Proc. Fla. State Hort. Soc. 94:113-114. 1981.

EFFECT OF CONTAINER SIZE AND FERTILIZATION RATE ON QUALITY OF THREE SPECIES OF FOLIAGE PLANTS[1]

TIMOTHY K. BROSCHAT
University of Florida, IFAS,
Agricultural Research and Education Center,
3205 SW College Avenue,
Fort Lauderdale, FL 33314

Additional index words. Ficus benjamina, Brassaia actinophylla, Philodendron selloum.

Abstract. **An experiment evaluating the effects of container size and fertilizer rate on quality of ficus** (Ficus benjamina **L.), philodendron** (Philodendron selloum **C. Koch), and schefflera** (Brassaia actinophylla **Endl.) was performed. Each species was grown in 3, 20, 50, and 90 liter containers with Osmocote®[2] 18N-2.6P-9.8K applied every 6 months at rates of 1.2, 2.4, 3.6, 4.8, and 9.6 g per liter of container size. Plants were evaluated subjectively for overall quality within each species and container size when most plants in each group were of marketable size. Ficus, philodendron, and schefflera each responded differently to increasing fertilizer rates in larger containers. It was concluded that fertilizer rates recommended for small containers cannot always be extrapolated for use in large container production without evaluating individual foliage plant species' growth response curves.**

Fertilization is important in production of tropical foliage plants. Fertilization rate not only affects production time and ultimate plant quality but also the plant's ability to survive in the interior environment. Recommendations for fertilization rates are generally made for plants growing under specific environmental conditions such as light intensity, type of growing medium, irrigation regime, temperature, and container size, all of which affect the plant's growth response to fertilization (1, 2).

Excellent fertilization recommendations have been made for production of foliage plants in central Florida (2, 3) where foliage plants are commonly grown in greenhouses in smaller containers. South Florida foliage plants, however, are usually grown outdoors under shadecloth or full sun and to a larger size than can economically be grown in greenhouses. Since no fertilizer recommendations have been made for production in the larger containers used in south Florida, growers have had to rely on rates formulated for smaller container production in greenhouses. This experiment was performed to determine if fertilization rates recommended for small containers can be extrapolated for larger containers or whether optimum fertilization rate varies with container size.

Materials and Methods

Ficus benjamina L., *Brassaia actinophylla* Endl., and *Philodendron selloum* C. Koch growing in 1-liter containers were transplanted into 3, 20, 50, and 90 liter (1, 5, 15, and 25 gallon) containers. The growing medium consisted of sphagnum peat moss, perlite, sand, and cypress shavings (8:5:2:5 by volume), amended with 880 g/m^3 Micromax® and 4.9 kg/m^3 dolomitic limestone. Six plants of each species were surface fertilized with Osmocote® 18N-2.6P-9.8K at rates of 1.2, 2.4, 3.6, 4.8, and 9.6 g per liter of container size at the time of transplanting. These rates bracket the rate recommended by Conover *et al.*, (2, 3) for 15 cm. diameter containers. Fertilizer was reapplied at 6-month intervals for those crops with longer production times. All plants were grown under 63% shadecloth and received overhead irrigation daily.

Within each container size for each species, plants were evaluated subjectively (1 = poor, 5 = average, 10 = excellent) for overall size and quality when most of the plants in the category were considered to be of *marketable size.* Regression analysis was performed on the data within each species to determine the effects of container size and fertilization rate, as well as their interaction, on plant quality. Schefflera data from 50 liter containers were omitted from the analysis due to confounding effects of *Alternaria* leafspot in that block.

Results and Discussion

As seen in Figs. 1-3, ficus, philodendron, and schefflera do not respond in the same manner to increases in fertilization rate and container size. Ficus showed a highly significant positive response to increased fertilization in 3 and 20 liter containers, but in larger containers fertilization rate had no effect on plant growth and quality (Table 1). Overall, both container size and fertilization rate had significant effects on ficus quality (Table 2). The significant negative interaction indicates that as container size increases, plant response to increased fertilization decreases. This suggests that ficus grown in small containers would benefit from high fertilization regimes, whereas quality plants can be produced in large containers with less fertilizer.

