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Shade requirements of aglaonemas[1]

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ABSTRACT

Aglaonema María and Silver Queen were grown under 63%, 80% and 92% shade to determine the optimum shade level or light intensity level for commercial production. María's shoot height and number of offsets increased as the shade level decreased. In Silver Queen the number of leaves increased and the number of offsets decreased as the shade level increased. The highest number of offsets was produced by Silver Queen at 63% shade. Light intensity at 63% nylon fiber shade increased offset production in both Silver Queen and María. Thus, 63% shade seems to be the ideal shade for aglaonema offset production.

RESUMEN

Requisitos de sombra de las aglaonemas

Las aglaonemas María y Silver Queen se cultivaron bajo 63, 80 y 92% de sombra para determinar la intensidad de luz óptima para producirlas comercialmente. La altura de la planta y el número de hijos de María aumentaron según disminuyó la sombra. En la aglaonema Silver Queen el número de hojas aumentó y el número de hijos disminuyó según aumentó la sombra. El mayor número de hijos lo produjo Silver Queen a 63% de sombra.

La sombra de 63% a base de fibra de nilón aumentó la producción de hijos tanto en Silver Queen como en María. El 63% parece ser el nivel de sombra ideal para producir hijos en aglaonema.

INTRODUCTION

The value of ornamental crops has consistently increased during the past three years. In 1987-88 it rose to $17 million (1), an increase of $1.0 million over the previous year. Considerable research is necessary for a sustained increase in the production of ornamentals because this enterprise depends on people's ever changing appreciation of different types of plants. Therefore, the selection of endemic plants with potential as ornamentals and the introduction, evaluation, maintenance and propaga-

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tion of ornamental cultivars deserve special attention. The adoption of good management practices also deserves special attention.

Even though ornamental plants have become an important agricultural enterprise, research has been scanty. The evaluation of some pine trees grown in Puerto Rico to be used as Christmas trees has been among the few works published on the production potential of locally available ornamentals (6). Little research has been done on the adaptability and production of endemic ornamentals. The effect of shade intensities on the chemical composition of leaves (5) and on the size of propagating material and planting distance (3) of *Dracaena sanderiana* Hort., has been studied. The growth and leaf nutrient composition of *Dracaena deremensis* Warneckii Engler under different shade intensities and nitrogen levels were also evaluated (4).

Aglaonema commutatum (Schott) Silver Queen and María are among the most important ornamentals produced for the export market. The latest information available (2) shows their steady importance. This paper reports data on the shade intensity requirements of aglaonemas.

Aglaonemas Silver Queen and María were grown under 63 and 80% nylon fiber, and 92% polyethylene levels of shade at the Río Piedras Agricultural Experiment Station. Concrete beds 12 m x 1.2 m, filled with a loamy sand soil were used to grow the plants.

Plants were purchased as rooted cuttings from local commercial nurseries. They were then planted in a single row 30.5 cm apart in May 1987. Soluble 20-20-20 fertilizer was applied monthly at a rate of 3.6 g/L, and a 14-14-14 slow-release fertilizer at a rate of 7 g/plant every 3 months. Weeds were controlled by hand. Water was applied as needed by an irrigation system with spaghetti tubing.

A complete randomized design with 3 treatments was used in the experiment. The response of aglaonemas to different shade intensities was measured by taking the number of leaves, plant height and number of offsets 29 October 1987. Light intensity under different shades was measured with a photometer. Aglaonema offsets were harvested 15 September 1988. All data were analyzed statistically by t test.

RESULTS AND DISCUSSION

The number of leaves on aglaonema Silver Queen increased significantly as the shade level increased (fig. 1). However, an aglaonema María there was no significant increase in number of leaves due to shade level (fig. 1). The highest number of leaves was produced by Silver Queen at 92% shade (table 1) and the lowest was produced by María at 80% shade. Silver Queen consistently had seven to eight more leaves than María in all shade levels. This fact suggests a more aggressive growth in Silver Queen than in María. Shoot height of aglaonema María decreased as

