

Cultural Guidelines for Commercial Production of Interiorscape *Anthurium*¹

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Anthurium is the largest genus in the family Araceae, encompassing more than 800 species native to tropical America, from Mexico, Costa Rica, and Cuba to Brazil and Argentina. Growth habit varies depending on species, as some are climbing hemi-epiphytes, others are terrestrial, and still others are epiphytes. The common names of Tailflower, Cresta de Gallo, Cockscomb, Flamingo Flower, Hawaiian Love Plant, and Tongue of Fire attest to the beauty of most *Anthurium* species' colorful and long-lasting inflorescences consisting of brightly colored spathes and contrasting or complementary spadices. A few commercially grown plants are classified as "rat tail" *Anthuriums* as their inflorescences have a long spadix and a small non-descript spathe.

Traditionally, *Anthuriums* with colorful inflorescences have been grown for cut flowers. With the introduction of compact interspecific hybrids through breeding and the selection of somaclonal variants, a series of potted *Anthurium* cultivars have been released in Florida, Hawaii, and the Netherlands. Florida is now the leading state in the nation in the production of potted flowering *Anthurium*. The intent of this article is to describe common species and cultivars in the foliage plant industry (See Table 1), provide guidelines for their culture and interior use, and list physiological problems that may be encountered during production and interiorscape use (See Table 3).



Figure 1. Commercial production of *Anthurium* cultivars in a shaded greenhouse.

Cultural Guidelines Propagation

Anthurium can be propagated by seed or division, but almost all cultivars are now propagated through tissue culture. Plantlets from tissue culture are grown in medium-filled, multi-cavity plastic liner trays. Rooting is best in well-aerated potting mixes of 1:1:1 peat, perlite, and bark. Mixes can also include wood shavings, fern slips, coffee parchment, rockwell, foam, macadamia shells, volcanic cinder, or taro peel. Substrate pH should be between 6.0 and 6.5, air temperatures between 70 and 90°F, and relative humidity should be high for best growth.

1. This document is ENH956, one of a series of the Environmental Horticulture Department, UF/IFAS Extension. Original publication date August 2003. Revised March 2015. Reviewed July 2018. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

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Production

Anthurium should be produced in container media with good drainage. Examples are: 1:1:1 Canadian peat, perlite, and bark or 50% Canadian peat, 20% styrofoam, 20% coarse vermiculate, and 10% pine bark with pH 6.0 to 6.5 and soluble salts 1 to 2 dS/m. Typical light levels range from 1,000 to 2,500 foot candles or 90% to 80% shade in Florida. Higher than that can cause pale leaf color, which is often misdiagnosed as a nutrient deficiency.

Controlled-release fertilizers, water-soluble fertilizers, or combinations of both have been used for *Anthurium* production. Generally, 2.5 to 3.0 lb N per 1,000 ft² per month should be the optimal rate for high quality plant production. Growers may use a fertilizer with N-P₂O₅-K₂O at 3-1-2 ratio at the beginning of production, then shift to a fertilizer with N-P₂O₅-K₂O at 1-2-2 ratio to promote flowering. Growers are recommended to monitor media soluble salts and pH every 2 or 3 weeks using the pour-through method. Information about the pour-through method can be found at <http://edis.ifas.ufl.edu/pdf/EP/EP07400.pdf>. If the soluble salts reading is 1 dS/m, the plant will show nutrient deficiency if no additional fertilizer is provided; if the soluble salts reading is 2 dS/m, nutrient levels are adequate; and if the reading is 3 dS/m or above, reduce either the rate or frequency of fertilizer application. In some cases, leaching the media with water is necessary to reduce soluble salts buildup. Table 2 provides a guide for determining if *Anthurium* cultivars are appropriately fertilized based on leaf analysis.

Drip- or sub- irrigation is recommended for *Anthurium* production. Do not allow fertilizer to splash onto the foliage, as it will leave a grey residue. The optimal temperature for *Anthurium* growth is 70 to 90°F. Keep air temperatures above 55°F; otherwise visible or invisible damage may occur, and plant growth will be delayed when temperatures return to appropriate levels.

Shipping and Interior Care

Shipping temperatures must be kept between 55 and 60°F. A sleeve is recommended for shipping to protect leaves and inflorescences. Use caution when handling *Anthurium* as their sap tends to be slightly irritating.

Once finished plants are placed in the interior setting, allow them to dry slightly between waterings. When it is time to water, do so thoroughly. Misting with water is also recommended to dislodge dust and temporarily increase relative humidity. A supply of a 20-20-20 water-soluble fertilizer solution with a N level at 50 ppm once a month should be adequate under interior conditions. Check the media soluble salts level using the pour-through method. A reading between 0.8 and 1.2 dS/m should be appropriate. Overfertilization indoors will cause soluble salts buildup and thus leaf marginal or tip injury. Remove expired flowers as needed. Maintain interior temperatures between 70 and 85°F. Avoid drafts and excessive heat or cold, especially from appliances such as televisions and refrigerators.

