



Ethylene: An Invisible Pest

A National Foliage Foundation project is identifying popular potted foliage plants that are susceptible to ethylene gas damage.

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Delivering high-quality, long-lasting potted foliage plants to consumers is a major challenge. Plants often deteriorate during transportation and marketing due to less than optimal handling. Typically, plants are exposed to high temperature, drought, low light, and/or ethylene.

Ethylene is a colorless, gaseous hormone produced by plants to regulate natural development and deterioration. However, when plants are exposed to external ethylene gas from vehicle exhaust fumes, cigarette smoke, and ripening fruit, effects can be detrimental. Exposure of some ornamental plants to ethylene causes extensive leaf drop, yellowing, and wilting. With a view to identifying ethylene-responsive potted foliage



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Relative sensitivity of 12 potted foliage species to either 0.1, 1, or 10 ppm of ethylene for four days at 70°F in the dark.

Species	Sensitive to ethylene?	Level of sensitivity
<i>Radermachera sinica</i> 'China Doll'	Yes	High
<i>Schefflera arboricola</i> 'Gold Capella'	Yes	High
<i>Dieffenbachia maculata</i>	Yes	Moderate
<i>Dizygotheca elegantissima</i>	Yes	Moderate
<i>Dracaena marginata</i>	Yes	Moderate
<i>Aglaonema</i> 'Mary Ann'	Yes	Low
<i>Ficus benjamina</i>	Yes	Low
<i>Anthurium scherzerianum</i> 'Red Hot'	No	—
<i>Asplenium nidus</i>	No	—
<i>Chamaedorea elegans</i> 'Neanthe Bella'	No	—
<i>Codiaeum variegatum pictum</i> 'Petra'	No	—
<i>Spathiphyllum</i>	No	—

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plant species, we recently evaluated 12 popular species for their sensitivity to ethylene-induced damage.

Study Setup

Twelve foliage plant species (see table) growing in 4-inch pots were selected at a marketable stage from nurseries near Orlando, FL. Plants were exposed to either 0, 0.1, 1, or 10 parts per million (ppm) of ethylene for four days at 70°F in the dark. The ethylene concentrations, exposure time, and temperature are typical of conditions encountered during transport of potted foliage plants.

Plants were then maintained at 70°F, 40% to 60% relative humidity, and 75 foot-candles of light (12 hours per day) for 14 days to simulate retail/home conditions. The quality of plants and their leaves were assessed every two days.

Research Results

Seven foliage plant species (*Aglaonema*, *Dieffenbachia maculata*, *Dizygotheca elegantissima*, *Dracaena marginata*, *Ficus benjamina*, *Radermachera sinica*, and *Schefflera arboricola*) were sensitive to ethylene treat-



Foliage



Exposure of potted *Aglaonema* 'Mary Ann' plants to 10 ppm of ethylene for four days at 70°F (right) caused yellowing of basal leaves. The untreated control plant is shown on the left.

ments. Exposure to ethylene caused leaf yellowing in *Aglaonema*, *Diefenbachia*, and *Dracaena* and extensive leaf drop from *Dizygotheca*, *Ficus*, *Radermachera*, and *Schefflera* plants. *Radermachera* and *Schefflera* were the most sensitive species, with a four-day exposure to just 0.1 ppm of ethylene inducing more than 10% leaf drop. Conversely, *Aglaonema* and *Ficus* plants were relatively less sensitive, and required exposure to the higher concentration of 10 ppm of ethylene to elicit symptoms.

These results highlight the potential problems that exposure to ethylene can cause. Treatments that either eliminate ethylene from the storage or transport environment or that protect plants against accidental exposure to ethylene may be necessary to maximize plant quality and marketability.

All other tested species (*Anthurium scherzerianum*, *Asplenium nidus*, *Chamaedorea elegans*, and *Spathiphyllum*) were insensitive to a four-day exposure of up to 10 ppm of ethylene. Based on these results, these species can be shipped without fear of ethylene-induced damage under regular transport conditions.

Conclusion

Seven of the 12 tested potted foliage species were sensitive to ethylene-induced damage. We showed for the first time that potted *Aglaonema* 'Mary Ann' plants are susceptible to ethylene-induced leaf yellowing. Results underscore the importance of taking ethylene — an invisible and odorless pest — very seriously. Ongoing research aims to develop practical



Exposure of potted *Schefflera arboricola* 'Gold Capella' plants to 10 ppm of ethylene for four days at 70°F (right) caused extensive leaf drop. The untreated control plant is shown on the left.

post-production treatments that protect ethylene-sensitive foliage plants and maximize their quality and longevity for consumers. ■

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