trolling infection also tended to injure petals on the oldest open florets because treated flowers were bagged immediately. However, florets cut in tight bud, as practiced commercially, were not injured.

Discussions and Conclusions

Sublimation of Termil at 2 grams or of TBZ at 4 grams per 1000 cubic feet protected gladiolus flowers from *B. cinerea* as well as or better than captan or Botran sprays. The data indicate that Termil and TBZ dusts were similar in effectiveness where twice as much TBZ as Termil was sublimed. Daconil 2787 spray protected flowers better than captan and in two experiments Daconil was better than TBZ thermal dust at 4 grams per 1000 cubic feet. Daconil spray was inferior to Termil dust at 1 or 2 grams in two other experiments.

Tutane was superior to TBZ dust, captan, Botran, and Daconil, and in one test significantly better than Termil. Tutane and the sublimed chemicals were superior to the fungicidal sprays also in that the petals were not disfigured by visible residues. The results obtained for the control of *B. cinerea* disease on gladiolus petals parallel those obtained on chrysanthemums, carnations, roses, snapdragons, and orchid flowers (7).

The results obtained with Termil in plantings under saran cloth suggest the possibility of improving disease control in dense plantings of bedded crops that are difficult to protect with sprays, especially on the underside of leaves. In addition, less labor would be required to apply the thermal dust than for sprays, rapid coverage at critical periods for protection would be possible, and the light weight equipment would not tend to pack the soil.

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CHARACTERISTICS OF RETAIL OUTLETS SELLING NURSERY PRODUCTS IN FLORIDA

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Abstract

As the second phase of activity in the Southern Regional Project on Marketing Woody Ornamentals (SM-33), researchers in Florida and seven other cooperating states studied the characteristics of retail nurserymen. The operations investigated were those which purchased for resale most of the nursery products marketed. Preliminary results of the Florida phase of the study are reported here.

Sixty-three firms were surveyed—31 sales yards, 18 landscape nurseries and 14 garden centers. These retail nurseries had average gross annual sales of $43,000, $75,000 and $255,000, respectively, with woody ornamental plants accounting for 52, 54 and 7 percent of their total revenue. Factors affecting decisions by retail nurserymen to purchase nursery stock, methods of purchase, advertising and promotion practices and other characteristics of the industry investigated are also presented.

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INTRODUCTION

The Florida nursery industry in all its facets is a large and complex entity. It was estimated that commercial wholesale nurseries producing woody ornamentals in Florida numbered 552 in 1965. They utilized more than 14,000 acres of land to produce their output and had sales of some $17 million (2).

Some 44 percent of the sales of wholesale producing nurseries in Florida in 1965 were made to individual consumers (1). Local wholesalers, retailers and landscape contractors purchased 4, 12 and 15 percent, respectively, of the output of nursery producers; much of this nursery stock found its way into the retail business operations analyzed here. An additional 19 percent was sold to buyers in cities more than 25 miles distant. It is expected that most of this stock was bought by various types of retail nurserymen for resale.

Purpose.—The purpose of this report is to analyze the marketing operations of various types of retail dealers who sell woody ornamentals and determine industry operational characteristics—business size, type organization, factors which affect their decisions to purchase nursery stock and others.

Research Procedure.—Because of the lack of information on characteristics of the population of firms involved in retail marketing of nursery products, a decision was made by the SM-33 Technical Committee to generate data on the characteristics of the actual business firms studied. These retail firms were classified in three primary types: sales yards, landscape nurserymen and garden centers. No attempt was made to estimate the overall size of the retail nursery business.

Researchers in seven other Southern States cooperated in this study, utilizing similar schedules for data collection. In each cooperating state a list of retail nurserymen was developed in 1968 through correspondence with operators believed to meet criteria for inclusion in the study. Data are reported only for retail nursery firms which had sales of woody ornamentals of $3,500 or more and which purchased for resale 65 percent or more of the woody ornamentals they marketed. Mass market stores were not included in the group from which data were collected.

Following data collection by personal interview, tabulations were made and average relationships computed.[1] Currently a regional research report for all eight cooperating states is being prepared. Preliminary results of the research done in Florida are reported here.

RETAIL NURSERY CHARACTERISTICS

Of the 63 retail nursery firms in Florida from which data were collected, the most numerous were sales yards—retail nurseries primarily engaged in the sale of nursery stock to retail customers. Landscape nurseries supplying the services of planning and planting as well as the sale of plants were the second most numerous category. Despite a high volume of sales, a smaller proportion of the marketings of garden centers, which carry a complex mix of home garden supplies, consisted of nursery stock than that of the other two types.

