

# THE IMPACT OF TISSUE CULTURE ON *FICUS* SPP. PROPAGATION AND PRODUCTION

GREGORY LLOYD

*Twynford Plant Laboratories*  
*15245 Telegraph Road*  
*Santa Paula, California 93060*

Plant propagation through tissue culture is continuing to expand as commercially sound laboratory production systems are developed. While commercially successful tissue culture propagation has occurred in the landscape, cut flower, small fruit, flowering pot and seed parent areas, the greatest impact of tissue culture in the U.S. continues to be in the interior foliage market where over forty million tissue culture propagules are used annually. The interior foliage industry has benefited from one of the most recent commercial successes with the advent of large-scale production of tissue-cultured *Ficus* spp. propagules.

*Ficus* species are tropical woody shrubs and trees that play a significant role as interior foliage plants. It is estimated that some 20,000,000 *Ficus* plants are produced annually in the U.S. for interior use. Size ranges from large-scale trees to small containers with either single or multiple stems. The bulk of U.S. production is currently being done in south Florida where plants are container-grown in full sun or in Saran houses.

Typically, *Ficus* is propagated readily from tip cuttings or air-layers with growers either maintaining their own stock or buying rooted cuttings from off-shore producers.

In the mid-1980s, Twynford Plant Laboratories began its *Ficus* program with the goal of establishing tissue culture propagation as a cost-effective, reliable alternative to conventional propagation. To become successful, the product had to offer unique benefits to the growers who were accustomed either to a readily available supply of inexpensive off-shore cuttings or easily rooted tips from their own stock plants.

In spite of this formidable competition from conventional propagation, the potential size of the market, as well as early indications of favorable laboratory performance, gave impetus to the project.

The program was developed around three criteria considered to be essential to successfully commercializing *Ficus* tissue culture.

**Reliability.** A tissue culture product cannot have a significant sales volume without a reliable and timely stream of product. The inability of tissue culture labs to produce on schedule is as significant a factor as are high unit costs in limiting the expansion

of the tissue culture industry. With *Ficus*, attention was paid to developing sound culture handling techniques that were extremely reproducible with an associated minimal product mutation rate. An important additional factor was the development of storage techniques for lab cultures which enabled excess inventory to be carried at a minimal cost. This “culture warehouse” created a safety net which could be drawn upon in the event of production shortfalls or increased sales demand. The development of a computerized data collection system that enabled ready monitoring of crop performance targets against actual results was another significant component of the program.

**Product Performance.** Uniform, vigorous, disease-free liners are a must if tissue culture is to be an alternative to low-cost conventional propagation. Tissue culture is well known for its role in producing high-health stock; *Ficus* is no exception. In fact, it is rare for a grower to experience any disease problems with tissue-cultured *Ficus*. Vigor is outstanding with plugs rapidly establishing in containers, even when they are planted directly in full sun in south Florida. Other factors attributed to the “invigorating” effect of tissue culture include a more vigorous root system and resistance to cold temperature stress. It has been noted that tissue-cultured *Ficus* remains green while cutting-produced plants turn off-color during exposure to low temperatures. In addition, there have also been reports of significantly reduced leaf drop from tissue culture derived *Ficus* maintained in interior environments.

**Product Quality.** Aside from the uniformity and disease-free aspects of tissue culture plugs, the major factor in producing what the grower perceived as a high-quality *Ficus* plug was the development of a multiple-stemmed plug. All plugs in Twyford’s 72-cell tray are produced with a minimum of five shoots resulting in a full, compact finished plant from only one plug rather than multiple conventional cuttings. The grower thus realizes the additional benefit of being able to rapidly plant into containers without pre-plant grading of cuttings.

Careful attention to laboratory processes and grower needs has resulted in a significant new product from tissue culture that has benefited the grower and consumer with a higher quality product without higher cost. Currently, Twyford Plant Laboratories offers a complete line of tissue-cultured *Ficus* cultivars that are soil-established in 72 cell plug trays. Cultivars include:

*Ficus benjamina* ‘Wintergreen’\*  
*Ficus benjamina* ‘Spearmint’\*  
*Ficus lyrata* ‘Everglades’\*  
*Ficus elastica* ‘Robusta’  
*Ficus elastica* ‘Cabernet’\*

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As technology continues to develop, many more “old standards”, as well as new unexploited cultivars will become available through tissue culture propagation in all areas of plant production. Steady but significant advances in culture system and cost reduction will greatly enhance the role of tissue culture propagation in the 1990s.