RESEARCH RESULTS FOR NURSERYMEN

Horticulture Series No. 18

Agricultural Experiment Station

Auburn University

E. V. Smith, Director   August 1972   Auburn, Alabama

CONTENTS

1. Evaluation of Several Growth Regulators on the Rooting of Three Azalea Cultivar

By

Terril A. Nell and Kenneth C. Sanderson[1/]

Nature of Work

The use of rooting inducing substances in the propagation of vegetative cuttings has become an accepted commercial practice. Research in the 1930's revealed that indole-butryic acid and napthalene acetic were the most effective root inducing chemicals however the search for new materials continues. Several new chemicals have recently become available and this research's objective was to evaluate several of these chemicals as root inducing substances on azaleas.

Four-inch softwood cuttings of the azalea cultivars Evensong, Kingfisher and Red American Beauty were cut at an angle to the plane of the stem and the base of the cutting dipped for 5 sec. in one of the following treatments: 1) check, no treatment; 2) 2,500 ppm B-Nine; 3) 50 ppm Bayer 102612; 4) 40 ppm 2, 4-D; 5) ppm Ancymidol; 6) 1,000 ppm Ethephon; 7) 1,000 ppm Nia 10637; 8) 1,000 ppm NAA; 9) 5,000 ppm NAA; 10) 1,000 ppm Uni-F 529. Propagation was carried out in a 1:1 sand and vermiculite media under mist and with bottom heat. Cuttings were graded 8 weeks after sticking as follows: 0 = no rooting, 1 = no rooting, 1 = callused, no roots, 2 = poor rooting, 3 = average rooting, 4 = good rooting, 5 = excellent rooting.

Results

Bayer 102612 burned the apical meristem on Evensong and Red American Beauty and curled the leaves on Kingfisher 3 weeks after treatment. NAA at 1,000 ppm produced the largest quantity of roots on Evensong and

1/ Former student and Associate Professor respectively, Department of Horticulture, Agr. Expt. Sta., Auburn University.

Kingfisher while Uni. F 529 had the highest rooting score on Red American Beauty. Bayer 102612 yielded the poorest rooting on all 3 cultivars.

Nia 10637, Ancymidol and Ethephon showed promise as root inducing substances and further research is warranted. Cultivars differed statistically in rooting with Kingfisher and Evensong yielding the best and poorest rooting scores, respectively.

This investigation demonstrated the value of choosing a cultivar that produces a good quick root system. The choice of a root inducing substances was dependent on the cultivar. Other researchers have shown that growth retardants such as B-Nine, Uni-F 529, Ethephon and Cycocel have root inducing properties, however, more research is needed on these compounds and materials such as Ancymidol and Nia 10637.

Publications:

Nell, T. A. 1971. The Effect of Several Growth Regulators on the Rooting of Three Azalea Cultivars. Proc. So. Agr. Workers. 68th Ann. Conven. 189.

Nell, T. A. and K. C. Sanderson. 1972. Effect of Several Growth Regulators on the Rooting of Three Azalea Cultivars. Florist Rev. 150: 21-22, 52-53.

2. Comparison of Jiffy Grow and Various Growth Regulators on the Rooting of *Cornus florida* and *Cornus florida rubra* Cuttings

By

Kermit Morris, Jr., and Kenneth C. Sanderson 1/

Nature of Work

Propagation of certain forms of flowering dogwood by softwood cuttings has been tried by nurserymen for many years, yet none have ever reported success on difficult species such as *C. florida rubra* at a commercial level. Two experiments were conducted to 1) compare IBA and a commercial root inducing compound containing both IBA and NAA on the rooting of *C. florida* and *C. florida rubra* and 2) evaluate several growth regulators on the rooting of *C. florida*. Experiment 1 compared 10 second dips of Jiffy Grow and IBA and 24 hr. low concentration soaks of IBA on rooting during July-September 1970. Treatments were as shown in Tables 1 and 2 and were applied to the lower inch of the cutting prior to propagation under mist in a 3:1 sand and peat medium. Experiment 2 evaluated the rooting inducing properties of several growth regulators on *C. florida* during April-May. Treatments were as shown in Table 3 and were applied as concentrated 10 second basal dips.

Full strength Jiffy Grow and 5,000 ppm IBA 10 second dips produced 100 per cent rooting of both *C. florida* and *C. florida rubra* propagated in July-September (Table 1). Significant differences in rooting scores were noted among treatments. Full strength Jiffy Grow produced the highest rooting scores and differed statistically from the check when species scores were combined (Table 2). Jiffy Grow full strength did not differ in rooting from the other Jiffy Grow and IBA treatments. For *C. florida*, 10 second dips of full strength Jiffy Grow, 2,500 ppm IBA and 5,000 ppm IBA and 24 hr. soak of 5 ppm IBA and 25 ppm IBA produced the highest scores and differed statisti-

---

1/ Former student and Associate Prof. respectively, Dept. of Hort., Agr. Expt. Sta., Auburn Univ.

cally from other treatments. The best rooting scores for *C. florida rubra* were produced by 10 second dips of 1:5 Jiffy Grow, full strength Jiffy Grow; 1,000 ppm IBA; 2,500 ppm IBA and 5,000 ppm IBA and 24 hour soaks of 10 ppm IBA and 50 ppm IBA. The check failed to root but was similar in rooting score to 10 second dips of 500 ppm IBA and 24 hour soaks of 5 ppm IBA.