Type Ownership.—Of the 63 retail nursery businesses on which data were collected, 31 were proprietorships, 26 were corporations and 6 were partnerships (Table 1). The proprietorship was the most prevalent form of business organization for sales yards. On the other hand, over half the garden centers and landscape nurseries contacted had a corporate form of organization. In all groups average sales of firms with the corporate form of organization were in excess of those organized as proprietorships and partnerships.

[1]A total of 80 firms classified as retail nurseries were visited but usable schedules were acquired from only 63. Some nursery operators interviewed did not respond to all questions.

Table 1.--Retail nurseries interviewed in Florida classified by major source of income and type of business organization, 1968

	Firms Interviewed	Average Sales
	Number	Dollars
Sales yard		
Proprietorship	18	31,115
Partnership	5	58,122
Corporation	8	60,088
All firms	31	42,947
Landscape nursery		
Proprietorship[a]	8	35,250
Corporation	10	104,014
All firms	18	75,119
Garden center		
Proprietorship	6	114,500
Corporation	8	361,000
All firms	14	255,357

[a]Includes one partnership

Table 2.--Average number of years retail nurserymen interviewed in Florida had been in the nursery business, 1967

Type business	Retail business	Any aspect
	Years	Years
Sales yard	13.2	14.7
Landscape nursery	10.2	12.7
Garden center	8.2	12.4
All firms	11.4	13.8

Time in Business.—The average retail nursery firm in Florida reported having been in business for more than 11 years (Table 2). It had been in some other aspect of the nursery business for an additional two years. The business life span of sales yards was higher than that of landscape nurseries and garden centers.

Composition of Sales

Plant sales (including labor and other landscape services) accounted for slightly more than a third of the dollar receipts reported by the retail nurserymen interviewed (Table 3). Plant sales made up 70, 62 and 14 percent, respectively, of the dollar volume of sales yards, landscape nurseries and garden centers.

Twenty-seven percent of the overall receipts of the 63 reporting firms were generated by marketings of woody ornamental nursery stock. Although woody ornamentals accounted for 54 percent of the sales volume of landscape nurseries and 52 percent of that of sales yards, they accounted for only 7 percent of the marketings of garden centers. Nearly half the value of billings of landscape nurseries consisted of landscape plantings. Such plants, with their accompanying landscape services, accounted for only 9 percent of the sales of retail nursery sales yards. Woody ornamentals sold at the place of

Table 3.--Average value of plant and non-plant sales per firm reported by retail nurserymen in Florida interviewed, 1967

Data from 63 reporting firms[a]

Item	Value of Sales							
	Sales yard	Landscape nursery	Garden center	All firms	Sales yard	Landscape nursery	Garden center	All firms
	Dollars				Percent			
Plant Sales								
Woody Ornamentals:								
At place of business	18,356	5,096	12,011	13,158	42.7	6.8	4.7	13.2
As landscape plants[b]	3,958	35,261	5,598	13,266	9.2	46.9	2.2	13.4
Subtotal	22,314	40,357	17,609	26,424	51.9	53.7	6.9	26.6
Bedding and vegetable plants	2,802	423	7,110	3,079	6.5	.6	2.9	3.1
Seeds and bulbs	1,161	261	6,355	2,058	2.8	.3	2.5	2.1
Foliage and potted plants	2,512	453	3,362	2,112	5.8	.6	1.3	2.1
Other plants	1,488	4,877	2,048	2,581	3.5	6.5	.9	2.6
Total plant items	30,277	46,370	36,484	36,254	70.5	61.7	14.3	36.5
Non-Plant Sales								
Fertilizers and soil conditioners	5,594	6,045	59,267	17,650	13.0	8.1	23.2	17.8
Pesticides	2,930	3,686	29,619	9,077	6.8	4.9	11.6	9.1
Tools and hardware	1,473	1,501	6,691	2,220	1.5	2.0	2.6	2.2
Other non-plant items	3,529	17,517	123,296	34,140	8.2	23.3	48.3	34.4
Total non-plant sales	12,671	28,749	218,873	63,087	29.5	38.3	85.7	63.5
All Sales	42,948	75,119	255,357	99,341	100.0	100.0	100.0	100.0

[a] Includes data from 31 sales yards, 18 landscape nursery firms and 14 garden centers.

[b] Includes labor and other services.

