The original films were attached to the structure in April and May, 1958, and thus, were exposed immediately to high light intensities and temperatures, which could cause rapid deterioration. One foremost problem encountered with polyethylene films was the rapid breakdown at the fold crease in the rolls. If this crease in polyethylene fell between two rafters, it was only a matter of a few weeks before it split, resembling a razor blade cut from one end of the panel to the other. Cutting the film on the crease would prevent this, but unfortunately all rolls are not folded alike. Consequently this creasing cannot be entirely eliminated and thus is a constant problem. Tears can be patched, but they still remain weak spots and are subject to further breakdown.

The method of attachment had little effect on the longevity of the plastics as breakdown occurred as rapidly at either end of the house.

Another problem encountered was the accumulation of dust and mold growth on the various plastics. These accumulations were more severe on vertical than on ridge panels. This caused reduction in light transmission through film from 12% to 36% (Table 2).

Despite the high reduction of light transmission recorded there is still sufficient light (2600 fc to 5,100 fc) entering the greenhouse to permit good growth on many plants. However, this could become a limiting factor if the dirt continues to accumulate. Unfortunately, it is difficult to remove this material even with detergents. No attempt has been made to separate light reduction due to plastic deterioration from that due to dirt and mold accumulation.

SUMMARY

1. The plastic tested to date have generally been of short to medium life with only Mylar classified as a long lasting plastic under Florida's climatic conditions.

2. Dirt accumulation is the greatest problem encountered. Light reduction as high as 36% has been noted. Fortunately, this reduction is not sufficient under Florida's conditions to reduce light transmission below that required by many plants, however, it does make the house very unattractive.

3. Newer plastics under test may prove to be more durable than those presently available.

VEGETATIVE PROPAGATION OF FEIJOA SELLOWIANA AND RHODOMYRTUS TOMENTOSA AS AFFECTED BY VARIOUS COMBINATIONS OF 3-INDOLEBUTYRIC ACID, ARGININE, SUCROSE AND THIAMINE

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Feijoa sellowiana and *Rhodomyrtus tomentosa*, members of the Myrtaceae family, are used extensively as ornamentals in Florida. Feijoa is used throughout the state, while rhodomyrtus is confined to the south central and southern areas. Both plants are similar in appearance and growth habit and their fruit are used to a limited extent in the production of jellies and jams.

Rhodomyrtus and feijoa are commercially propagated by seed although clonal selections of feijoa have been successfully propagated by grafting. Repeated attempts to root feijoa cuttings experimentally and commercially have generally met with failure.

LITERATURE REVIEW

Joiner (5) and his co-workers initiated a rooting experiment at the University of Florida horticultural greenhouse, February 25, 1958, using *Feijoa sellowiana* as one of the index plants. Various hormones at different concentrations under three types of watering treatments were tested. Seven parts per million of 3-indolebutyric acid applied as a 24-hour soak to 4 inch terminal cuttings of feijoa resulted in 90% rooting and produced moderately good root systems where a constant mist was used. A 50-50 mixture by volume of imported peat and No. 30 perlite was used as the rooting medium. The mist was controlled by a time clock which turned on the water one hour

after sunrise and off one-hour after sunset. The experiment terminated April 22, 1958.

Gregory and van Overbeek (3) working with a difficult to root hibiscus variety 'Ruth Wilcox' concluded that 3-indolebutyric acid alone was not effective in root initiation and the presence of another factor or factors supplied by grafting *Hibiscus rosa-sinensis* var. *'Brilliantissimus'* (single scarlet) onto the 'Ruth Wilcox' variety provided this additional and necessary substance or combination of substances. Further work conducted by van Overbeek (6) on the same two hibiscus varieties indicated that necessary root inducing substances were produced in the leaves of the single scarlet hibiscus scion and translocated to the cut basal end of 'Ruth Wilcox' stock. In this same experiment van Overbeek (6) showed that a leafless cutting of the single scarlet variety produced as many roots as a leafy cutting when treated with a combination of 3-indolebutyric acid, arginine and sucrose. Although the number of roots produced were the same, the quality of the induced root system was not. van Overbeek suggests the possible application of thiamine to improve rooting quality.

Dickey (2) tested rooting response of several plants including feijoa under three methods of watering in six media and during three seasons of the year. None of his treatments produced rooting response on feijoa cuttings within eleven weeks.

Materials and Methods

A randomized block design was utilized to check the effect of 3-indolebutyric acid, arginine, sucrose and thiamine separately and in all possible combinations on the rooting of feijoa and rhodomyrtus cuttings. The experiment included 15 treatments with 10 cuttings as the experimental unit and four replications. Concentration of the variables were: 3-indolebutyric acid 7 ppm, arginine 10 ppm, sucrose 4,000 ppm, and thiamine 1 ppm. Materials were supplied by a 24-hour soak after which the cuttings were inserted in a sterilized 40-60 mixture by volume of imported peat and No. 30 perlite. Constant mist in an unshaded glass greenhouse was provided from 7:30 am until 6:30 pm.

Six hundred rhodomyrtus cuttings were obtained from Mr. Joel Kuperburg, Caribbean Gardens, Naples, Florida. On July 8, 1959, they were placed in treatment solutions for 24 hours.

Feijoa cuttings were taken from stock plants at the University of Florida on July 7, 1959, and placed in treatment solutions. All cuttings were inserted in the medium 24 hours following initiation of treatment on July 9, 1959, and terminated September 4, 1959.