Table 1. Rooting Percentage of *Cornus florida* and *C. florida rubra* Cuttings Treated with Jiffy Grow and IBA

Treatment	Species		Mean
	C. florida rubra	*C. florida*	
Check	17	72	44
1:10 Jiffy Grow	75	100	88
1:5 Jiffy Grow	100	92	96
Full strength Jiffy Grow	100	100	100
500 ppm IBA 10-sec. dip	75	100	88
1,000 ppm IBA 10-sec. dip	100	75	88
2,500 ppm IBA 10-sec. dip	100	92	96
5,000 ppm IBA 10-sec. dip	100	100	100
5 ppm IBA 24-hr. soak	72	100	86
10 ppm IBA 24-hr. soak.	83	75	79
25 ppm IBA 24-hr. soak.	67	100	84
50 ppm IBA 24-hr. soak.	83	92	87
Mean	81	91	86

Table 2. Rooting Scores of *Cornus florida* and *C. florida rubra* Cuttings Treated with Jiffy Grow and IBA

Treatment	Species		Mean
	C. florida rubra	*C. florida*	
Check	2.00 c	2.67 e	2.33 b
1:10 Jiffy Grow No. 2	3.58 b	3.58 de	3.58 ab
1:15 Jiffy Grow No. 2	5.00 a	4.08 bcd	4.54 a
Full strength Jiffy Grow No. 2 . .	5.17 a	5.17 a	5.21 a
500 ppm IBA, 10-sec. dip	3.17 bc	4.00 bcd	3.58 ab
1,000 IBA, 10-sec. dip	4.00 ab	3.67 cd	3.83 ab
2,500 ppm IBA, 10-sec. dip	5.17 a	4.67 ab	4.92 a
5,000 ppm IBA, 10-sec. dip	5.00 a	4.58 abc	4.79 a
5 ppm IBA, 24-hr. soak	2.75 bc	4.67 ab	3.71 ab
10 ppm IBA, 24-hr. soak	4.00 ab	3.25 de	3.63 ab
25 ppm IBA, 24-hr. soak	3.42 b	4.75 ab	4.08 ab
50 ppm IBA, 24-hr. soak	4.00 b	4.17 bcd	4.08 ab

Means in columns followed by the same letter(s) are not significantly different at the 5 per cent level.

Table 3. Rooting Percentage and Scores of *Cornus florida* Cuttings Treated with Various Growth Regulators

Treatment	Rooting percentage	Rooting x/ scores
Check	20	2.20
1:4 Jiffy Grow No. 2	0	2.00
Full strength Jiffy Grow No. 2	10	2.20
2,500 ppm IBA	50	2.80
5,000 ppm IBA	20	2.00
10,000 ppm IBA	40	2.70
2,500 ppm NAA	0	1.90
5,000 ppm NAA	10	1.90
10,000 ppm NAA	50	2.60
500 ppm E1-531	20	2.10
1,000 ppm Ancymidol	10	2.11
2,000 ppm Ancymidol	10	2.00
1,000 ppm Nia 10637	30	2.30
2,500 ppm Nia 10637	30	2.50
5,000 ppm Nia 10637	10	2.00
10,000 ppm Nia 10637	0	1.80
1:2 Jiffy Grow plus 500 ppm Ancymidol. . .	40	2.40
5,000 ppm IBA plus 500 ppm Ancymidol . . .	20	2.20
2,500 ppm IBA plus 2,500 ppm Nia 10637 . .	0	1.80
5,000 ppm Nia 10637 plus 500 ppm Ancymidol . .	40	2.40
Mean	21	2.21

x/ Rooting scores: 0 = no rooting, dead; 1 = no rooting, not callused; 2 = callused; 3 = light rooting; 4 = medium rooting; 5 = heavy rooting.

Rooting of *C. florida* in Experiment 2 (April-May) was slower and poorer than in Experiment 1 (July-September) thus indicating a seasonal variation. While treatments such as 5,000 ppm Nia 10637, 1,000 ppm Ancymidol and 5,000 ppm IBA plus 500 ppm Nia 10637 callused early, roots failed to initiate promptly and the experiment's mean rooting percentage was also much lower (21% vs. 91%). Best root percentage treatments (50%) were 2,500 ppm IBA and 10,000 ppm Nia (Table 3). Experimental compounds Ancymidol and Nia 10637 produced lower rooting percentages with increased concentrations, however only 1,000 ppm Nia 10637 and 2,500 ppm Nia 10637 exceeded the check in rooting. A mixture of 5,000 ppm Nia 10637 plus 500 ppm Ancymidol produced a greater rooting percentage than either material alone thus indicating an additive effect. None of the treatments averaged light rooting and there was no statistical differences in rooting scores.

