Abstract

Genetic analysis of *Antirrhinum majus* L. cut flower postharvest longevity (PHL) suggest PHL is quantitative and influenced by significant additive gene effects, and important dominance and epistatic interactions. Heritability was estimated at 78 and 30% broad and narrow sense, respectively. Two to 4 genes minimum control PHL. Several genes of large effect explain the majority of short PHL while long PHL likely involves many genes. Backcrossing to a long-lived parent with selection for flower color is a useful method of acquiring long-lived colored lines. Gain from selection for long PHL is attainable; however, due to environmental influence, slow progress is expected and replicated selection required.

Preharvest conditions, cut flower harvest weight and floral development influenced PHL. Best PHL was achieved when production temperature 2 to 6 weeks prior to harvest was 15°C compared to 30°C. Genotypes with lighter harvest fresh and dry weights had longer PHL. A 58% lower stem fresh weight was associated with 65% PHL increase. Additionally, flower opening rate is not directly related to PHL.

Fifty-three percent fewer stomata per cut flower is associated with 9 days longer PHL. Long PHL is associated also with initial rapid reduction in transpiration and maintenance of low steady transpiration. Short-lived genotypes had 22 to 33% reductions in fourth quarter transpiration, while long-lived had 2 to 8%. These large transpiration reductions and higher average fourth quarter fresh weight loss of the short-lived compared with long-lived genotypes indicate vascular occlusions may be associated with short PHL.

Soluble sugars (SS) studies suggest source-sink relations may be more important to PHL than total endogenous SS concentrations. In this study, long-lived cut flower petals had a higher percentage of total cut flower SS than short-lived petals. Also, although long-lived (WL) and short-lived (WS) inbred SS concentration dropped when grown at 30°C compared to 15°C, PHL for WL decreased 2.8 d and increased 1.3 d for WS.

Further investigation of stomatal numbers and functioning relative to PHL may provide breeders a rapid and nondestructive indirect selection for PHL. Additionally, the proposed vascular occlusion development and possible genetic control warrant further study.