Philodendron responded strongly to increased fertilization in all container sizes (Table 1, Fig. 2). Overall, increasing container size or fertilization rate improved growth of philodendron, but there was no interaction between the 2 variables with this species. Although the highest fertilizer

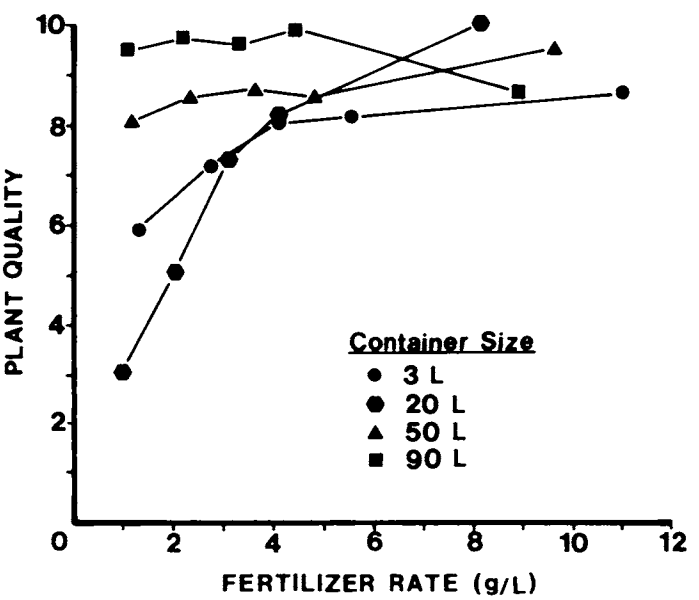

Fig. 1. Effect of increased fertilization rates on quality of *Ficus benjamina* grown in several sizes of containers.

[1]Florida Agricultural Experiment Station Journal Series No. 3333.
[2]Use of a trade name does not constitute a guarantee of the product by the University of Florida and does not imply its approval to the exclusion of other products that may also be suitable.

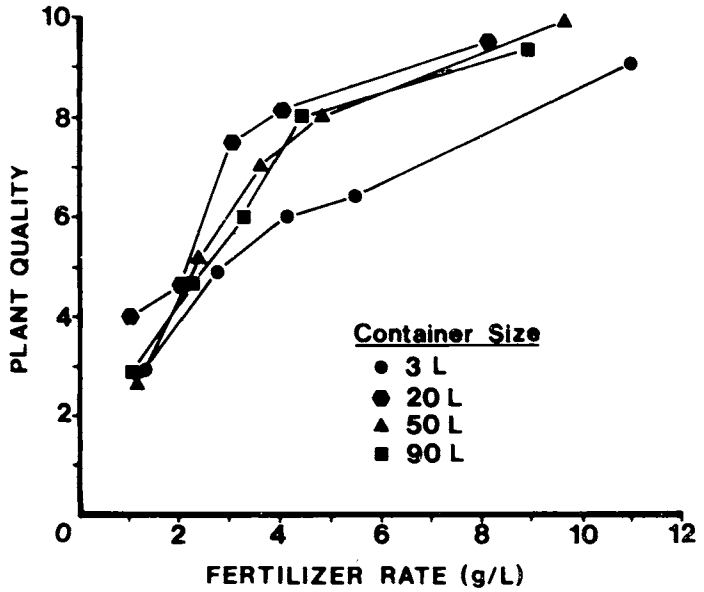

Fig. 2. Effect of increased fertilization rates on quality of *Philodendron selloum* grown in several sizes of containers.