This study shows the importance of seasonal variation in the rooting of *C. florida* and confirms the use of high concentration IBA dips for successful rooting of *C. florida* and *C. florida rubra*. Jiffy Grow, a commercial formulation of IBA and NAA, produced superior rooting, in some cases and NAA yielded one ot the best rooting percentages on *C. florida*, thus indicating a combination of IBA and NAA may be more successful in rooting *C. florida*. Further studies on the experimental growth regulators, Ancymidol and Nia 10637 should be carried out, however Nia 10637 seemed to stimulate rooting in this study. Results for Ancymidol at 500 to 2,000 ppm were poorer than the check, however lower concentrations should be tried since both Ancymidol and Nia 10637 usually reduced rooting with increased concentrations. A combination of 500 ppm Ancymidol and 5,000 ppm Nia 10637 produced better rooting than when the materials were used alone.

Publications:

Morris, K. P. Jr., and K. C. Sanderson. 1972. Effects of various growth regulators on the rooting of *Cornus florida* and *C. florida rubra* cuttings. Am. Nurseryman. 136(5):12-13, 83-90.

3. Effect of Photoperiod on the Growth of Empress Tree, Paulownia tomentosa, Seedlings.

By

Kenneth C. Sanderson [1]

Nature of Work

Effect of photoperiod on the growth of Empress tree, Paulownia tomentosa was studied in a greenhouse experiment conducted during December 1970 and April 1971. The objective was to determine if photoperiodic treatments speed the development of the seedlings. Two-inch Paulownia seedlings was transplanted into 1-gallon plastic containers containing equal parts of soil, peat and perlite on December 30, 1970. A mixture consisting of equal portions of 8-8-8, Osmocote 14-14-14, Mag-Amp 7-40-6 and Sta-Green 12-6-6 was incorporated preplant into the media at the rate of 2 tablespoons per bu. Four plants each were placed under three photoperiodic treatments and the treatments were replicated twice. A 9 hr. natural day length between 7:30 a.m. and 4:30 p.m. was used. Plants were covered with black cloth from 4:30 p.m. to 8:00 a.m. and given the following supplemental light treatments: 1) no light, 2) 15 hr. (continuous light) and 3) 4 hr. of light in the middle of the night ('light break'). Two 6-watt incandescent bulbs (light intensity approx. 25-30 ft. at pot level) were used to provide supplemental light. Minimum night temperature in the greenhouse was maintained at 68° F. The height of the seedlings was recorded after 14½ weeks.

Results

Supplemental lighting increased the height of Paulownia seedlings with the continuous light treatment (9 hr. natural day plus 15 hr. supplementary) averaging the tallest plants (27.2 cm). Plants grown

1/ Associate Professor, Department of Horticulture, Agr. Expt. Sta., Auburn University.

under the light break treatment average 2.8 cm in height. The 9 hr. day treatment produced the shortest mean height (15.6 cm). Plants receiving supplemental light had larger and lighter green leaves than plants grown without supplemental light. Unlighted plants had small dark green leaves.

Publications: None

4. Rooting Response of Cuttings of Several Ornamentals Treated with Various Growth Regulators.

By

Kenneth C. Sanderson 1/

Nature of Work

Four experiments on root inducing compounds were conducted during May to October 1970 in a lightly shaded greenhouse. Each experiment involved different combinations of species and treatments. Propagation was carried out under mist (2.5 sec. every 100 sec. 8 a.m. to 4:30 p.m.) using a 1:1 sand and peat media with bottom heat (70 degrees F.). All liquid treatments were applied as 5 sec. dip except in Experiment 4 which used a 10 sec. dip. Following rooting, cuttings were scored for rooting using the following relative scoring system for each experiment and species: 0 = dead; 1 = alive, not callused; 2 = callused; 3 = light rooting; 4 = medium rooting and 5 = heavy rooting.

Experiment 1. Cuttings of azaleas, *Rhododendron hybrida* cv. Even- Dawn Redwood, *Metasequoia glyptostroboides* and Shore Juniper, *Juniperus conferta* received the following basal dip treatments (10 per treatment) prior to sticking: 1) none; 2) Hormodin No. 2; 3) 1,000 ppm Ethephon; 4) 2,500 ppm B-Nine, 5) 50 ppm Bay 102612 and 6) 1,000 ppm IBA. Cuttings were treated and stuck on May 21, 1971. Treatments were replicated twice. Records were taken on azaleas and Shore Junipers after 8 weeks and on Dawn Redwood after 16 weeks.

