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Increasing the longevity of foliage potted plants with EthylBloc®

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1. Summary of Research Project

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 systems. Typically, plants are distributed over long distances and are exposed to high temperature, drought, low light and ethylene gas. Exposure to ethylene greatly reduces the longevity of many plant species by causing rapid leaf drop, yellowing and wilting. In flowering potted plants, ethylene sensitivity has been shown to vary significantly between species and among varieties. In contrast, the sensitivity of many foliage plant species, including popular new varieties, has not been thoroughly investigated. Moreover, there is a critical need to evaluate the ability of anti-ethylene agents such as EthylBloc® to prevent ethylene damage in foliage plants.

The objectives of our present research are to:

1. Determine the sensitivity of a broad range of potted foliage plants to ethylene damage.
2. Determine the potential of EthylBloc® to prevent ethylene damage.

By evaluating ethylene sensitivity of plants under simulated shipping conditions, we aim to provide industry with practical recommendations on critical ethylene exposure limits for each species. We will also establish if EthylBloc® is effective to justify the additional expense of using this product.

2. Research Completed

The first step in our research is to determine the sensitivity of selected potted foliage plants to ethylene. In our 2005 report we evaluated the ethylene sensitivity of potted *Aglaonema, Anthurium, Dieffenbachia, Dizygotheca, Dracaena* and *Spathiphyllum* plants. We established that *Aglaonema, Dieffenbachia, Dizygotheca* and *Dracaena* foliage plants were sensitive species. During this past year, we expanded our screening study to include evaluation of A*splenium nidus, Chamaedorea elegans, Chlorophytum comosum, Codiaeum variegatum pictum, Ficus benjamina, Radermachera sinica* and *Schefflera arboricola* and re-tested *Spathiphyllum* plants.

Plants were grown to a marketable stage at nurseries near Apopka, Florida and then transported to the University of Florida at Gainesville. They were treated with 0 (air control), 0.1, 1 and 10 parts per million (ppm) of ethylene at 70 °F in the dark for 4 days inside sealed glass aquariums. Plants were then placed in interior rooms maintained at 70 °F, 50 % relative humidity, and 70 foot candles of light (12 hours/day) that simulated retail/home conditions.

Potted *Chlorophytum*, *Ficus*, *Radermachera*, *Schefflera* and *Spathiphyllum* plants were found to be sensitive to ethylene. Exposure to ethylene induced moderate levels of leaf yellowing on *Chlorophytum* and extensive leaf drop on *Ficus, Radermachera, and Schefflera* (Figs. 1A, B, C, D). In contrast to our 2005 report, *Spathiphyllum* plants displayed low levels of leaf yellowing when exposed to ethylene. Two species (A*splenium* and *Chamaedorea*) were completely resistant to all ethylene concentrations while *Codiaeum* was not consistently responsive to ethylene at all tested concentrations.

