MAXIMUM ETHYLENE DOSAGES FOR CARNATIONS

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Barden's work (CFGA Bul. 263) showed that bud-cut carnation flowers are less susceptible to ethylene injury. Her highest dosage levels of 55,000 ppb-hrs at 35° F. failed to reduce carnation keeping life. However, 47,000 ppb-hrs on open flowers, at the same temperature, caused zero keeping life. The work on tight-bud carnations was continued during the winter of 1972-73 to determine maximum tolerance of bud carnations to ethylene at 35° F. It was not until dosages exceed 200,000 ppb-hrs that a significant reduction in keeping life occurred. For all practical purposes, tight-bud cut carnations, when stored at 35° F., are immune to ethylene.

Periodically, ethylene samples have been made in various wholesale houses in the Denver region, with tests made of the atmosphere in various types of packing boxes. Concentrations of 50 ppb are common. Out of 40 individual determinations in the last 4 years, levels in a cut flower box were found to exceed 100 ppb twice, with one maximum of 198 ppb. On the basis of this limited sample, 100 ppb or more represents an extreme case. It may be that a long-term program of monitoring should be undertaken as a protective measure.

One hundred ppb for a 24-hour period is sufficient to cause a 20 percent reduction in keeping life of open flowers if kept at 70° F. At 35° F., 6 days would be required. Table 1 provides example of various concentrations and times that would be required to significantly effect cut flower carnations. Without question, cutting carnations in an immature stage, combined with low temperature, will eliminate any difficulty resulting from excessive ethylene dosages in the marketing process. Concentrations exceeding 1,000 ppb can be tolerated for short periods if the exposure occurs at 35° F.

Table 1: Ethylene concentrations and exposure periods required to reduce cut flower carnation life by 20 percent.

	Concentration	Time (Days)	
		Open	Tight Buds
At 70° F.	100	0.9	1.3
	200	0.4	0.6
	400	0.2	0.3
At 50° F.	100	1.8	5.8
	200	0.9	2.9
	400	0.5	1.5
At 35° F.	100	6.0	83.0
	200	3.0	41.0
	400	1.5	21.0
	800	0.8	10.0

Damage to tight buds effects the outer petals first by severely drying them, preventing normal flower opening. The typical "sleepy" symptom is not apparent. Due to variability in cutting stage, the most open buds will be affected first. Damage will be obvious in one day, and those that will open normally can be selected without difficulty. Open flowers are so sensitive that all within a group are damaged and must be discarded.