Table 4.--Estimated average number of suppliers of woody ornamentals from which retail nurserymen in Florida made purchases in 1962 and 1967 and proportion of woody ornamental purchases made from three major suppliers, 1967

Type nursery	Suppliers		Purchases from three major suppliers
	1962	1967	1967
	No.	No.	Percent
Sales yard	9.8	11.1	63.9
Landscape nursery	8.6	14.6	69.1
Garden center	4.5	8.6	70.3
All firms	7.2	11.5	66.4

business were the source of 43 percent of the value of all marketings by sales yards.

Non-plant items made up 86 percent of the sales of garden centers and nearly 40 percent of retail landscape nursery dollar volume. Of specified groups of non-plant items, each type firm had major sales in the following order: (1) fertilizers and soil conditioners; (2) pesticides, insecticides and herbicides; and (3) tools and hardware.

Sales per Firm.—Garden centers, each averaging sales of more than a quarter million dollars, had cash receipts per firm much in excess of the other two groups. Average receipts of landsape firms were $75,000 and those of sales yards were $43,000.

The $40,000 received from woody *ornamentals* handled by the average landscape nursery exceeded the $22,000 by sales yards and the $18,000 by garden centers. The average value of non-plant sales made by garden centers was nearly $220,000. This compared with similar values of $29,000 in landscape nurseries and $13,000 in sales yards.

Woody Ornamental Purchasing Practices

Number of Suppliers.—The average number of firms from which cooperating retail nursery firms made purchases increased from 7.2 to 11.5 in the five years from 1962 to 1967 (Table 4). The average for landscape firms increased from 8.6 to 14.6. Garden centers patronized fewer wholesale nursery suppliers than the other two types of firms.

Despite an increase in number of suppliers, retail nurseries made two-thirds of their purchases of woody ornamentals in 1967 from three major wholesale nurseries. The proportion of such purchases made from the three leading suppliers varied from 64 percent for sales yards to 70 percent for garden centers.

Plant Buying Practices.—Most retail nurserymen tended to classify previous sales and avail-

Table 5.--Methods of negotiating purchase of woody ornamental plants for resale reported by retail nurserymen in Florida, 1968

Method of purchase	Average value of purchases per nursery							
	Sales yard	Landscape nursery	Garden center	All firms	Sales yard	Landscape nursery	Garden center	All firms
	Dollars				Percent			
Telephone from retailer to supplier	3,299	9,412	2,436	4,854	30.3	52.7	23.6	38.0
Buying trip to supplier's nursery	3,485	4,954	2,494	3,685	32.0	27.7	24.1	28.9
Salesman calling on retailer	2,186	1,902	2,583	2,193	20.1	10.7	25.0	17.2
Mail order	1,064	25	191	573	9.8	0.1	1.8	4.5
Trucker	356	867	668	571	3.3	4.9	6.5	4.5
Telephone from supplier to retailer	418	633	744	552	3.8	3.5	7.2	4.3
Standing order	7		673	153	a	0	6.5	1.2
Conventions and meetings	8	64	544	143	a	.4	5.3	1.1
Other	70			34	.7	0	0	.3
Total	10,893	17,857	10,353	12,758	100.0	100.0	100.0	100.0

[a]Less than 0.1 percent.

Table 6.--Number of retail nursery firms reporting various types of advertising and promotion expenditures and average expenditures per firm for advertising and promotion in various media by firms interviewed in Florida, 1967

Media	Firms reporting				Avg. expend. for all firms reporting any advertising[a]				Avg. expend. for those firms utilizing specific media			
	Sales yard	Landscape nursery	Garden center	All firms	Sales yard	Landscape nursery	Garden center	All firms	Sales yard	Landscape nursery	Garden center	All firms
	No.				Dollars				Dollars			
Newspaper	19	7	14	40	873	181	1,981	891	1,333	439	1,981	1,403
Yellow pages of telephone directory	22	15	12	49	244	498	459	349	322	564	535	449
Radio	10	5	5	20	212	80	361	199	614	273	1,010	628
Garden clubs, flower shows, etc.	7	3	6	16	62	22	89	54	258	125	208	54
Direct mail	1	6	5	12	10	49	55	30	c	138	155	158
Trade shows, etc.	3	2	1	6	26	3	36	21	250	28	c	22
Trade magazines	2	3	1	6	6	21	36	16	80	120	c	16
Television	3	0	-	3	35	-	-	16	341	-	-	341
Other	10	4	8	22	78	46	873	242	226	198	1,528	942
Total firms advertising	29	17	14	60	1,546	900	3,890	1,818	-	-	-	-
Total firms not advertising	2	1	0	3	-	-	-	-	-	-	-	-
All firms	31	18	14	63	-	-	-	-	-	-	-	-

[a]Total expenditures divided by all firms advertising, whether or not media were used.