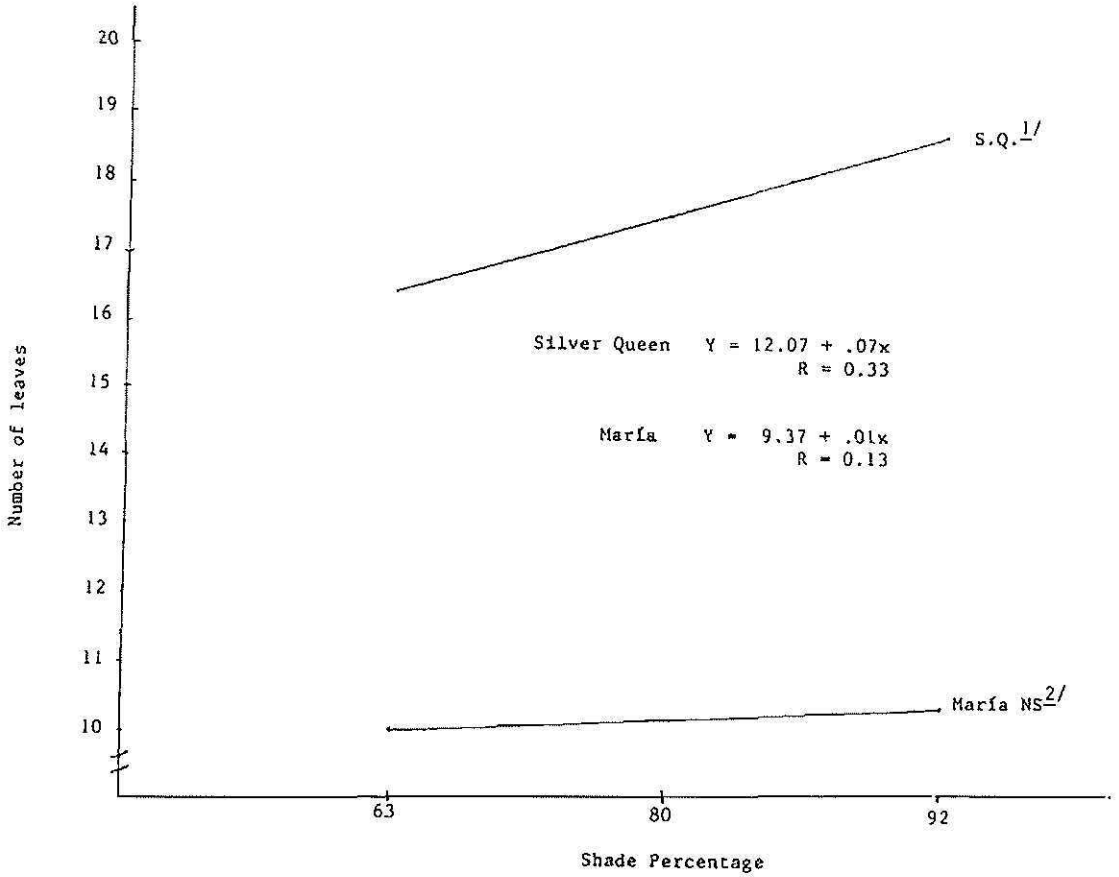

FIG. 1.—Relationship between number of leaves and shade level in aglaonemas Silver Queen and María, 1987. [1]Regression coefficient is significant at 5% level. [2]NS-Regression coefficient is not significant.

shade increased (fig. 2). In contrast, Silver Queen shoot height did not decrease significantly as the shade level increased (fig. 2). Silver Queen was 11 to 13 cm taller than María under all shade levels (table 1).

There were differences in terms of general appearance between the two aglaonema cultivars. Silver Queen is more affected by light intensity

TABLE 1.—*Effect of shade intensity on the growth of aglaonema Silver Queen and María, 1987*

Cultivar	Shade	Number of leaves	Shoot height
	%		*cm*
Silver Queen	63	17 a[1]	43.46 a
	80	17 a	43.03 a
	92	19 b	42.60 a
María	63	10 ab	32.33 a
	80	9 a	29.44 b
	92	11 b	29.90 a

[1]Means followed by the same letter do not differ at the 1% probability level.

