

ETHYLENE ACCUMULATION IN GREENHOUSES

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Nurserymen are making increased use of plastic greenhouses to grow temperature-sensitive crops during the winter. Unusual symptoms have appeared on several crops grown in such greenhouses when heaters were not vented externally.

A progressive marginal yellowing of older leaves occurred on some cultivars of common geranium (*Pelargonium hortorum*). Leaves of other cultivars were reduced in size. Some downward rolling of leaf margins also occurred, and the plants in general appeared more compact than normal. Flowering decreased markedly until there were almost no blooms among several thousand plants. Accelerated leaf drop was noted in some begonias, particularly angelwing begonia (*Begonia coccinea* 'Lucerna'). Bougainvillea has also shown a great amount of leaf drop.

Ethylene gas accumulation was suspected to be the cause of the symptoms. Air samples were taken February 25, 1975, from two greenhouses after their heaters had operated for several hours. Samples also were taken in houses where heaters had not been operating. The samples were analyzed by gas chromatography.

In one house (containing geraniums), where the heaters had burned for several hours before the air sample was taken, 263 parts per billion (ppb) of ethylene was detected. This is considered a high level. An ethylene level of 34 ppb was detected in another house where

heaters had been burning. This concentration could cause problems with some plants if it were maintained over a prolonged period. In this particular house, a heavy drop of older leaves occurred in schefflera plants.

Ethylene levels in houses with the heaters off were considerably lower, ranging from 10 to 16.3 ppb. Table 1 summarizes the ethylene levels measured. The greenhouse with the highest levels had no external venting nor were heaters externally vented. The house with the 34 ppb had openings in the end of the house for air exchange, but the heater was not externally vented. Excess ethylene can accumulate under such conditions.

Propane was the fuel used in the houses sampled but is not the only fuel that can cause such problems. All gas-fired heaters should be vented outside the greenhouse, regardless of the type of fuel, to minimize ethylene accumulation in the greenhouse atmosphere.

TABLE 1. Greenhouse Ethylene Concentrations —
Heaters Burning Versus Heaters Off

House Number	Heater Operation Before Sampling	Ethylene (ppb) 2/25/75
1	Burning	263.0
2	Burning	34.1
3	Not burning	16.3
4	Not burning	10.0
5	Not burning	16.3