

Title Effects of ethylene, pollination, and ethylene inhibitor treatments on flower senescence of gentians

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Abstract

Flower senescence of the potted gentian (*Gentiana scabra*) ‘Shinbisei’ was investigated in relation to ethylene sensitivity and production. ‘Shinbisei’ flowers were used for all experiments except for those with inflorescences. Exposure to ethylene at $0.5 \mu\text{L L}^{-1}$ or higher concentrations for 24 h markedly accelerated flower senescence, indicating that *G. scabra* flowers are highly sensitive to ethylene. Treatment with 0.2 or 0.5 mM silver thiosulfate complex (STS) and $2 \mu\text{L L}^{-1}$ 1-methylcyclopropene (1-MCP), ethylene action inhibitors, and 50 mM α -aminoisobutyric acid, an inhibitor of 1-aminocyclopropane-1-carboxylate (ACC) oxidase, did not delay flower senescence. However, treatment with 1 mM L- α -(2-aminoethoxyvinyl) glycine, an inhibitor of ACC synthase, slightly delayed flower senescence. Pollination significantly accelerated petal senescence of *G. scabra* flowers. Ethylene production of petals, gynoecium, and stamens in unpollinated flowers slightly increased during senescence. Pollination significantly increased ethylene production of petals, gynoecium and stamens 1 day after pollination. To clarify whether 1-MCP delays senescence of cut gentian inflorescences, cut *G. scabra* ‘Yuki-hotaru’, *G. scabra* \times *Gentiana triflora* ‘Aoi-kaze’, and *G. triflora* ‘Koharu’ inflorescences with various stages of flowers, including buds with colored petals, were treated with $2 \mu\text{L L}^{-1}$ 1-MCP for 24 h. 1-MCP treatment delayed flower wilting of cut inflorescences of ‘Aoi-kaze’ and ‘Yuki-hotaru’ more than that of ‘Koharu’, suggesting that there is species variation in the effect of 1-MCP in delaying flower senescence of cut gentian inflorescences.