

Title Flower bud abscission triggered by the anther in the Asiatic hybrid lily
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Abstract

It is not well documented which floral parts may trigger the onset of tepal or petal senescence and or flower bud abscission. Asiatic hybrid (*Lilium × elegans* Thunb.) 'Red Carpet' lily flowers were selected as a model to study this relationship because the various floral organs of a lily flower can be easily dissected and collected for physiological studies. We hypothesized that anther is the organ that triggers flower bud abscission. Ethanol-soluble sucrose, fructose, and glucose were analyzed in the tepal, anther, filament, and pistil. The analysis was conducted on flower buds weighing 1.5 g (small buds) and 3.9 g (large buds). The sucrose content in the anthers of small buds remained high when cut flowers were held at 21 °C for 5 d, suggesting that sucrose is not hydrolyzed into fructose and glucose. However, in large buds, sucrose was not detected when flowers were held at 21 °C for 5 d. The respiration rate of small buds (2.06 g) was high (2000–3000 mg/kg fw) when the tepals were removed and the anther remained attached to the filament, but was low (less than 400 mg/kg fw) in large buds approaching anthesis. Ethylene was produced only in small buds (1.42 g) when the anthers were present. Radioactive ¹⁴C sucrose applied to the cut end of the pedicel was translocated rapidly to the anther at harvest, but was not translocated to the anther when abscission was induced by keeping flower buds at 21 °C. Ethylene detected in small flower buds possibly was stimulated by physiological changes resulting from the lack of assimilates available to the anther and the lack of sucrose hydrolysis occurring in the anther. The absence of sucrose hydrolysis in the anther and lack of translocation of sucrose from the filaments to the anther in small buds may be factors that contribute to flower bud abscission in 'Red Carpet' lily.