experiments were begun on February 28, 1959 and terminated on June 20, 1959.

Generally there was little difference between plants grown in organic and clay pots in total growth increments. However, plants grown in these containers produced significantly more growth than did those grown in aluminum pots.

Philodendron oxycardium made the most growth when rooted directly in organic pots, however, the greatest bud elongation was obtained from plants bench rooted and grown in clay pots. *Peperomia floridiana* rooted directly in pots produced more green weight and volume than when bench rooted. Dry weight of either of the above species was not affected by method of rooting.

Little difference was noted in the amount of effort required to handle any of the three pots tested. It was more difficult to keep aluminum pots and organic pots from tipping over due to lack of weight.

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NITROGEN AND LIGHT INTENSITY REQUIREMENTS OF SOME COMMERCIALLY GROWN FOLIAGE PLANTS

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In an earlier report Taylor et al (6) gave results of various levels of nitrogen and light intensities on growth response of *Philodendron oxycardium, Philodendron micans* and *Scindapsus aureus* four months following initiation of treatment March 16, 1958. The experiment was continued and growth measurements taken again eight and 13 months after treatment initiation – July 16 and December 15, 1958. Results of these latter measurements will be given herewith. Chemical analyses of the tissue have been made and will be presented in a later report.

Methods and Materials

Three experiments, consisting of three levels each of light intensity and nitrogen in factorial combination, was established. Treatments were placed in randomized block design with two plants each of *P. oxycardium*, *P. micans* and *S. aureus* per crock as the experimental unit, replicated four times. Nitrogen was provided at rates of 90, 180 and 360 parts per million (ppm) and light levels were 10, 40 and 70 percent full sunlight. Light was varied by using cages covered with different grades of saran cloth manufactured by Chicopee Manufacturing Corporation. One liter of complete nutrient solutions with varying amounts of nitrogen were applied monthly and water was applied as needed. Medium consisted of 50% soil and 50% peat by volume.

Results

P. oxycardium – at low and medium light intensities the number of nodes increased as nitrogen was increased from N_1 to N_2. As nitrogen was further increased the number of nodes decreased as compared with N_2 (Table 1). At the last sampling date number of nodes were unaffected by treatment.

TABLE 1. EFFECT OF NITROGEN AND LIGHT ON NUMBER OF NODES OF PHILODENDRON OXYCARDIUM SECOND STOCK PLANT PHASE JULY 16, 1958

Light Level	Nitrogen Level			Light Level Means	
	N_1-90ppm	N_2-180ppm	N_3-360ppm		
L_1 10% Full Sunlight	19.5	20.8	15.8	20.6	
L_2 40% Full Sunlight	20.2	28.5	19.0	22.6	
L_3 70% Full Sunlight	17.8	18.2	20.8	18.9	
N Level Means	19.2	24.5	18.5		
L.S.D.				.05	.01
Between Nitrogen Means				3.7	5.0
For Means Within Table				6.4	N.S.

Leaf color was lightest at low nitrogen treatments during the second stock plant phase, especially at low N-low light. At the medium nitrogen level increasing light from L_1 to L_2 decreased color, but at N_3 leaf color did not decrease except at L_3 (Table 2). At the last sampling date leaf color was affected by light only at the low nitrogen level, decreasing as light was increased from L_2 to L_3.

Leaf area was larger at the N_3 nitrogen level than at N_1 during the second phase and larger at both N_2 and N_3 levels than at N_1 during the third. Leaf area was depressed at

TABLE 2.

EFFECT OF NITROGEN AND LIGHT ON LEAF COLOR AS PER CENT LIGHT REFLECTANCE* OF PHILODENDRON OXYCARDIUM SECOND STOCK PLANT PHASE JULY 16, 1958

Light Level	Nitrogen Level N_1-90ppm	N_2-180ppm	N_3-360ppm	Light Level Means
L_1 10% Full Sunlight	22.5	15.8	14.4	17.6
L_2 40% Full Sunlight	22.4	19.1	16.0	18.6
L_3 70% Full Sunlight	33.4	19.0	18.6	23.7
N Level Means	26.4	18.0	16.4	

L.S.D.	.05	.01
Between Nitrogen and Light Level Means	1.8	2.5
For Means Within Table	2.2	3.0

* The higher the percent reflectance the lighter the color.

the high light levels at both of the last sampling dates.

Stem length was affected by treatment only during the second phase of the experiment (Table 3). Under low nitrogen levels stem length was much reduced at the L_3 level compared to the L_1 and under medium nitrogen it was greatly reduced at L_3 as compared to L_1 and L_2, but under high nitrogen light had no effect.

TABLE 3.

EFFECT OF NITROGEN AND LIGHT ON TOTAL STEM LENGTH IN CM. OF PHILODENDRON OXYCARDIUM SECOND STOCK PLANT PHASE JULY 16, 1958

Light Level	Nitrogen Level N_1-90ppm	N_2-180ppm	N_3-360ppm	Light Level Means
L_1 10% Full Sunlight	80.6	91.1	51.7	74.5
L_2 40% Full Sunlight	62.0	98.5	63.0	74.5
L_3 70% Full Sunlight	43.8	45.8	56.8	48.8
N Level Means	62.2	78.4	57.2	

L.S.D.	.05	.01
Between Nitrogen and Light Level Means	15.2	20.6
For Means Within Table	26.2	35.6

P. micans – leaf color was darker at N_2 than at N_1 during the second phase and during the third was significantly darker at N_3 than at N_1 or N_2. Leaf area, unaffected during phases one and two was larger during the third phase at N_3 than at N_1.

Stem length during the third stock plant phase was reduced at the L_3 light level. Stem diameter and number of nodes were unaffected by treatments.

