sawdust plunging medium the only treatment comparisons attaining significance was that of L_2 and L_3.

DISCUSSION

The data indicate that excessive shading as used by some growers might materially reduce bud set. It is also indicated that the additional nitrogen required by bacteria breaking down the sawdust may have been obtained at the expense of the plants. This was reflected in reduced bud production.

SUMMARY

A factorial experiment with *Gardenia jasminoides* 'Veitchii,' combining three light conditions (full sun, 50 percent saran shade and 50 percent saran shade from August 6 to October 1, 1959, then full sun until experiment's termination, May 4, 1960), two plunging media (peat and sawdust) and two fertilizer treatments (1¼ pounds of sodium nitrate and 10 ounces of sodium nitrate and 5 ounces of muriate of potash per 100 square feet, respectively), was initiated August 6, 1959.

Under the conditions of this experiment, light and plunging media were the factors that affected bud formation in gardenia. Fertilizer treatments had no effect.

Bud production was low under 50 percent saran shade and there was no difference between the peat and sawdust plunging media, but it increased significantly in both plunging media when the plants were given full sun from October 1 until experiment was terminated. Peat was superior to sawdust as a plunging medium only when the plants were grown in full sun. Plants given full sun and with the pots plunged in peat produced the most buds.

ROOTING RESPONSE OF FEIJOA SELLOWIANA AND MYRICA RUBRA AS AFFECTED BY 2,3,5-TRIIODOBENZOIC ACID AND 3-INDOLEBUTYRIC ACID

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Propagators of ornamental plant material have always been faced with the problem of difficult-to-root species. The use of mist propagation and growth regulators has in many instances overcome this difficulty. However, there still remain many plants difficult to root even under the best commercial practices. *Feijoa sellowiana* and *Myrica rubra* are classified in this category and were chosen as index plants for these experiments.

Zimmerman and Hitchcock (14) were the first to test 2,3,5-triiodobenzoic (TIBA) as a plant growth regulating substance. They classified it as a growth regulator which is active in inducing modification of plant organs, but inactive in causing cell elongation or root formation.

Aberg (1) in 1953, summarized the effects of TIBA on shoot parts as follows: (1) in very low concentrations TIBA has a weak auxin effect which is thought to be the result of synergism between it and endogenous auxin; (2) high concentrations of TIBA antagonize the effects of externally applied auxins and native auxins, and (3) toxic influences of high concentrations of TIBA are non-specific and eventually lead to the death of cells.

These same reactions are also applicable to root growth. At concentrations of 10^{-8} to 10^{-6} M synergistic action of TIBA with native or externally applied auxin is apparent. At higher molarities, 10^{-6} to 10^{-5} antagonism occurs, and finally toxicity is manifest in the range of 10^{-5} to 10^{-4}M.

Aberg (1) offers a probable explanation of the synergistic action of TIBA as an effect on the enzymatic systems regulating the metabolism of 3-indoleacetic acid (IAA) in plant cells. TIBA in low concentrations would increase the IAA synthesis and produce a greater hormonal response up to a threshold level.

Veldstra and Booij (11) propose that TIBA competes with auxin for inactive sites in the cell plasm thereby affording a greater opportunity for free auxin molecules to attach to active sites within the plant.

Audus and Das (3) assume that the effect of TIBA or any growth regulating substance is a function of the amount of that material absorbed at an active center and the amount absorbed is proportional to the relative activity of the substance. These workers also visualize two active growth centers—one which promotes and the other which inhibits growth. The authors asserted that growth response to auxin application could result from: (1) exogenous auxins applied in sufficient concentrations displaces endogenous auxin in supraoptimal amounts thereby reducing inhibition and stimulating growth; (2) endogenous auxin may not be present or in insufficient concentrations and the exogenous auxin applied would affect the growth center directly, or (3) if optimal amounts of auxin and antiauxin are applied the inhibition of growth is due to the inhibition center being activated which inhibits the promotion center due to the greater activity of the antiauxin.

Most research workers have placed TIBA in the vague, broad classification of antiauxins. In general, these substances are thought to antagonize auxins except when used in very minute concentrations. Snyergism occurs if used in combination with an auxin at low concentrations or weak auxin activity if used alone. Growth promotion by antiauxins is thought to be the influence of the mediated auxin system and not the antiauxin alone.

Methods and Materials

Two experiments were initiated February 27, 1960, in a greenhouse at Gainesville, to test the effect of TIBA and indolebutyric acid (IBA) on the rooting of *Feijoa sellowiana* and *Myrica rubra* cuttings. Concentrations of the variables were 0.3 ppm, 0.7 ppm, 1.1 ppm, 3.0 ppm, 7.0 ppm and 11.0 ppm. The control treatments were distilled water. The treatments of both experiments were assigned in randomized block design. There were four replications and the experimental unit was 10 cuttings.