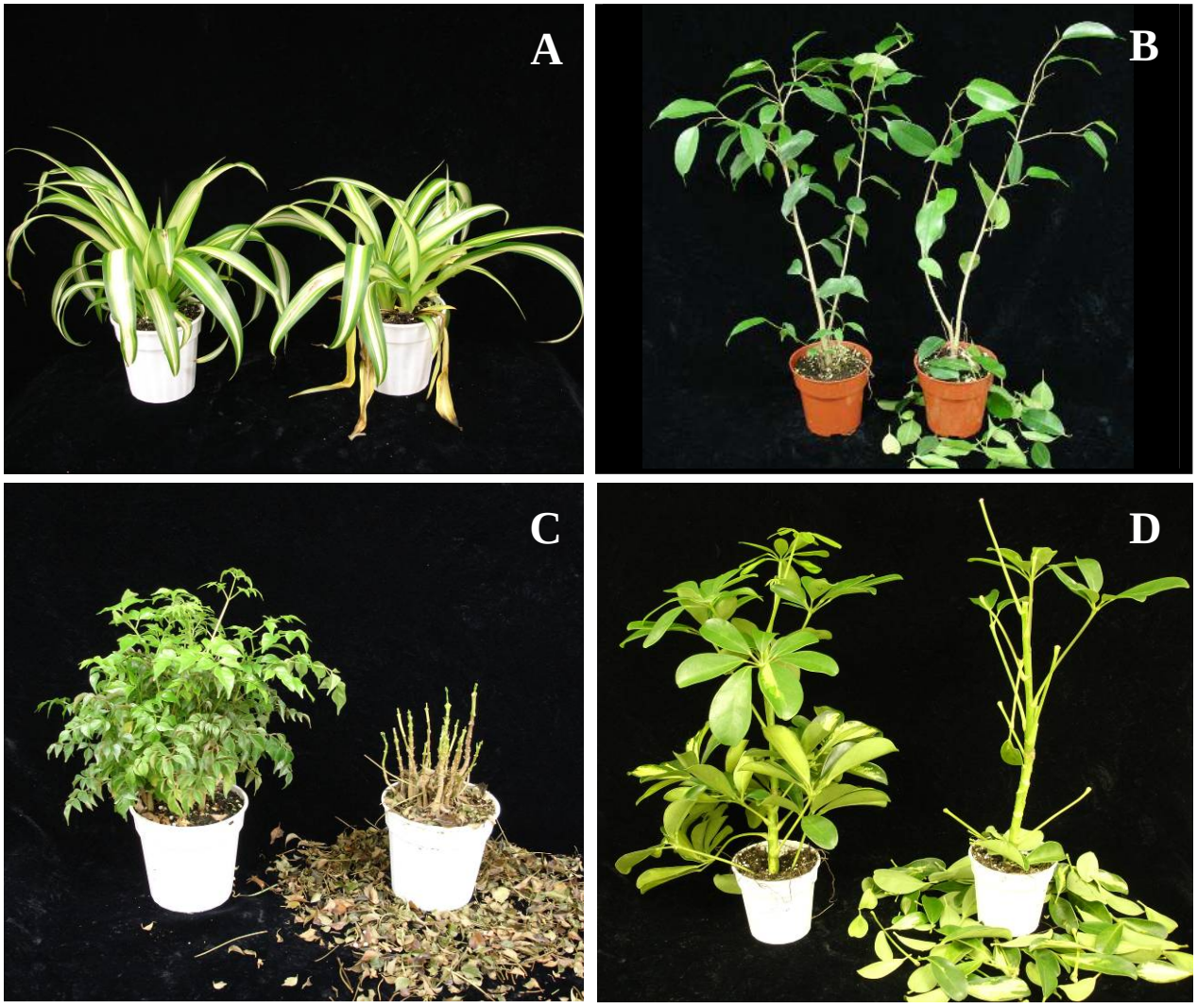

Fig. 1. Photographs of *Chlorophytum comosum* 'Hawaiian' (A), *Ficus benjamina* (B), *Radermachera sinica* 'China Doll'(C) and *Schefflera arboricola* 'Gold Capella' (D) plants after exposure to either 0 (left) or 10 (right) parts per million (ppm) of ethylene for 4 days at 70 °F.

Radermachera and Schefflera plants were highly sensitive to ethylene. They suffered extensive leaf drop when exposed to 0.1, 1 and 10 ppm of ethylene for 4 days at 70 °F (Fig. 2). In contrast, *Ficus* and *Chlorophytum* plants were relatively less sensitive and only displayed leaf drop and yellowing when exposed to the highest tested concentration of 10 ppm of ethylene (Fig. 2).