S. aureus – leaf color darkened witl each increase in nitrogen during both phases of growth and became lighter at the L_3 light level during the second stock plant phase. Leaf area during the second stock phase was increased at the N_3 level, but at the last sampling date it was increased with each increase in nitrogen and was decreased at the L_2 and L_3 light treatments compared to L_1 (Table 4). Only during the third stock plant phase was stem length affected by treatment and then it was much longer at the high nitrogen level than at the low. Stem diameter increased with each increase of nitrogen during the second phase but was unaffected during the third.

TABLE 4. EFFECT OF NITROGEN AND LIGHT ON LEAF AREA IN SQ. CM. OF SCINDAPSUS AUREUS THIRD STOCK PLANT PHASE, DECEMBER 15, 1958

Light Level	Nitrogen Level N_1-90ppm	N_2-180ppm	N_3-360ppm	Light Level Means
L_1 10% Full Sunlight	25.8	32.8	37.8	32.1
L_2 40% Full Sunlight	20.2	20.6	30.0	23.6
L_3 70% Full Sunlight	16.1	22.4	35.3	24.5
N Level Means	20.7	25.2	34.4	

L.S.D.	.05	.01
Between Nitrogen and Light Level Means	4.5	6.2

DISCUSSION

Previous research has generally shown that vegetative growth of many plant species increases, within limits, as nitrogen supply is increased, decreases if nitrogen supply is excessive and that increases in light intensities often have the opposite effect (2), (3), (5).

When leaf areas of the test species were affected by nitrogen, and light they were generally increased as substrate nitrogen increased and decreased as light intensity decreased.

Leaf color of *P. micans* and S. *aureus* was darkened with increased nitrogen while increased light intensity lightened leaf color of S. *aureus* during the second stock plant phase. Rabinowitch (2) stated that bleaching or lightening of leaf color occurs when the rate of photo-oxidation (chlorophyll) exceeds the rate of chlorophyll formation. Tam et al (4) found the rate of chlorophyll formation to vary directly with available nitrogen supply if other factors are not limiting. Work of these investigators indicate that chlorophyll photo-oxidation due to high light intensity may be at least partially compensated for by increased nitrogen supply and would explain the effect of nitrogen and light on leaf color of *P. micans* and S. *aureus* and the nitrogen-light interaction on leaf color of *P. oxycardium.*

The interaction of treatments on stem length of P. oxycardium (Table 3). probably means that under L_1 and L_2 light intensity was insufficient to promote further growth at the high nitrogen level or that the nitrogen level was excessive at N_3 in respect to light and inhibited growth. The data indicate that high nitrogen supply was excessive at the L_1 and L_2 levels and was effective in producing further growth at the L_3 light level. Stem length reduction of *P. micans* during the third stock plant phase with increased light intensity was due to a decrease in internodal length, and effect of nitrogen on stem length of S. *aureus* was due to internodal lengthening.

Increased stem diameter of S. *aureus* due to increased nitrogen during the second stock plant phase can probably be attributed to increased succulence of the tissue resulting from increased utilization of sugars into proteinaceous substances and a corresponding decrease in cellulose accumulation on cell walls allowing more elasticity and higher water content of the cells (1).

SUMMARY

Three experiments were initiated to test effects of three levels each of nitrogen and light intensity in factorial combination on growth of *Philodendron oxycardium, Philodendron micans* and *Scindapsus aureus.* The experiments were set-up in randomized block design and were replicated four times.

Leaf color of the three species was generally darker at the high nitrogen level and lighter at high light levels. Leaf color of *P. oxycardium* under high nitrogen treatment was unaffected by increasing light intensity in the third stock plant phase.

Leaf area of *P. oxycardium* and S. *aureus* was increased as nitrogen supply increased and decreased as light intensity increased during both growth phases and leaf area of *P. micans* was increased as nitrogen was increased during the third stock plant phase.

Stem length and number of nodes of *P. oxycardium* was affected by a nitrogen x light interaction during the second stock phase. Stem length of *P. micans* during the third phase was reduced by increased light intensity and stem length of S. *aureus* increased as nitrogen supply increased.

Stem diameter of S. *aureus* was increased during the second stock plant phase by increased nitrogen.

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ROOTING AND BUD GROWTH RESPONSES OF PHILODENDRON OXYCARDIUM TO VARIOUS LEVELS OF 3-INDOLEBUTYRIC ACID, NAPTHALENEACETIC ACID AND SUCROSE

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Failure or delay in bud break and subsequent growth of stems from the leaf-stem cuttings of *Philodendron oxycardium* is a problem often encountered by commercial foliage plant growers in Florida. There is some indication this bud break delay problem might be seasonal and occurs often on cuttings that root readily within an average six to eight-week period. In some instances this problem extends production of saleable plants from the cutting stage by four to six weeks. This ties up valuable greenhouse space and costs growers considerable money in labor and materials.

It is possible that the problem is caused by a carbohydrate-nitrogen or auxin relationship within the cuttings and/or by unfavorable photoperiods. This experiment was established to check some of the hypotheses suggested as causes of this problem. It was hoped in addition that one or more of the treatments would prove beneficial in decreasing the time required for root development and increase root quality.

METHODS AND MATERIALS

Gamma 3-indole-n-butyric acid (IBA) and 1-napthaleneacetic acid (NAA) at 0, 100, 300, 750, and 1500 parts per million (ppm) and sucrose at concentrations of 0, 0.15 and 0.50 molar (0,51300, and 171000 ppm, respectively) were the variables. A 2 x 5 x 3 factorial experiment was used with the 30 treatments placed in randomized block design