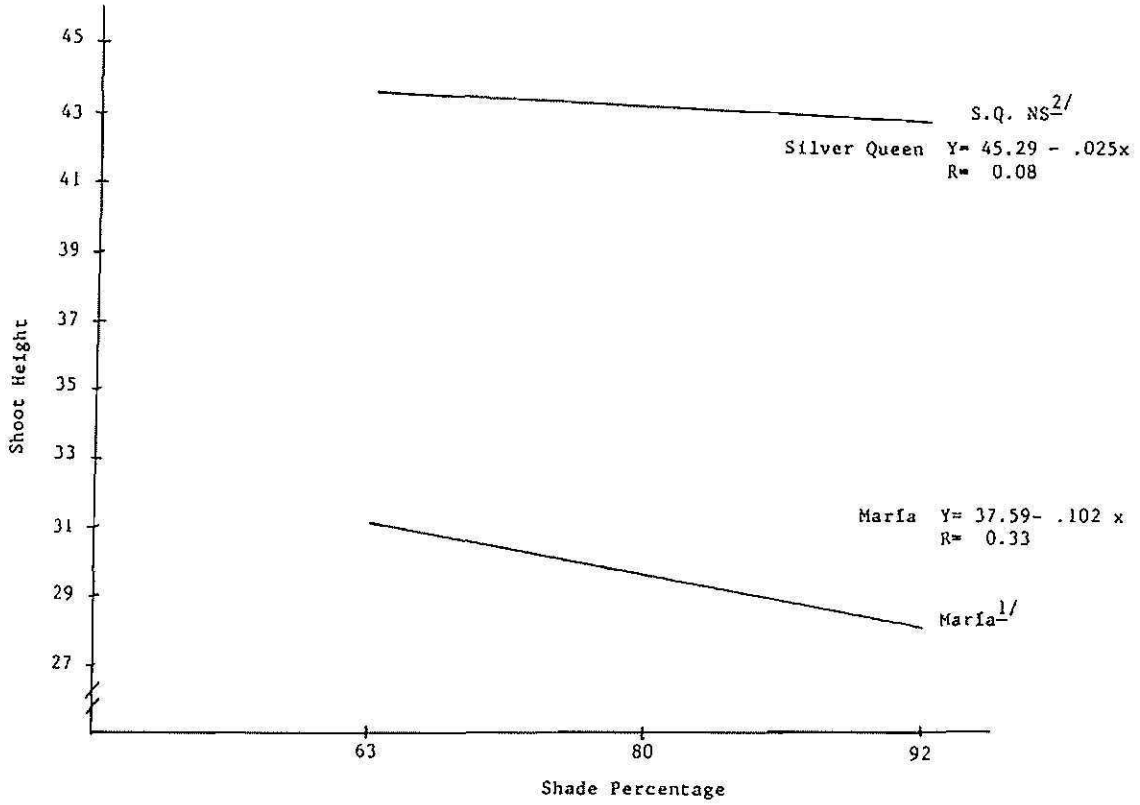

FIG. 2.—Relationship between shoot height and shade level in aglaonema Silver Queen and María, 1987. [1]Regression coefficient is significant at 5% level. [2] NS-Regression coefficient is not significant.

than María. With Silver Queen the higher the light intensity the lighter the green of the leaves. Burned leaf tips were observed especially in Silver Queen at 63% shade whereas in María no difference was observed in leaf color among the light intensity levels.

The highest light intensity levels were registered in May and August 1987 (table 2), and April and July 1988 (table 3), the lowest in November and December 1987 (table 2) and January and September 1988 (table 3). For both 1987 and 1988, the high light intensity period was from April to August and the lowest from November to January. In both years the light intensity observed in September was lower than normal because of a prolonged rainy period. The greatest difference in light intensity among shade levels was found at noon and the least at 8:00 a.m.

In both Silver Queen and María the number of offsets increased consistently as the shade level decreased (figs. 3, 4). In 1988 the difference in offset production per plant in Silver Queen among shade levels was five more offsets in 63% than in 80%, and three more offsets in 80% than in 92% (table 4). In contrast María offset production per plant was two more offsets in 63% than in 80% shade, and three more in 80% than in 92%.

TABLE 2.—*Light intensity levels under different shade percentages per month,[1] 1987*

Time	Light intensity levels (fc) 63%	80%	92%
	May		
8:00 a.m.	562	425	322
1:00 p.m.	725	575	325
3:00 p.m.	592	417	272
	June		
8:00 a.m.	388	328	254
1:00 p.m.	469	325	211
3:00 p.m.	462	338	256
	July		
8:00 a.m.	355	291	249
1:00 p.m.	493	370	223
3:00 p.m.	519	374	270
	August		
8:00 a.m.	462	375	348
1:00 p.m.	656	501	262
3:00 p.m.	519	381	294
	September		
8:00 a.m.	454	367	370
12:00 m.	274	205	121
4:00 p.m.	173	129	72
	October		
8:00 a.m.	558	411	425
12:00 m.	415	310	185
4:00 p.m.	155	99	53
	November		
8:00 a.m.	482	329	369
12:00 m.	276	201	130
4:00 p.m.	200	124	104
	December		
8:00 a.m.	445	306	279
12:00 m.	431	332	198
4:00 p.m.	116	83	53

[1] Total of average of each weekly measurement.

Difference in the number of offsets between cultivars was lower in 1987 than in 1988 (table 4). The highest number of offsets was produced by Silver Queen at 63% shade and the lowest by María at 92% shade (table 4). This difference in offset production and growth of the stock plant suggests a more aggressive growth of Silver Queen than María. Therefore, income will be higher if we produce Silver Queen rather than María.