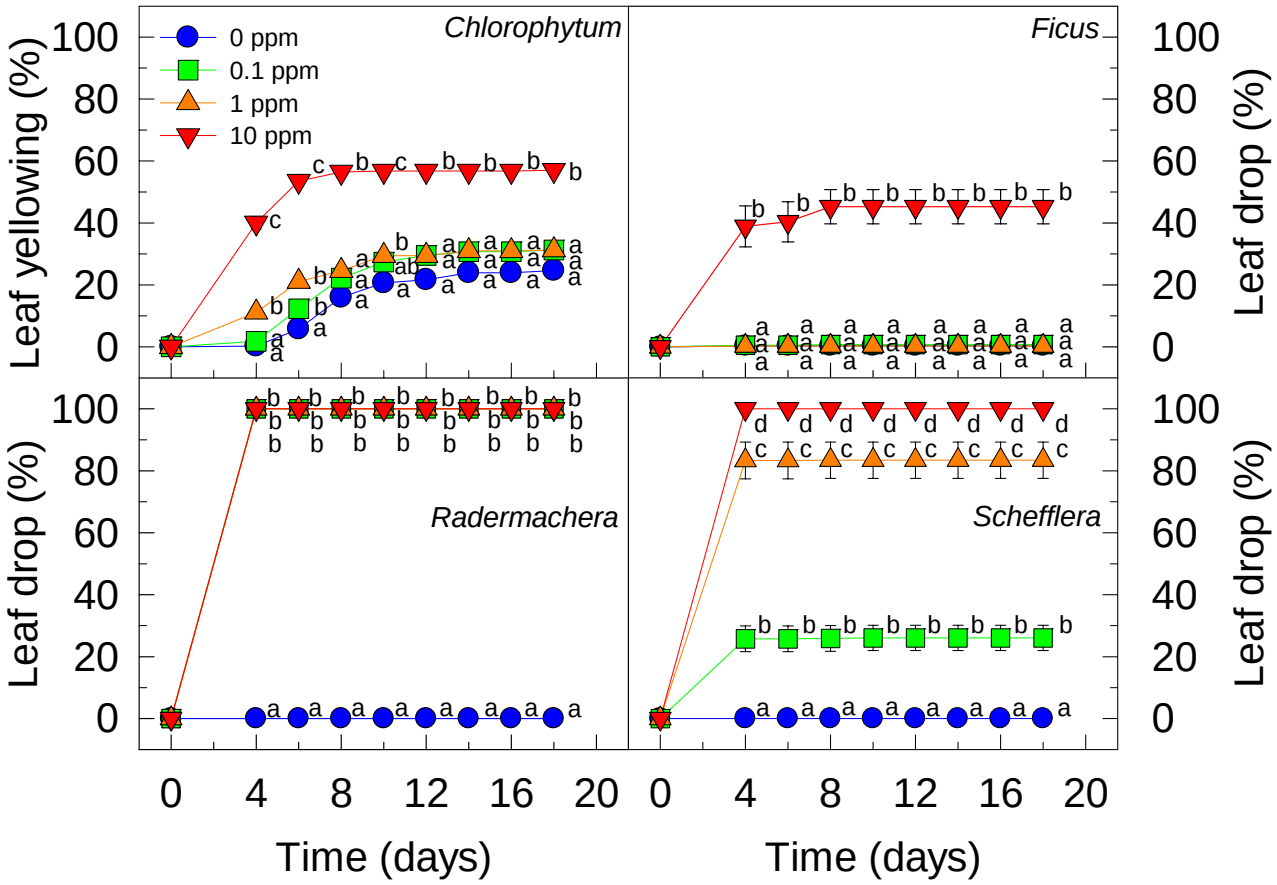

Fig. 2. Proportion (%) of the total number of leaves on potted *Chlorophytum*, *Ficus*, *Radermachera* and *Schefflera* plants that displayed yellowing or dropped in response to exposure to either 0 (●), 0.1 (■), 1 (▲) or 10 (▼) ppm of ethylene for 4 days (days 0-4) at 70 °F. After exposure to ethylene, plants were held (days 4-18) in ethylene-free air at 70 °F, 50 % relative humidity and 70 foot candles of light (12 hours per day).

The next step in our research will be to test the efficacy of EthylBloc® treatments to protect sensitive species against ethylene. We will work with *Aglaonema*, *Dizygotheca* and *Schefflera* plants and evaluate EthlyBloc® treatments under simulated and actual shipment conditions.

3. Publications and Presentations

Macnish, A.J., R.T. Leonard and T.A. Nell. (2006). Ethylene: An Invisible Pest. *Ornamental Outlook* **May**, 14-16.

Macnish, A., R. Leonard and T. Nell. (2006). Ethylene Sensitivity of Selected Potted Foliage Plants. Tropical Plant Industry Exposition, Fort Lauderdale, January 19-21. Poster.