Experiment 2. On August 7, 1970 the following treatments were applied to cuttings of azalea, *Rhododendron hybrida* cv. Evensong; Dwarf Chinese Holly, *Ilex cornuta burfordi*; Leatherleaf Mahonia, *Mahonia bealei* and Shore Juniper, *Juniperus conferta*: 1) none; 2) 1,000 ppm

1/ Associate Professor, Department of Horticulture, Agr. Expt. Sta., Auburn University.

Ethephon; 3) 2,500 ppm B-Nine; 4) 1,000 ppm Uni-F 529; 5) 40 ppm 2,4,5-TP; 6) 50 ppm Bay 102612; 7) 1,000 ppm Nia 10637; 8) 125 ppm Ancymidol (A-rest); 9) 1,000 ppm IBA and 10) 5,000 ppm IBA. Five cuttings were used in each treatment which was replicated twice. Rooting scores were recorded after 8 weeks on October 7, 1970.

Experiment 3. Various strengths of 3 commercial root inducing compounds were compared with 2,4,5TP, B-Nine and Ethephon in root inducing activity on cuttings of azalea, *Rhododendron hybrida* cv. Evensong and Camellia, *Camellia japonica*. Treatments applied on May 14, 1970 were 1) check; 2) Hormodin No. 1; 3) Hormodin No. 2; 4) Hormodin No. 3; 5) Rainbow Tender; 6) Rainbow Woody; 7) Rootone; 8) Rootone No. 10; 9) 5 ppm 2,4,5-TP; 10) 40 ppm 2,4,5-TP; 11) 1,000 ppm Ethephon; 12) 2,500 ppm B-Nine. Treatments were replicated twice using 5 cuttings per treatment. Rooting scores were recorded after approximately 8 weeks.

Experiment 4. Cuttings of Shore Juniper, *Juniperus conferta* were stuck on May 14, 1970 using 5 cuttings per treatment and 4 replications. Treatments were 1) none; 2) Hormodin No. 1; 3) Hormodin No. 2; 4) Hormodin No. 3; 5) Rootone; 6) Rootone No. 10; 7) Cutstart X; 8) Cutstart XX; 9) Cutstart XXX; 10) Ferbam; 11) Rainbow Tender; 12) Rainbow Woody; 13) 50 ppm Bay 102612; 14) 1,000 ppm IBA 10 sec. dip; 15) 50 ppm 24 hr. soak; 16) 1,000 ppm Ethephon. Four replications of 5 cuttings each were used per treatment. Cuttings were scored for rooting 8 weeks after treatments.

Results

Hormodin No. 2 and 1,000 ppm Ethephon treatments yielded the highest rooting scores in Experiment 1, (Table 4). Cuttings treated with Bay 102612 averaged the poorest rooting scores. Azaleas rooted best when treated with Hormodin No. 2. Ethephon treated Dawn Redwood cuttings had higher rooting scores than cuttings receiving other treatments. Untreated, Hormodin No. 2 and Ethephon treated cuttings yielded the best rooting scores for Shore Juniper.

Ethephon was the best overall root inducing substance in Experiment 2 (Table 5). Azalea cuttings rooted best when treated with 125 ppm Ancymidol, 40 ppm 2,4 5-TP and 1,000 ppm Ethephon. Highest rooting scores for Dwarf Burford Holly cuttings were obtained with 50 ppm Bay 102612, 40 ppm 2,4 5-TP and 1,000 ppm Nia 10637 treatments. Ethephon yielded the best rooting score on Mahonia. Shore Juniper rooted best with no treatment, 1,000 ppm Ethephon and 1,000 ppm Nia 10637.

No treatment, Hormodin No. 1, Hormodin No. 3, Rootone and 2,500 ppm B-Nine produced the best overall rooting scores in Experiment 3 (Table 6). Rootone and the check scored the highest rooting for azalea cuttings. Hormodin No. 3 was the best root inducing material for camellia cuttings.

Ethephon, Hormodin No. 3 and Rootone No. 10 produced the best root for Shore Juniper in Experiment 4 (Table 7).

Table 4. Rooting Scores of Azalea, Rhododendron hybrida cv. Evensong, Dawn Redwood, Metasequoia glyptostroboides and Shore Juniper, Juniperus conferta Cuttings Treated with Various Growth Regulators, Experiment 1

Treatment	Species			Treatment mean
	Azalea	Dawn Redwood	Shore Juniper	
Check	4.3	1.9	3.7	3.3
Hormodin No. 2	4.6	2.1	3.7	3.5
1,000 ppm Ethephon	3.8	3.2	3.8	3.6
2,500 ppm B-Nine	3.8	2.0	3.4	3.1
1,000 ppm IBA	3.7	1.9	3.3	2.8
50 ppm Bay 102612	2.4	1.7	1.4	1.5
Mean	3.8	2.1	3.2	3.0

Cuttings were rated: 0 = dead, 1 = alive, not rooted or calluses, 2 = callused, 3 = light rooting, 4 = medium rooting, 5 = heavy rooting.

