

COLORADO FLOWER GROWERS ASSOCIATION, INC.

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Effect of Ethylene on Growth of Carnations: Preliminary Report

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Four refrigerated chambers, covered with clear vinyl, were constructed in one of the 16x18-foot CSU greenhouses. Temperatures were maintained the same in all four, with a constant air flow. On April 4, 1973, 7 pots per chamber were planted to CSU Red, 2 plants per pot. Ethylene was injected into the air stream at a constant rate to give approximately 100, 300, and 500 ppb ethylene inside the chambers. The control chamber used ambient air with no filtration, the ethylene concentration varying from below 10 to about 30 ppb. Gas concentrations were established

prior to planting and have continued to the present date (July 11, 1973). The root substrate was gravel, irrigated and fertilized automatically.

Figures 1 through 4 show the preliminary results. Effects of the ethylene concentrations began to be noticed prior to pinching (3 weeks from planting). After pinching, the typical internode shortening was not so evident until elongation of the breaks began. As the treatments continued, effects on growth became more visible. Typically, the symptoms of ethylene

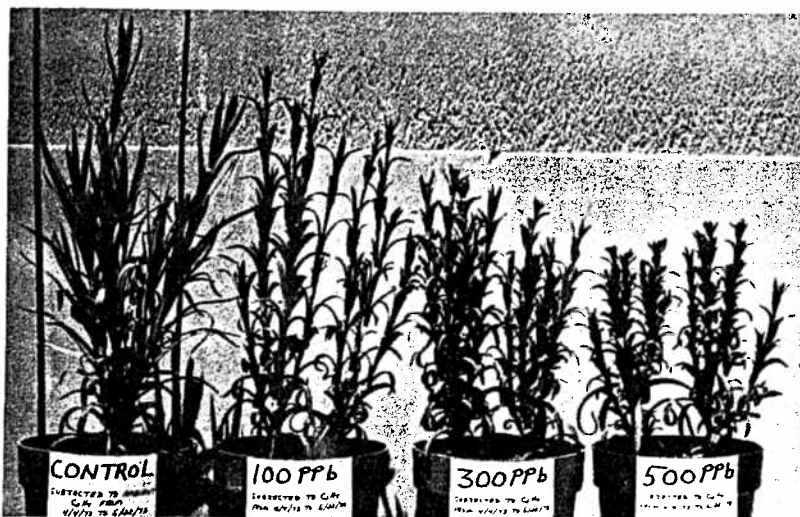


Figure 1. Effect of ethylene on carnation growth, continuous treatments from time of planting, April 4, 1973, picture taken on June 22, 1973. Carnations grown in gravel.

damage are shortened internodes, numerous lateral shoots, small leaves, stiff and hard stems, and hastening of flowering. Even at 100 ppb, with sufficient exposure, visible effects could be noted. It appears that there is a time versus concentration relationship, perhaps similar to that determined for cut flowers by Barden. Ethylene levels at 100 ppb are relatively frequent in urban regions, and with unvented, natural gas burners, levels that cause chronic damage — versus the acute symptoms shown here — are probably common. Further information will be forthcoming.



Figure 2. Effect of 300 ppb ethylene given continuously from planting on CSU Red carnations. Planted April 4, 1973, picture taken June 22, 1973.



Figure 3. Normal carnation growth when subjected to ambient air, ethylene concentrations ranging from less than 10 ppb to about 30 ppb from time of planting, April 4, 1973, to June 22, 1973.



Figure 4. Growth of CSU Red carnations subjected continuously between April 4, 1973, to June 22, 1973, to 100 ppb ethylene.