Terminal cuttings, 3 to 5 inches long, were obtained from plants on the University of Florida campus. Treatments were applied as a 24-hour soak after which cuttings were inserted in a sterilized medium of 50% peat-50% No. 30 perlite. Intermittent mist was applied from 8:00 A. M. until 5:30 P. M. in an unshaded glass greenhouse.

Duration of the experiment was eight weeks, terminating April 23, 1960. Cuttings were removed and percent rooting and "root quality" were determined. The "rooting quality" values are those previously used by Taylor and Joiner (10). They are: (1) no roots; (2) slight rooting; (3) moderately rooted; (4) heavily rooted; (5) very heavily rooted. This is illustrated for feijoa in Figure 1.

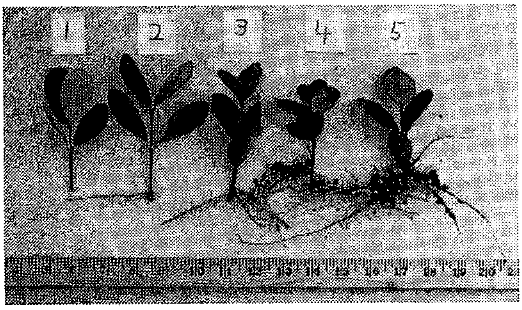

Fig. 1. "Rooting quality rating" system used for rating FEIJOA SELLOWIANA.

Results

The rooting of *Myrica rubra* cuttings was not significantly affected by treatment. Only nine of 520 cuttings rooted.

TIBA at the rate of 1.1 ppm (treatment 3) produced a greater percent of rooted cuttings and a better "rooting quality" score than any of the other treatments (Table 1). Treatment 3 was the only treatment significantly better than the control (treatment 13), and treatment 5 was the only one that significantly depressed rooting below that of the control. The remaining TIBA treatments were neither significantly better nor worse than the control.

None of the IBA treatments (treatments 7, 8, 9, 10, 11, 12) were significantly better or worse than the control (treatment 13).

Discussion

Joiner (6) produced 90% rooting with feijoa when the cuttings were placed under constant

Table 1. Effect of 2,3,5-triiodobenzoic acid and 3-indolebutyric acid on rooting of feijoa.

Treatment Number	Materials Used-PPM	Percent Rooted	Rooting Quality
1	0.3 TIBA	12.5	1.30
2	0.7 TIBA	15.0	1.23
3	1.1 TIBA	42.3	2.15
4	3.0 TIBA	15.0	1.30
5	7.0 TIBA	2.5	1.03
6	11.0 TIBA	15.0	1.30
7	0.3 IBA	22.5	1.50
8	0.7 IBA	20.0	1.23
9	1.1 IBA	16.5	1.35
10	3.0 IBA	15.0	1.28
11	7.0 IBA	7.5	1.05
12	11.0 IBA	10.0	1.25
13	Control-distilled water	15.0	1.30
L.S.D.		.05	.01
Between percent rooted means		9.86	13.21
Between rooting quality means		0.28	0.37

mist during February and March after receiving a 24-hour soak of 3ppm IBA. Dickey (5) working with this plant without hormone found that feijoa rooting was unaffected by season of year. Recent work by Taylor and Joiner (1) has shown feijoa to root very poorly during July and August under the best treatment previously described by Joiner (6).

This experiment has shown that TIBA at 1.1 ppm is much more effective in promoting rooting of feijoa than IBA at this or any other concentration of TIBA and IBA used. Poole (8) conducting an experiment simultaneously with feijoa, using several levels of IBA as spray and soak treatments, got only 12.5% rooting with his best treatment.

These data indicate a narrow or limited range in which root promotion occurs as a result of auxin or antiauxin treatment. Several workers concur that TIBA is effective as a growth stimulant only in very minute concentrations and that its effect at these concentrations is the result of a synergistic action between it and the endogenous auxin of the plant.

Some workers believe the effectiveness of TIBA can be ascribed to its ability to displace supraoptimal concentrations of endogenous auxin at an inhibiting level to one effective as a growth stimulant.

Either of these theories may offer a possible explanation to data of this experiment.

In conjunction with the first theory it might be proposed that enough endogenous auxin was present in the cuttings to give 15% rooting as did the control. Addition of TIBA at 1.1 ppm established a proper ratio between it and the native auxin to give a synergistic action which stimulated rooting to 42.3 percent. Below 1.1 ppm TIBA was not present in sufficient quantity to act as a synergist, above 1.1 ppm TIBA acted as an antiauxin antagonizing the native auxin. This theory would apply to treatments one through five but not six. This theory does not explain the maximum inhibition obtained at treatment five (7.0 ppm TIBA) when theoretically it should have occurred at treatment six (11.0 ppm TIBA).

This discrepancy would also occur by explaining the TIBA results by the second theory. If treatment three displaced enough of the supraoptimal native auxin to give maximum root promotion it would follow that higher concentrations would displace too much, lowering the endogenous auxin below the threshold level. Again maximum inhibition should occur at treatment six rather than five.

Rooting quality as affected by TIBA may also be partially explained by the above postulations but would be subject to the same limitations.