Table 5. Rooting Scores of Azalea, <u>Rhododendron hybrida</u> cv. Evensong Dwarf Burford Holly, <u>Ilex cornuta burfordi</u>, Leatherleaf Mahonia, <u>Mahonia bealei</u> and Shore Juniper, <u>Juniperus conferta</u> Cuttings Treated with Several Growth Regulators, Experiment 2

Treatment	Species				Mean
	Azalea	Holly	Mahonia	Shore Juniper	
Check, none	4.0	4.1	2.7	3.8	3.7
1,000 ppm Ethephon	4.2	3.9	4.0	3.8	4.0
2,500 ppm B-Nine	3.5	4.0	2.2	2.4	3.0
1,000 ppm UNI-F 529	4.0	4.0	3.2	2.6	3.5
40 ppm 2,4 5-TP	4.3	4.2	2.3	2.9	3.4
50 ppm Bay 102612	3.5	4.3	2.7	3.1	3.4
1,000 ppm Nia 10637	3.8	4.2	2.4	3.8	3.6
125 ppm Ancymidol	4.4	3.7	3.2	2.5	3.5
1,000 ppm IBA	4.1	3.3	3.7	2.7	3.5
5,000 ppm IBA	4.1	4.0	3.2	3.3	3.7
Mean	4.0	4.0	3.0	3.1	3.5

Cuttings were rated: 0 = dead, 1 = alive, not rooted or callused, 2 = callused, 3 = light rooting, 4 = medium rooting, 5 = heavy rooting.

Table 6. Rooting Scores of Azalea, <u>Rhododendron hybrida</u> cv. Evensong and Camellia, <u>Camellia japonica</u>. Cuttings treated with Various Commercial and Experimental Root Inducing Substances, Experiment 3

Treatment	Species		Mean
	Azalea	Camellia	
Check	3.7	2.4	3.1
Hormodin No. 1	3.3	2.6	3.0
Hormodin No. 2	2.6	2.4	2.5
Hormodin No. 3	2.9	3.0	3.0
Rainbow Tender	3.0	2.0	2.5
Rainbow Woody	2.8	2.2	2.5
Rootone	3.6	2.2	2.9
Rootone No. 10	3.0	2.2	2.6
5 ppm 2,4 5-TP	2.7	1.8	2.3
40 ppm 2,4 5-TP	2.6	2.0	2.3
1,000 ppm Ethephon	2.7	1.8	2.3
2,500 ppm B-Nine	3.3	2.4	2.9
Mean	3.0	2.3	2.7

Cuttings were rated: 0 = dead, 1 = alive, not rooted or callused, 2 = callused, 3 = light rooting, 4 = medium rooting, 5 = heavy rooting.

The outstanding root inducing properties of Ethephon on most species is the most important finding of this research. Ancymidol, Bay 102612, Nia 10637, 2, 4 5-TP and B-Nine had exceptional root inducing properties on some species. Bay 102612 was inhibitory in some instances. Further testing of all these materials is needed.

Publications: None

5. Comparison of Various Morphactin Sprays and Node Position on Mean Shoot Length of Azalea, cv. 'Kingfisher'

By

Kenneth C. Sanderson and William E. Barrick 1/

Nature of Work

Morphactins constitute a new group of plant growth regulators which influence growth patterns of plants. Concentration determines effect, however morphactins have been reported to dwarf, delay and inducing branching in plants. Six-inch pot size 'Kingfisher' azaleas were sprayed with the morphactins listed in Table 8 on March 23, 1970. The plants were sheared four weeks prior to spraying. Six lateral branches on six plants were selected for data at six node positions (node position 1 was closest to the shearing point and node 6 the furtherest). Data on shoot length was taken May 19, 1970. The plants were grown in a shaded fiberglass greenhouse during the experiment.

Results

Morphactins at the concentrations used in this experiment caused severe distortion of the leaves on azaleas. The distortion was still evident approximately 9 months after treatment. Leaves appeared crinkled and misshapen. New leaves were smaller in size and initially light green in color. The Bayer 102614 had the greatest shoot length (Table 8). Ortho's "Maintain" had the shortest shoots. The Bay 102614 produced longer shoots at node 2 than at node 1 (counting from the shearing point) at both 50 and 100 ppm. However, in most cases, an inverse relationship between node position and shoot length existed. Shoot length decreased with increases in node position. Further research is warranted on the influence of morphactins on shoot development in azaleas.

1/ Associate Professor and former student, respectively, Department of Horticulture, Agr. Expt. Sta., Auburn University.