TABLE 3.—*Light intensity levels under different shade percentages per month,[1] 1988*

Time	Light intensity levels (fc) 63%	80%	92%
	January		
8:00 a.m.	278	182	202
12:00 m.	425	320	200
4:00 p.m.	302	203	135
	February		
8:00 a.m.	301	245	232
12:00 m.	669	490	302
4:00 p.m.	341	235	172
	March		
8:00 a.m.	376	272	271
12:00 m.	519	392	230
4:00 p.m.	384	249	222
	April		
8:00 a.m.	575	422	408
12:00 m.	717	517	285
4:00 p.m.	240	153	118
	May		
8:00 a.m.	534	406	362
12:00 m.	592	420	221
4:00 p.m.	435	255	231
	June		
8:00 a.m.	412	332	264
12:00 m.	543	410	229
4:00 p.m.	404	273	212
	July		
8:00 a.m.	608	398	333
12:00 m.	628	467	247
4:00 p.m.	447	328	265
	August		
8:00 a.m.	389	291	246
12:00 m.	614	430	249
4:00 p.m.	322	222	144
	September		
8:00 a.m.	421	322	295
12:00 m.	484	378	210
4:00 p.m.	195	134	91

[1]Total of average of each weekly measurement.

There was no difference between shades in general appearance of offsets even though there were some differences in appearance of the stock plant. The stress in aglaonema stock plant caused by high intensity levels at 63% shade seems to promote offset production in Silver Queen

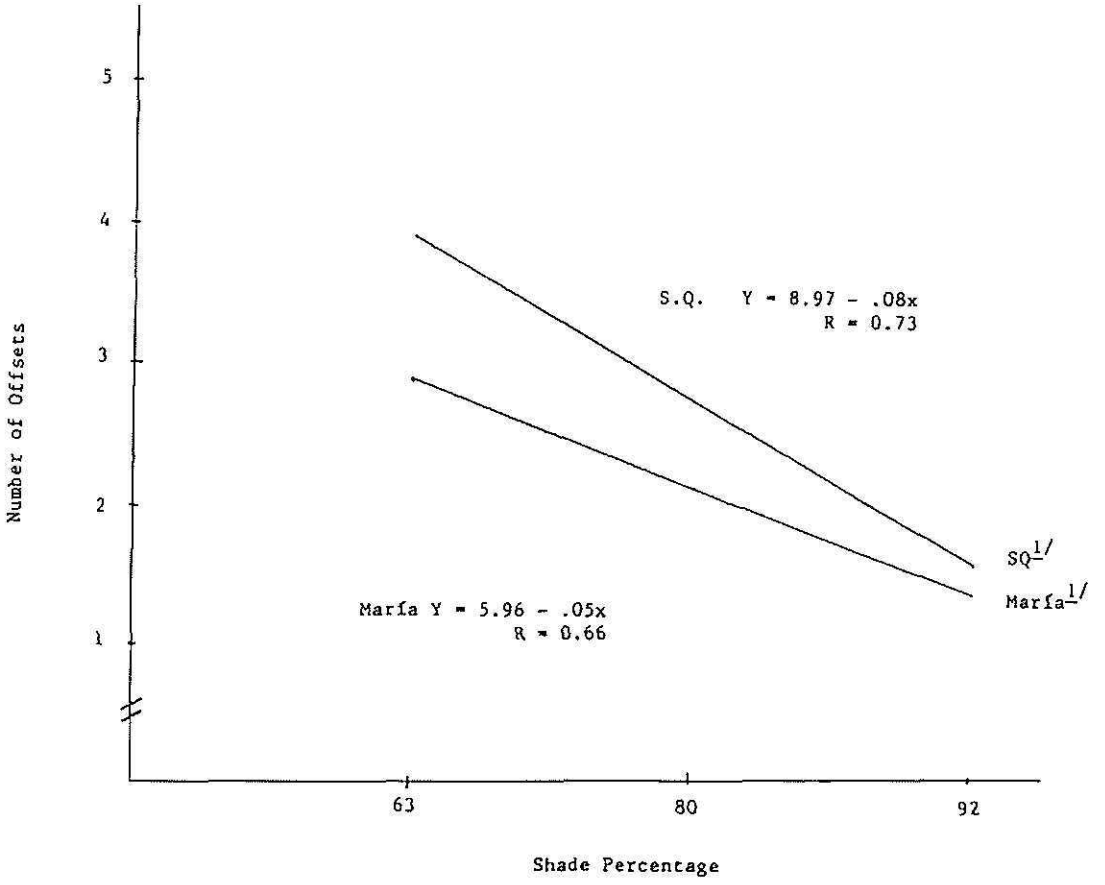

FIG. 3.—Relationship between number of offsets and shade level in aglaonemas Silvers Queen and María, 1988. [1] Regression coefficient is significant at 1% level.

and María. Silver Queen was more sensitive than María to light intensity; the higher the light intensity the darker the green and the greater the offset production.