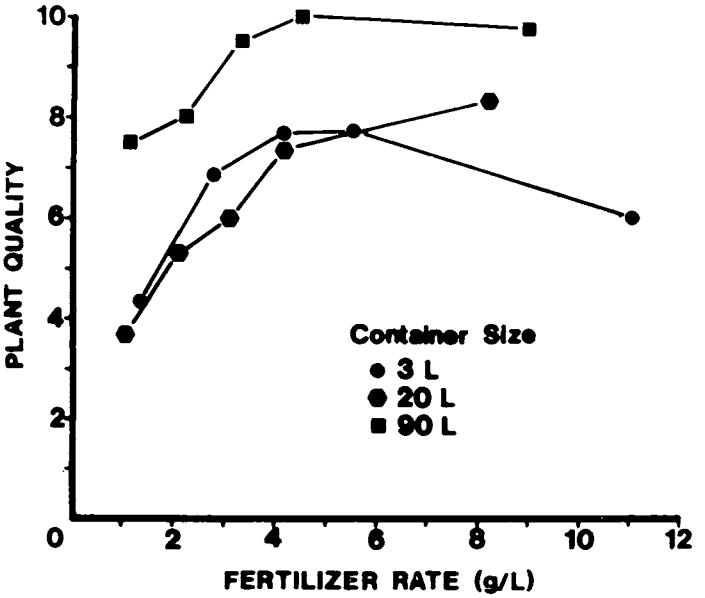

Fig. 3. Effect of increased fertilization rates on quality of *Brassaia actinophylla* grown in several sizes of containers.

rate used in this experiment is higher than that recommended (2, 3, 4), the increase in plant growth, even at the highest rate, suggests that it may be advantageous to increase the recommended fertilizer rates to ca. 9-10 g/liter for this species when watering every day. This results in production of high quality plants in less time, and plants grown under these regimes performed comparably to those grown with less fertilizer when transferred to an interior environment.

Schefflera showed a significant growth response to fertilization in all container sizes, with maximum growth and quality occurring near the recommended rate of Conover *et al.*, (2, 3) (Fig. 3, Table 1). Higher fertilizer rates generally did not increase quality further. Overall, container size had no effect on plant quality, although fertilizer rate did significantly affect plant growth.

Table 1. Effect of fertilizer rate on quality of shade grown foliage plants in various sized containers.

Species	Container size (liters)	Linear effect	Quadratic effect
Ficus benjamina	3	(+)***	(–)***
	20	(+)***	(–)***
	50	NS	NS
	90	NS	NS
Philodendron selloum	3	(+)***	(–)**
	20	(+)***	(–)**
	50	(+)***	(–)***
	90	(+)***	(–)***
Brassaia actinophylla	3	(+)*	(–)*
	20	(+)*	NS
	90	(+)***	(–)***

*, **, *** = significant at .05, .01, and .001 levels respectively.
NS = not significant .05 level.

Table 2. Overall effects of fertilizer rate, container size and their interaction on quality of shade grown foliage plants.

Species	Variable	Linear effect	Quadratic effect
Ficus benjamina	Container size	(+)***	NS
	Fertilizer rate	(+)***	(–)***
	Container size X fertilizer rate	(–)***	
Philodendron selloum	Container size	(+)**	(–)**
	Fertilizer rate	(+)***	(–)***
	Container size X fertilizer rate	NS	
Brassaia actinophylla	Container size	NS	NS
	Fertilizer rate	(+)***	(–)***
	Container size X fertilizer rate	NS	

*, **, *** = significant at .05, .01, and .001 levels respectively.
NS = not significant .05 level.

In conclusion, fertilizer rate recommendations for small containers cannot always be extrapolated to larger container sizes. As seen here with ficus, plants in larger containers grow very well with very little fertilizer, whereas they require relatively greater fertilizer input if grown in smaller containers to attain comparable quality. Within the range of fertilizer rates tested, philodendron growth and quality were proportional to the fertilization rate, regardless of container size, and schefflera plants grew best at rates recommended for smaller containers, even if extrapolated to larger container sizes.

Literature Cited

1. Conover, C. A. 1972. Influence of nutrition on foliage quality and longevity. Fla. Foliage Grower 9(3):1-4.
2. ————, R. T. Poole, and R. W. Henley. 1975. Growing acclimatized foliage plants. Fla. Foliage Grower 12(9):1-4.
3. ————, R. T. Poole. 1981. Guide for fertilizing tropical foliage plant crops. Fla. Foliage 7(3):53-60.
4. Poole, R. T. and D. B. McConnell. 1974. Fertilization of Philodendron selloum. Southern Nursery Assoc. Res. J. 1(1):7-12.