[b]Total expenditures divided by number of firms advertising in specific media.

[c]Not shown to avoid disclosure for individual firm.

ability of plants as "very important" reasons in their decisions to buy plants. Expected sales and landscape contracts also ranked high.

The nurserymen interviewed, shown a list of practices related to plant buying, were asked to rate them as "very important," "important" or "not important." Reasons in which 40 percent or more of the responses fell in the "not important" class were the following: (1) availability of capital or credit policy of supplier; (2) advice of suppliers; (3) new introductions; and (4) transportation.

The retail nurserymen contacted were also given a list of possible reasons denoting why they had chosen their present suppliers; they were asked to indicate whether each reason was "very important," "important" or "not important." Quality ranked first, with 92 percent of all firms classifying it as "very important." Reporting nurseries had a total of more than 70 percent "very important" and "important" responses for the following reasons: (1) friendship and respect of supplier; (2) price; (3) availability of large assortment of plants; and (4) delivers promptly.

The retailers responding tended to classify the following items in the "not important" category: (1) credit beyond 30 days; (2) provides assistance in resale; (3) persistence of suppliers' salesmen; (4) issues catalog; (5) gives information on care and/or use of plants; (6) carries unusual plants; and (7) quantity discount.

Methods of Negotiating Purchases

More nursery stock was reported as purchased from suppliers through telephone calls made to wholesale nurserymen by retailers than by any other method (Table 5). More than half the purchases of landscape nurseries, nearly a third of those by sales yards and almost a fourth of the ones by garden centers were negotiated through telephone calls placed by the purchaser. Buying trips to suppliers' nurseries were also important means of making purchases. Reporting firms in the various groups arranged from a fourth to a third of their purchases by this method.

Salesmen calling on retail nurseries accounted for between 11 and 25 percent of the purchases by the three groups of retail nursery operators.

Advertising and Promotion

On the average, sales yards reported expenditure of nearly 4 percent of their gross receipts on advertising and promotion. Landscape nurseries spent over 1 percent and garden centers less than 2 percent of their total revenue for this purpose. The number of firms reporting various types of advertising and promotion expenditures, along with average expenditures for all firms and also for those firms reporting specific items, is noted in Table 6.

On the average, sales yards and garden centers spent more money on newspaper advertising than on any other media. The yellow pages of the telephone directory was the primary advertising medium of landscape nurserymen. Radio was also an important medium.

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ROOTING RESPONSE OF FOUR ORNAMENTAL SPECIES PROPAGATED IN VARIOUS MEDIA

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ABSTRACT

The objective of this investigation was to determine rooting responses and growth of *Philodendron oxycardium*, *Scindapsus aureus*, *Rhododendron indicum* and *Gardenia jasminoides* cuttings rooted in German peat, calcined clay, BR-8 blocks and composted municipal refuse, and to determine their growth after potting.

Cuttings rooted in peat and calcined clay generally were larger with better root systems than cuttings placed in the other two media and grew at a faster rate after potting.

INTRODUCTION

Selection of the correct propagation medium for use in plant production is a problem constantly confronting the grower. The fact that there are many kinds of propagating materials that may produce satisfactory results for many plants gives the grower a wide variety of choices. When mixtures of these propagating materials are used, the variety of choice is innumerable. Reisch (6) and Vermeulen (8) present interesting and informative reviews of rooting media.

Peat and perlite are often used in rooting response tests, as well as vermiculite, sand, calcined clay, wood shavings, bark and soil (1, 2, 3, 4, 5, 7, 9). More recent products that might be used as rooting media are BR-8 blocks and composted municipal refuse. BR-8 blocks are made from wood fibers and acrylonitrile and allow easy handling of rooted cuttings. Composted municipal refuse is a highly organic medium with small quantities of macro as well as micro elements. (Thornton Laboratories, Inc., Tampa, unpublished data).

The purpose of this paper is to present rooting responses obtained from cuttings of various ornamental species grown in German peat, calcined clay, BR-8 blocks and "Alive," a composted municipal refuse and growth after potting.

MATERIALS AND METHODS

Three experiments were initiated May 6, 1969, in a glass house with 50% shade when single node cuttings of *P. oxycardium* (Cordatum), *S. aureus* (Golden Potos) and tip cuttings of *R. indicum* 'Gerbian White' (Azalea) were placed in four propagating media: (1) "Alive," (2) BR-8 blocks, No. 1001, (3) calcined clay and (4) German peat. May 13, 1969, *G. jasminoides* 'Veitchii' tip cuttings were placed in the four media. June 23, 1969, another group of gardenias were placed in the four media.

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