Table 8. Comparison of Various Morphactin Sprays on Mean Shoot Length (mm) at Various Nodes on Azalea, cv. Kingfisher

Treatment	Node 1	2	3	4	5	6	Mean
Check	34.5	30.7	15.7	2.6	5.6	3.0	15.4
100 ppm Bay 102612 . . .	7.1	6.0	1.3	0.0	0.0	1.1	2.6
100 ppm Bay 102613 . . .	1.1	1.0	0.4	0.7	1.6	1.5	1.0
100 ppm Bay 102614 . . .	28.3	34.7	15.5	6.6	1.9	0.3	14.5
100 ppm Ortho	0.8	0.4	0.1	0.0	0.0	0.0	0.2
50 ppm Bay 102612 . . .	0.9	0.2	0.2	0.3	0.4	0.3	0.4
50 ppm Bay 102613 . . .	2.1	8.1	6.6	3.0	2.7	1.3	4.0
50 ppm Bay 102614 . . .	36.2	44.1	14.1	1.0	1.2	0.2	16.1
50 ppm Ortho	1.0	1.6	.3	0.1	0.0	0.0	0.5
Mean	12.3	13.0	6.0	1.6	1.6	0.8	6.0

Publications: None

6. Effect of Various Growth Regulator Sprays on Shoot Development of Azalea, cv. 'Kingfisher'

By

Kenneth C. Sanderson 1/

Nature of Work

Several growth regulator sprays were evaluated on shoot development of azaleas. Bayer 102613, a morphactin, which had shown retardant and shoot stimulatory properties in tests on chrysanthemum was tested at 10 and 50 ppm. B-Nine, a standard growth retardant was applied at 5,000 ppm. Ethephon, a new growth regulator was sprayed at 2,500 ppm. Ancymidol a new growth retardant was applied to the plants at 6 and 23 ppm. Niagara 10637, was sprayed at 6,000 ppm. Uniroyal's new growth retardant F-529 was used at 2,500 ppm. Liners of the azalea cultivar 'Kingfisher' were sprayed with a mist blower until the leaves glistened. The spray applications were made approximately 4 weeks after the plants had been sheared. Five lateral shoots were measured prior to retardant spraying and then remeasured at the end of the experiment. There were four plants per treatment and two replications. The experiment was conducted in a fiberglass greenhouse with a light intensity of approximately 5,000 ft-c. The retardant sprays were applied on July 31, 1970 and measurements were made on October 7, 1970.

Results

Bay 102612 and Niagara 10637 distorted the leaves of the azaleas. Bay 102613 at 50 ppm yielded the least increase in shoot length (Table 9). Check plants had the greatest mean increase in shoot length (2.11 cm). All retardants except Ancymidol at 6 ppm reduced shoot length.

1/ Associate Professor, Horticulture Department, Agr. Expt. Sta., Auburn University.

Table 9. Comparison of Various Growth Retardant Sprays on Shoot Development of Azalea, cv. 'Kingfisher'

Treatment	Increase in shoot length (cm)
Check	2.11
10 ppm Bayer 102613	1.74
50 ppm Bayer 102613	.54
5,000 ppm B-Nine	1.70
2,500 ppm Ethephol	1.33
6 ppm Ancymidol	2.00
23 ppm Ancymidol	1.84
1,000 ppm Niagara 10637	1.17
6,000 ppm Niagara 10637	1.53
2,500 ppm Uniroyal F 529	1.33

Publications: None

7. Germination of Three Woody Ornamentals in Municipal Compost and Peat Media

By

Kenneth C. Sanderson[1/]

Nature of Work

Municipal compost which had been treated with and without raw sewage prior to 12-16 weeks composting was compared with imported german peat moss as a germination media. Compost consisted of ground paper, metal, plastic and assorted trash of the City of Mobile, Alabama. Compost which did not receive sewage treatment will be referred to as Mobile Aid. Previous work revealed the compost to contain considerable boron and heavy metals, have a high pH which was resistant to change and high soluble salts. Seed of *Catalpa bignonioides*, *Sophora japonica* and *Pinus taeda* were sown in the following media: 1) Sewage Compost, 2) Mobile Aid, 3) Sewage Compost and sand, 4) Mobile Aid and Sand, 5) Peat Moss and Sand, 6) Sewage Compost and Soil, 7) Mobile Aid and Soil, 8) Peat Moss and Soil. Media was steam pasteurized prior to seed sowing. Equal volumes of materials were used in media combination. Ten seeds of each species were sown into the media treatments on April 17, 1968. Treatments were replicated 5 times. Germination was carried out in a greenhouse using mist and a night temperature of 70 F. Weekly records were taken on germination until the termination of the experiment on May 15.

Results

The highest mean germination percentage occurred in sewage compost and soil (59%) and peat and sand (58%), (Table 10). Seeds sown in peat and soil (28%) yielded the poorest germination. *Catalpa bignonioides* germinated best in sewage compost (62%) and poorest in Mobile Aid (48%). *Sophora*

1/ Associate Professor, Department of Horticulture, Agr. Expt. Sta., Auburn University.

japonica yielded the lowest germination in sewage compost (36%) and the highest germination in Mobile Aid and soil (60%) and peat and soil (60%). *Pinus taeda* germinated best in peat and sand (70%). Poor germination occurred with pine seed sown in Mobile Aid (24%) and peat and soil (28%).