This study indicates that the ideal nylon fiber shade level for aglaonema offset production is 63%. Light intensity levels at 63% shade enhance offset production, especially in alaonema Silver Queen.

TABLE 4.—*Effect of shade intensity on aglaonema Silver Queen and María offsets production*

Cultivar	Shade	Number of offsets 1987	1988
	%		
"Silver Queen"	63	4 a[1]	18 a
	80	3 b	13 b
	92	1 c	10 c
"Maria"	63	3 a	13 a
	80	2 b	11 b
	92	1 c	8 c

[1] Means followed by the same letter do not differ at the 1% probability level.

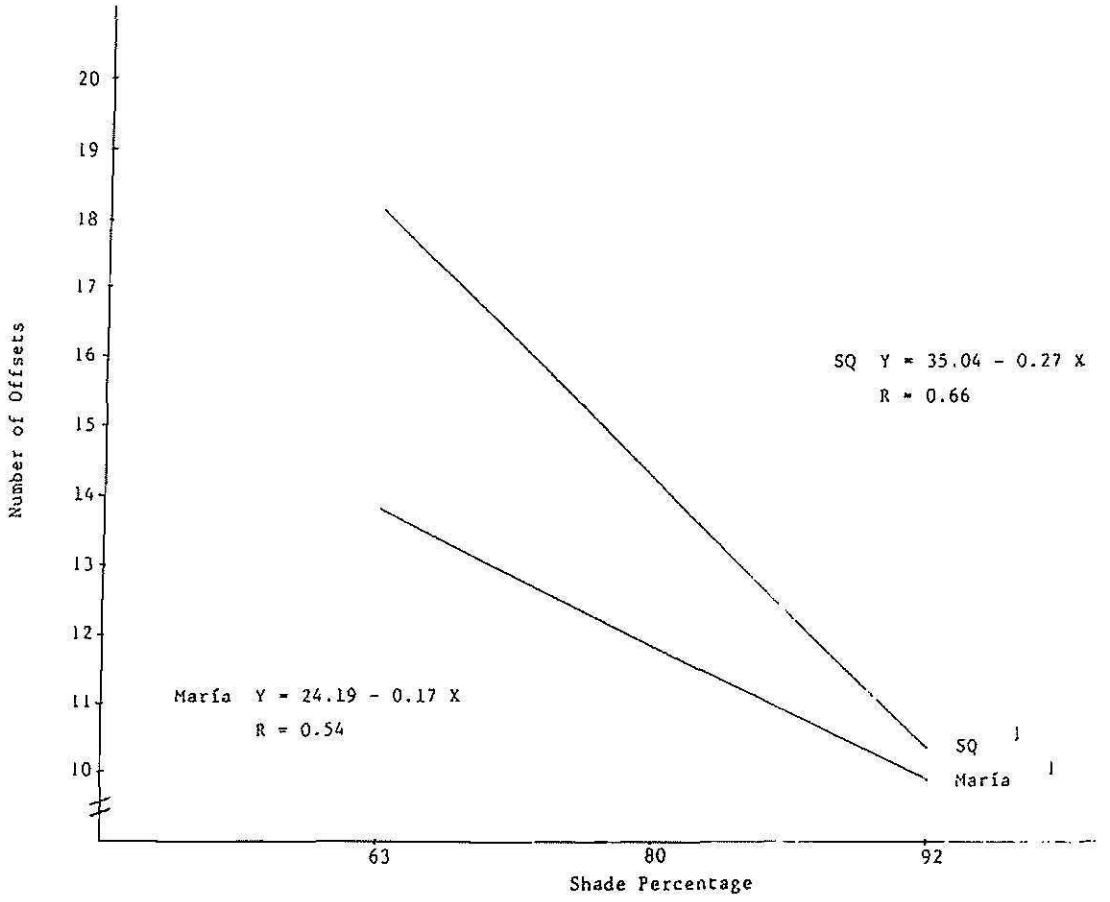

FIG. 4.—Relationship between number of offsets and shade percentage in aglaonemas Silver Queen and María, 1988. [1]Regression coefficient is significant at 1% level.

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