Three measurements were taken to determine effectiveness of treatment: percent rooting, root length and root quality. Quality rating grades were established as follows: 1) no roots, 2) slight rooting, 3) moderately rooted, 4) heavily rooted, 5) very heavily rooted. Treatment combinations are given in Table 1.

Results

The rooting of *Feijoa sellowiana* was not significantly affected by treatment. Only 10 of the 600 cuttings rooted and none of the 10 could be attributed to treatment.

Percent rooting and length of roots of the rhodomyrtus cuttings were not affected by treatments, but quality of roots produced did respond to treatment.

Treatment one was superior to all other treatments except three, six, and seven (Table 1). Treatment three was only better than treatment eleven. Treatment six was better than all treatments except one, three, five, and seven. Treatment seven was significantly better than all treatments except one, three, five, six, seven and nine.

Average percent rooting of all rhodomyrtus cuttings was 72.8% with an average root length of 3.25 inches.

TABLE 1. TREATMENT EFFECT OF ALL COMBINATIONS OF 3-INDOLE-BUTYRIC ACID, ARGININE, SUCROSE AND THIAMINE

Treatment No.	Materials Used	Averages
*1	IBA	3.0
2	IBA & Thiamine	2.0
*3	IBA & Arginine	2.5
4	IBA & Sucrose	2.1
5	IBA, Arginine & Sucrose	2.4
*6	IBA, Arginine & Thiamine	2.9
*7	IBA, Arginine, Sucrose & Thiamine	2.7
8	Arginine & Sucrose	1.9
9	Arginine & Thiamine	2.3
10	Arginine, Thiamine & Sucrose	1.9
11	Sucrose & Thiamine	1.9
12	Sucrose	1.9
13	Thiamine	2.1
14	Arginine	2.0
15	Control - de-ionized water	2.1

L.S.D = 0.7 at 5% Level of Probability.
*Treatments significantly affecting quality rooting.
Abreviations: IBA = 3-indolebutyric acid.

Discussion

Previous work by Joiner (5) indicated that feijoa rooted well when treated with a 3-indolebutyric acid. Dickey's (2) work showed

that rooting of feijoa cuttings was not affected by season, but he used no hormones on these cuttings.

Feijoa's failure to root could possibly have been due to age of wood. Joiner's (5) work was done in February. Feijoa at that time of year is generally dormant. Age of wood usually affects the carbohydrate-nitrogen ratio. Feijoa cuttings taken during February would probably contain a high carbohydrate reserve. Some plants do not root without a high carbohydrate-nitrogen relationship.

Photoperiodic response and temperature may be other contributing factors in failure of feijoa cuttings to root. In this experiment the cuttings were under long days getting shorter, while those rooted by Joiner (5) were under short days getting longer, and during February, when a minimum 70° F night temperature was maintained and day temperatures did not exceed 85° F. This experiment night temperature never dropped to 70° F and day temperatures were usually in excess of 100° and often exceeded 110° F.

Feijoa cuttings taken during July probably contained little stored carbohydrates and any carbohydrate present was undoubtedly utilized rapidly by a high respiration rate partially induced by high temperature. This could have been an important factor in the results especially in the presence of hormones and other growth factors.

No treatment significantly affected percent rooting or length of roots of the rhodomyrtus cuttings.

Results indicate 3-indolebutyric acid as the only substance affecting quality rooting. Statistical analysis clearly shows no additional benefit is derived from arginine, sucrose or thiamine. In every instance additional materials gave no increase in quality grade. Where thiamine and sucrose alone (trt. 2 & 4) were added an actual depressive or inhibitive effect on 3-indolebutyric acid was noted.

It appears that regardless of all treatment combinations used the primary variable influencing quality rooting is 3-indolebutyric acid.

The inhibition that occurred when sucrose was added to 3-indolebutyric acid may possibly be explained by an apparent nutritional deficiency of the rhodomyrtus cuttings. At the time cuttings were made the leaves were a yellowish green—a lighter color than normal for this plant species. If this condition was indicative of a nitrogen deficiency then the presence of a high carbohydrate level is probable. A partial conversion of the stored carbohydrate to sugar plus the addition of 4,000 ppm of sucrose (trt. 4) in a 24-hour soak could have resulted in partial to complete plasmolysis. If this reaction occurred root initiation and development would have been depressed.

Thiamine is known to be essential for continued growth of excised roots of certain plant species grown in sterilized nutrient cultures. Also it is known that thiamine is produced by the plant. A possible explanation concerning the results obtained by the combination of it and 3-indolebutyric acid (trt. 2) is impossible in view of the present information available.

Summary

An experiment was initiated July 7, 1959, to determine the rooting response of *Feijoa sellowiana* and *Rhodomyrtus tomentosa* to treatment combinations of 3-indolebutyric acid, arginine, sucrose and thiamine.

All cuttings received constant mist during the daylight hours and were inserted in a 40-60 mixture by volume of imported peat and No. 30 perlite.

Measurements were percent rooting and length and quality of roots.

Feijoa failed to root regardless of treatment. The failure of feijoa to root may be the indirect result of uncontrolled factors as photoperiod, temperature, age of wood and seedling variation of stock plants, or other factors.

Quality of roots produced by rhodomyrtus cuttings was enhanced by 3-indolebutyric acid treatment. Combinations of arginine, thiamine or sucrose with 3-indolebutyric acid tended to inhibit the effect of the acid. Arginine, sucrose and thiamine when used as separate treatments or in combination with each other produced poor results.

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