Table 10. Influence of Municipal Compost and Peat-Amended Media on the Germination of Three Woody Ornamental Species

	Germination percentage			
	Catalpa bignonioides	Sophora japonica	Pinus taeda	Mean
Sewage compost	62	36	48	49
Mobile Aid	48	44	24	39
Sewage compost and sand	54	50	36	47
Mobile Aid and sand . .	46	44	36	42
Peat and sand	56	48	70	58
Sewage compost and soil	60	56	60	59
Mobile Aid and soil . .	56	60	48	53
Peat and soil	56	60	28	28

Publications: None

8. Evaluation of Several Growth Retardants on Azaleas

By

Kenneth C. Sanderson 1/

Nature of Work

Two experiments were conducted on growth retardants and azaleas during 1970-71. Experiment 1 was established on November 11, 1970 and Experiment 2 was established on August 16, 1971.

In Experiment 1, 4 inch potted liners of the azalea cultivar Evensong were treated on a bright sunny, November 11, 1970 as follows: 1) check, no treatment, 2) 2,500 ppm B-Nine spray, 3) 1,000 ppm Uni-F 529 spray, 4) 3,000 ppm Cycocel spray, 5) 1,250 ppm B-Nine plus 1,500 ppm Cycocel spray, 6) 100 ppm Ancymidol spray, 7) 100 ppm Ancymidol drench, 8) 3,000 ppm Cycocel drench, 9) 1 teaspoon per 6 qt. 10% Phosfon L. drench, 10) 1,000 ppm Ethephon drench. Spray treatments were applied until runoff. Drenches were applied by filling the pot to rim with the retardant solution. Two shoots on each plant were measured prior to treatment and tagged for later measurement.

Kingfisher azaleas, 6 inch potted plants, received the following spray treatments in Experiment 2: 1) check, none, 2) 100 ppm Ancymidol, 3) 200 ppm Ancymidol, 4) 3,000 ppm Cycocel, 5) 1,500 ppm B-Nine, 6) 1,500 ppm Uni-F 529, 7) 750 ppm B-Nine plus 750 ppm Uni-F 529, 8) 200 ppm Nia (Niagra) 10637, 9) 200 ppm Nia 10656, 10) 1,500 ppm Cycocel plus 750 ppm B-Nine, 11) 2.5g/liter Dupont DPX and 12) 1.25g/liter DPX.

Both experiments were conducted in lightly shaded greenhouses. Normal greenhouse culture was used in both experiments.

Results

The Evensong azaleas in Experiment 1 outgrew the treatments before growth could be measured. This cultivar also exhibited a witchesbroom-type

1/ Associate Professor, Dept. of Hort., Agr. Expt. Sta., Auburn Univ.

growth which might be related to nutrition (experiments are being conducted on this problem). The distorted growth made it difficult to assess the treatments. Sprays of Cycocel, A-rest Uni-F 529 and B-Nine plus Cycocel and drenches of Ancymidol were observed to reduce growth more initially than sprays of B-Nine and drenches of Cycocel, Ethephon or Phosfon L.

In Experiment 2, phytotoxicity was observed with Cycocel and DPX. Cycocel caused a severe chlorosis of the leaves when applied alone or in combination with B-Nine. Dupont's DPX caused the new leaves to be rolled upward, off color and severely dwarfed. DPX treated plants had a wilted appearance 4 weeks after treatment. At the rate of 2.5g/liter DPX reduced leaf size an estimated 75 per cent on shoots developing after treatment. DPX treated plants produced shoots approximately half the length of the untreated check plants (Table 12). Differences among most of the retardants were not great. NIA 10637 produced considerable reduction without injury and deserves further study.

Table 11. Mean Shoot Length of Kingfisher Azaleas after Treatment with Various Growth Retardants

Treatments[x/]	Mean shoot length (cm)[y/]
Check	8.5
100 ppm Ancymidol	7.2
200 ppm Ancymidol	7.9
3,000 ppm Cycocel	6.0
1,500 ppm B-Nine	9.0
1,500 ppm Uni-F 529	8.3
750 ppm B-Nine plus 750 ppm Uni-F 529	7.4
200 ppm Nia 10637	6.4
200 ppm Nia 10656	7.0
1,500 ppm Cycocel plus 750 ppm B-Nine	6.3
2.5g/L DPX	4.0
1.25g/L DPX	4.4

x/ Plants sprayed until run-off.

y/ Mean of 25 shoots from 5 plants selected at random from 3 replications.

