Abstract

Leaf stomatal density, postharvest biology, and ornamental trait genetics were investigated utilizing inbreds and hybrids of *Antirrhinum majus* L., snapdragon, to examine limitations to cutflower postharvest longevity (PHL) and genetics relevant to ornamental quality improvement. Market share for *A. majus* cutflowers may be expanded with understanding of ornamental quality constraints while anatomical and postharvest biology information may be applicable beyond species bounds.

Stem recuts increased water uptake though subsequent affects upon genotypic PHL differed. A high humidity environment equalized transpiration and PHL but in doing so shortened PHL of one genotype. Cutflower leaf removal did not affect or equalize PHL. Water loss from detached leaves, stoma per cutflower, and cutflower leaf area did not correlate to PHL. Stomatal density correlated to PHL however affects of stomatal density on PHL are minimal. Leaf stomatal density was stable across nodes and plant development in *A. majus* and quantitatively inherited with moderate narrow sense heritabilities (h2) of 0.37 ± 0.06-0.60 ± 0.07. Less severe reductions in hydraulic conductance with subsequent capacity for *in vivo* water movement and stomatal regulation of transpiration can in part explain PHL differences.

Twenty-two ornamental quality traits evaluated were quantitatively inherited with high h^2 generally ranging from 0.63-0.88 ± ~10. Branching habit and buds at discard had lower h^2 of 0.41 ± 0.15 and 0.20 ± 0.20, respectively. Phenotypic and genotypic correlation coefficients among 22 traits examined ranged ±1.0 though definitional and mathematical non-independence were confounded in extreme values. Genotypic correlations ranging ±0.80 ±0.10 revealed important physiological and pleiotropic interactions relevant to simultaneous improvement of ornamental quality traits. Full-sibling or F_3 (derived by F_2 self-pollination) family selection for PHL should result in gains of 1.8 days per selection cycle. Index selection for single quality traits based on cumulative information from F_3, F_4, and F_5 generations derived by self-pollination and single seed descent is 4-33% more effective than F_5 family selection for 21 of 22 traits analyzed. F_5 family selection would be more effective for branching habit. Selection for single and multiple quality traits is feasible and can be rapid