It is possible that maximum stimulation of rooting by TIBA occurs in the range of 1.1ppm to 3.0 ppm. Previous workers have shown that antiauxins have a very narrow range in which they act as growth promoters and auxin synergists.

Logical explanations of these seeming discrepancies are impossible from the data of this experiment and information available concerning the action of these auxin and antiauxin materials. Uncontrolled factors, such as seedling variation and previous nutritional status, might be partially responsible for these discrepancies.

Summary

Two experiments were begun February 27, 1960, to determine effects of 2,3,5-triiodobenzoic and 3-indolebutyric acid on rooting of *Feijoa sellowiana* and *Myrica rubra.*

Auxins and antiauxins at six levels each applied to the cuttings as a 24-hour soak (Table 1) after which they were placed under intermittent mist from 8:00 A. M. until 5:30 P. M. in a sterilized rooting medium of 50% imported peat and 50% No. 30 perlite.

Duration of the experiment was eight weeks terminating April 23, 1960. Growth measurement used was percent rooting and "rooting quality" score.

Myrica rubra rooted very poorly and there was no increase in rooting that could be attributed to treatments. *Feijoa sellowiana* produced the best "rooting quality" and highest percent of rooting with 1.1 ppm 2,3,5-triiodobenzoic acid, but 7.0 ppm depressed rooting. None of the 3-indolebutyric acid levels produced rooting significantly better than the control.

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TABEBUIA — OUR BEST YARD TREES

EDWIN A. MENNINGER

The Flowering Tree Man

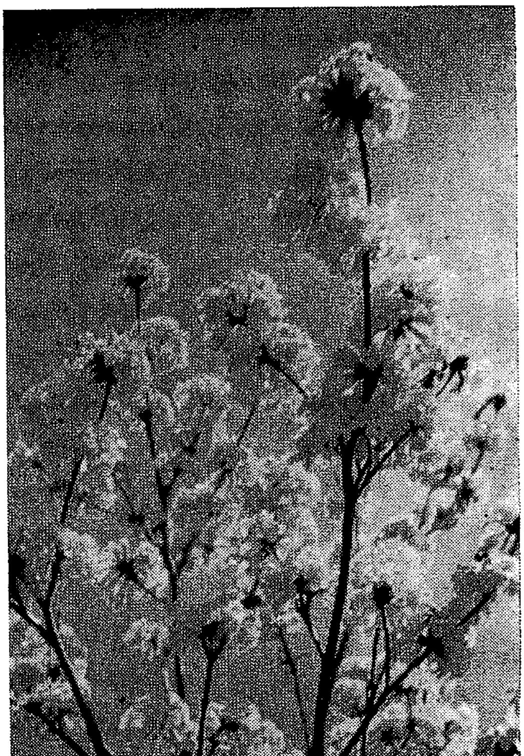
Stuart

The most satisfactory flowering trees for parkway and yard planting in southern Florida belong to the genus *Tabebuia*. This Brazilian native name applies to about 150 species of broad-leaved, mostly evergreen trees from the West Indies and Central and South America. Some of them were formerly included in *Tecoma*[2], some still are; in this article correct botanical names are retained, but all are lumped together as Tabebuia trees.

Almost without exception they are showy-flowered and precocious, with trumpet-shaped blossoms, white, pink, lavender, purple, red and yellow, frequently in great profusion. F. C. Hoehne, dean of plantsmen in Sao Paulo, Brazil, in his book *City Planting of Trees*, sums up the utility of the *Tabebuia* group when he says: "To name the species most worth cultivating is easier than to exclude those not worth while", and then he suggests ten outstanding kinds for street planting in Brazil; about half of his choices are now growing in Florida too.

Of the dozen or more species under cultivation generally in Florida now, commonest is the Paraguayan silver-trumpet tree (*T. argentea*[3] Britton; Syn. *Tecoma argentea* Bur. & K. Schum.) which owes its common name to the silver-gray cast of its evergreen leaves.

Also commonly cultivated are three species that are much confused, even by botanists. Two quite different trees have been introduced into Florida under the name of *T. pallida* Miers. One of these, commonly called the Cuban Pink Trumpet, is evergreen and it flowers on and off all year, usually with the ovate-lanceolate leaves but often while leaf change is in process. The deciduous *T. pallida* (sometimes called *T. pallida* No. 2) drops its linear-obcordate leaves (which have an iridescent oily sheen) once a year and while bare, blooms profusely, then puts on its new foliage. Many specimens of both trees are in common cultivation. The third tree, which too



YELLOW POUI (Tabebuia serratifolia) from Trinidad is a big timber tree at home but in Florida it is a difficult tree to grow and consequently is rare. It has spectacular yellow flowers.

(1) Based in part on an article by the author in the Journal of the New York Botanical Garden, June 1949.
(2) Without any apparently valid reason, **Tecoma stans** is referred by **HORTUS SECOND** to **Stenolobium Stans** and therefore is so treated here.
(3) In this article the Abbreviation **T.** stands for **TABEBUIA**