Publications: None

9. Photoperiodic Effects on Shoot Development in Azaleas

By

Kenneth C. Sanderson[1/]

Nature of Work

Four-inch liners of the azalea cultivar Kingfisher were placed under the following treatments on November 23, 1970: 1) controlled day, 9 hr. of natural light, 2) controlled day plus 15 hr. incandescent light, continuous illumination, 3) controlled day plus 15 hr. of darkness with a light break of 4 hr. in the middle of the dark period, and 4) natural day occurring during November-January in Auburn, Alabama. Two shoots on each plant were sheared to six nodes prior to treatment. There were 4 replications with 4 plants per replication. The plants were grown in peat moss amended with 28 g of limestone and 28 g of gypsum. Fertilization consisted of applications of 25-10-10 at the rate of 908 g per 100 gal. every 2 wk.

Results

Shoot growth was similar to previous research conducted at Auburn by Barrick. Shoot development occurred sooner on the 9 hr. controlled day than on the other photoperiods. Increases in photoperiod increased the length of the shoot. Overwatering and disease terminated this experiment before shoot length could be measured. Shoot number was less on long photoperiods than short photoperiods.

Publications: None

1/ Assoc. Professor, Dept. of Hort., Agr. Expt. Sta., Auburn University.

10. Propagation of Juniper Cuttings in Various Media

By

Kenneth C. Sanderson[1/]

Nature of Work

Cuttings (9 cm long) of Junipers chinensis pfiteriana were propagated in the following steam pasteurized media: 1) imported German peat moss, 2) sand and peat moss, 3) Mobile Aid (a slow composted municipal refuse product of the City of Mobile, Ala.), 4) Alive (a rapidly composted municipal refuse product of the city of Houston, Texas), 5) 1:1:1 soil, peat moss and perlite, 6) vermiculite, 7) calcined clay (turface) and peat moss, 8) sand. Propagation was carried out in a lightly shaded greenhouse under mist. Five cuttings were used per treatment and treatments were replicated 5 times. Cuttings were treated and stuck on June 23, 1970 and root scores obtained 8 weeks later as follows: 0 = dead, 1 = alive, not callused or rooted, 2 = callused, 3 = light rooting, 4 = medium rooting, 5 = heavy rooting.

Results

Cuttings rooted in vermiculite averaged the highest rooting score (3.8), however, Mobile Aid yielded a comparable result (3.7). Poorest rooting occurred in imported German peat moss (2.1). Mean rooting scores for the remaining media were: sand and peat (3.5), Alive compost (3.2), 1:1:1 soil, peat and perlite (3.4), calcined clay and peat (2.8) and sand (2.6). Water relations nutrition, pH or other factors probably were responsible for the results obtained.

Publications: None.

FACTORS AFFECTING UTILIZATION AND EXPANSION POTENTIAL FOR ORNAMENTAL PLANTS AND TURF

Fred B. Perry, Jr., and Henry P. Orr1
Department of Horticulture
Auburn University Agricultural Experiment Station
Auburn, Alabama

Nature of Work: This work was designed to characterize major final consumers of ornamental plants and turf and to analyze the regulations of the various levels of government controlling plant use. Attempts will be made to project future changes in production, marketing and merchandising procedures.

Information was collected from 104 single unit owner occupied homes and 26 multi-unit apartment complexes in Alabama. The sample was drawn from the Standard Metropolitan Statistical Areas (SMSA) of Montgomery, Birmingham, Gadsden, Huntsville, Mobile, Tuscaloosa, and the Alabama part of Columbus, Georgia market area, as based on the 1970 census.

Information on kinds and amounts of plants purchases, family income, education and interest in the use of plants was tabulated and will be combined with that from eight other states of the Southern Region.

Results: The total ornamental purchases (plants for outdoor use) in the Alabama SMSA's in 1971 was $4 million by single unit home owners alone. Approximately 68% of purchases were from nurseries and garden centers, 26% from chain stores, 2% from mail order, 1% from florists, and 3% from all other sources.

The amount of plant purchases according to education, income and home value are shown in Table 1. Heads of families with less than a high school education generally fell into the lower income group and lived in homes of less than $25,000.

1/ Associate Professor and Professor: Respectively, Department of Horticulture, Auburn University Agricultural Experiment Station, Auburn, Alabama.

People with at least a high school education earning over $10,000 per year and living in middle average homes of $25,000 value or more, account for the greatest portion of the plant purchasing public.

Table 1. Amount of purchases in relation to education, income and home value

Education	Income	Value of home	Average amt. of purchase
12 yr. & under	$10,000 & less	under $25,000	$40.00
over 12 yr.	over $10,000	$25,000 & over	$228.00

Very little advantage is being taken of the opportunity to reach the plant buying public through radio and TV. When asked to evaluate the importance of source of information for the best selection of plants and their proper use and culture in the landscape it was found that the homeowner's own experience was primary. In the order of decreasing importance as plant information sources were: nurseryman, garden magazines, neighbors, garden books, newspapers, and lastly county agricultural agents. Very few products were constantly in view to the public as are ornamental plants. There is probably no period in time when there has been a greater awareness of our ecological surroundings. This emphasis on our environment offers an unequalled opportunity to the plant industry to further educate the public and to inform them on the materials and methods available to them for improvement of their outdoor environment.