

Foliage Plants

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Foliage plant production and sales represent a significant part of ornamental plant production in the U.S.. In 1998, sales were \$509 million, with the greatest production in Florida (61%), California (18%), and Texas (4%). Consequently, foliage plants are shipped long distances to supply retail markets throughout North America and Europe. Temperature control is critical to successful shipping and quality retention in the darkness of transport vehicles. The shipping environment is not conducive to maintaining foliage plant quality. Although it is difficult to generalize, the best shipping temperature is in the range of 15 to 18 °C (59 to 64 °F), with 85 to 90% RH. Temperatures of 10 to 13 °C (50 to 55 °F) are the lowest that should be considered for shipping, and even at this range some chilling injury may occur with some plants. Foliage plants should be acclimatized by growers prior to shipment. Acclimatization is the process of making plants more tolerant to environmental changes during or after shipment. Growers acclimatize plants using lower fertilizer levels and temperatures, and/or reduced light and water during the last 2 to 4 weeks before shipment. Acclimatized plants are better adapted to dark storage in transit and reduced light in stores than non-acclimatized plants. Requirements and length of shipping tolerated vary due to the wide diversity of foliage plants. Shipping temperatures have been identified for some acclimatized plants in temperature-controlled containers (Table 1). These guidelines are based on simulated shipping tests in darkness.

In simulated shipping tests at 10, 13, 16 and 19 °C (50, 55, 61 and 66 °F) for 1 to 4 weeks in the dark, *Schefflera arboricola* shipped best at 19 °C, *Ficus benjamina* at 10 or 13 °C, and *Dracaena marginata* equally well at 13, 16, and 19 °C. These plants withstood shipment for 3 weeks without significant loss of quality and for 4 weeks at some temperatures without severe quality reduction. *Sheffiera* plants recovered from dark storage within 17 days after transfer to light. *Ficus* plants are damaged by holding at 4 °C (39 °F) for 6 or more days. Similar chilling injury can occur on many foliage plants at temperatures drop to 7 °C (45 °F) for long periods, or to 2 to 5 °C (36 to 41 °F) for even short periods. Although 1 day at 5 °C (41 °F) may not damage most foliage plants, severe damage can occur when plants are subjected to cool temperatures over a 3 to 5 day transit time. *Coleus* is very cold sensitive. *Dracaena sanderana* and *Spathiphyllum clevelandii* are severely injured after 1 day at 2 °C (36 °F) and slightly after 1 day at 10 °C (50 °F). *Aglaonema* is very intolerant of temperatures < 10 °C (50 °F). Exposure to 4.4 °C (40 °F) for 2 days causes severe damage to *Scindapsus pictus* (satin pothos) and *Maranta leuconeura* (prayer plant). *Fittonia verschaffeltii* (silvernerv plant) is severely damaged within 8 h at 2 °C (36 °F).

Foliage plants should be turned over rapidly in marketing and should not be over-ordered. Plants should not be stored in back rooms for extended periods or in severe drafts of heat or cold. Foliage plants should not be transported with fruits, vegetables, or cut flowers, most of which emit ethylene and are shipped at low temperatures. Plants such as scheffleras, crassulas, fittonias, and ficuses are very sensitive to ethylene at a level as high as 5 ppm.

Table 1. Suggested shipping temperatures for acclimatized foliage plants to maintain quality in refrigerated vans¹.

Plant name	1 to 15 days shipment		16 to 30 days shipment ²	
	°C	°F	°C	°F
<i>Aglaonema</i> , cv. Fransher	13-16	55-60	16-18	60-65
<i>Aglaonema</i> , cv. Silver Queen	16-18	60-65	16-18	60-65
<i>Ardisia crispa</i>	10-13	50-55	--	--
<i>Aspidistra elatior</i>	10-13	50-55	--	--
<i>Brassaia actinophylla</i>	10-13	50-55	10-13	50-55
<i>Chamaedorea elegans</i>	13-16	55-60	--	--
<i>Chamaedorea seifrizii</i>	13-16	55-60	--	--
<i>Chrysalidocarpus lutescens</i>	13-18	60-65	16-18	60-65
<i>Codiaeum variegatum</i>	16-18	60-65	16-18	60-65
<i>Cordyline terminalis</i>	16-18	60-65	--	--
<i>Dieffenbachia picta</i>	16-18	60-65	--	--
<i>Dracaena deremensis</i>	16-18	60-65	--	--
<i>Dracaena fragrans</i>	16-18	60-65	--	--
<i>Dracaena marginata</i>	13-18	55-65	16-18	60-65
<i>Ficus benjamina</i>	13-16	55-60	13-16	55-60
<i>Ficus nltida</i>	13-16	55-60	--	--
<i>Howeia forsteriana</i>	10-18	50-65	10-18	50-65
<i>Nephrolepis exaltata</i>	16-18	60-65	--	--
<i>Peperomia bicolor</i>	16-18	60-65	--	--
<i>Philodendron selloum</i>	13-16	55-60	--	--
<i>Philodendron oxycardium</i>	16-18	60-65	--	--

<i>Phoenix roebelenii</i>	10-13	50-55	--	--
<i>Pleomele reflexa</i>	16-18	60-65	--	--
<i>Rhapis excelsa</i>	10-13	50-55	--	--
<i>Schefflera arboricola</i>	10-13	50-55	10-13	50-55
<i>Scindapsus aureus</i>	16-18	60-65	--	--
<i>Spathiphyllum</i> , Mauna Loa	10-13	50-55	13-16	55-60
<i>Yucca elephantipes</i>	10-13	50-55	10-13	50-55

¹Data are for plants in containers in the dark. Some plants stored without lights for 10 to 14 days will show slight to severe leaf loss and/or yellowing but will recover.

²Blanks indicate that plant's tolerance to shipping beyond 15 days is unknown.