Our recent study of *Anthurium* cultivars showed that several cultivars are able to flower continuously under interior light levels of 100 foot candles for over one and a half years. Potted *Anthuriums* are true interior flowering foliage plants and have advantages over potted plants such as chrysanthemums and poinsettias due to their unique appearance, long-lasting flowers, continuous growth, and flowering under interior conditions. It is anticipated that more potted *Anthurium* cultivars will be introduced to the foliage plant and interior plantscape industries and that *Anthurium* will continue to increase in value as a flowering foliage plant.

Table 1. A listing of common cultivars available in Florida as of 2003.

Species or Hybrid	Cultivar or Common Name	Characteristics
<i>A. andreaeanum</i>	Flamingo Anthurium	Shiny, bright red spathes with yellow-tipped white spadices.
<i>A. hookeri</i>	Bird's Nest Anthurium	A "rat-tail" anthurium grown for its very large, stiff, corrugated leaves.
<i>A. hookeri</i>	'Alicia'	Narrow leaves, margins not as ruffled. Narrow rosette.
<i>A. hookeri</i>	'Ruffles'	Leaves are broad with highly ruffled margins. Open rosette.
<i>A. 'Bubble Gum'</i>	'Bubble Gum'	Pale pink spathes with pink spadices. Muted leaves.
<i>A. 'Cotton Candy'</i>	'Cotton Candy'	Salmon pink spathes with yellow spadices.
<i>A. 'Favorita'</i>	'Favorita'	Solid white spathes and spadices with deep green foliage.
<i>A. 'Gemini'</i>	'Gemini'	Paler red spathes with green or yellowish spadices.
<i>A. 'Kingston'</i>	'Kingston'	Paler red spathes with pale pink spadices.
<i>A. 'Krypton'</i>	'Krypton'	Deep red spathes and spadices.
<i>A. 'Lady Jane'</i>	'Lady Jane'	Pink spathes and spadices with dark green foliage.
<i>A. 'Lady Ruth'</i>	'Lady Ruth'	Rose colored spathes with whitish spadices.
<i>A. 'Nicolien'</i>	'Nicolien'	Mint pink spathes with similar spadices and extremely dark green foliage.
<i>A. 'Nicoya'</i>	'Nicoya'	Deep pink spathes with strikingly white spadices.
<i>A. 'Pacora'</i>	'Pacora'	Red spathes with white spadices.
<i>A. 'Picante'</i>	'Picante'	Dark fuchsia spathes with purple spadices and dark foliage.
<i>A. 'Pink Frost'</i>	'Pink Frost'	Bright pink spathes with white spadices.
<i>A. 'Purple Plum'</i>	'Purple Plum'	Purple spathes, spadices, and stalks with bright green foliage.
<i>A. 'Red Hot'</i>	'Red Hot'	Smaller red spathes and spadices. Prolific bloomer.
<i>A. 'Salsa'</i>	'Salsa'	Very deep red spathes with yellowish spadices.
<i>A. 'SmallTalk' (Pink)</i>	'SmallTalk' (Pink)	Pale, low growing pink spathes with yellowish spadices.
<i>A. 'SmallTalk' (Red)</i>	'SmallTalk' (Red)	Red, low growing spathes with yellowish spadices.
<i>A. 'Sundial'</i>	'Sundial'	Bright red spathes with yellowish spadices and dark foliage.

Table 2. Nutrient concentrations in leaves that are generally considered low, medium, or high for *Anthurium* growth.

Nutrient	Low	Medium	High
Nitrogen (%)	<2.0	3.0-4.0	>4.0
Phosphorus (%)	<0.2	0.2-0.6	>0.6
Potassium (%)	<2.0	2.0-5.0	>5.0
Calcium (%)	<1.0	1.0-3.0	>3.0
Magnesium (%)	<0.3	0.3-1.0	>1.0
Sulfur (%)	<0.2	0.2-0.6	>0.6
Iron (ppm)	<50	50-400	>400
Manganese (ppm)	<40	40-500	>500
Zinc (ppm)	<20	20-200	>200
Copper (ppm)	<5	5-40	>40
Boron (ppm)	<20	20-100	>100

Table 3. Causes and effects of various physiological problems.

Symptoms	Probable Cause	Treatment
Bleached leaf centers with brown tips.	Excess light.	Increase shade to reduce light level.
Chlorotic lower leaves with brown tips.	Excess fertilizer.	Leach soil, check roots for damage, and reduce fertilization.
Chlorotic older leaves with root damage.	Excess water.	Remove yellow leaves, and irrigate less frequently to allow potting mix to dry well between watering. To prevent this, use potting mixes with proper aeration and drainage properties.
Tip burn, root damage, and reduced growth.	Not enough water.	Increase irrigation frequency.
Many leaves but few or no flowers.	Light level too low.	Increase light intensity.
Interveinal yellowing or chlorosis on older leaves.	Magnesium deficiency.	Drench with magnesium sulfate or use magnesium nitrate sprays.
Uneven or irregular yellowish spots on leaves.	Manganese deficiency.	Spray with manganese sulfate.
Broad, dry, tan blotches on leaves.	Sunburn.	Reduce light levels so they do not exceed 2,500 foot candles.