.0  $\mu\text{mol m}^{-2} \text{s}^{-1}$  in ‘Harmony White’ cuttings when measured after 11 d of propagation. The fresh-weight loss percentage was <12% in both cultivars after 5 d storage at  $\leq 10$  °C. Survival, rooting, and visual ratings after 16 d of propagation were negatively influenced by storage temperatures  $\leq 5$  and  $> 25$  °C. However, there were no significant trends on the effects of storage temperature and duration on subsequent time to flower, number of lateral branches formed, and plant height in cuttings. These results indicate that New Guinea impatiens cuttings can be stored for up to 5 d at 10–20 °C, with little or no impact on postharvest photosynthetic recovery, survival, visual quality, rooting, and subsequent plant performance.