

Control. The efficacy of 3 fungicides against the disease was investigated. Six plants each were sprayed 1 day before inoculation with Terraclor (1.198 g/liter), Benlate (0.599 g/liter), and captan (2.396 g/liter). An additional 6 plants each were treated 1 day after inoculation. For control, 6 unsprayed plants were inoculated and 6 unsprayed plants were not inoculated.

Results and Discussion

Of the 4 inoculation techniques, only 2 were successful. Only those in which cultures of the fungus grown on PDA were used resulted in disease development. The "detached leaf" technique was chosen for all subsequent tests because the resulting symptoms most closely resembled those of naturally infected plants (Fig. 1). On the leaves, the organism caused a soft brown decay often covered with white mycelium. As the disease progressed, the stem became hollowed, the plants often

collapsed, and black sclerotia formed within the stem.

Pathogen specificity. Neither the *Gymura* nor the tomato isolate was host-specific. Both isolates infected both host genera with identical disease symptoms resulting.

Control. All 3 fungicides gave excellent control when they were applied 1 day after inoculation, but only Benlate was effective when applied before inoculation (Table 1). All inoculated controls died, whereas all non-inoculated plants remained healthy. Unfortunately, pathogenicity of the fungus was lost before the control experiments could be repeated. Considering the pathogenicity and wide host range of the fungus, however, it is likely that additional outbreaks of Sclerotinia blight of *Gymura* will occur.

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COMPARATIVE CENSUS DATA ON THE FLOWER AND NURSERY INDUSTRY

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Abstract. A special census of the flower and nursery industry, with data on specific flower and nursery crops collected by the Bureau of the Census in 1970, was recently released. About 10 percent of the value of all U.S. cut flower production was accounted for by Florida; this compared with about 30 percent in California. The special census attributed 5 percent of the 1970 national value of nursery crops to Florida. A comparison of the data for Florida on the flower and nursery industry reported in the 1969 regular Census of Agriculture and those in the 1970 Special Census showed substantial differences. Data on rising nursery acreage reported by plant inspectors of the Florida Department of Agriculture are at variance with reduced acreages reported from 1964 to 1969 by the Census of Agri-

culture. Other evidence would indicate an increase in the value of nursery product sales from 1964 to 1969 rather than the some \$4 million reduction reported in census statistics.

Despite the billion dollar importance in the United States and its size of more than \$100 million in Florida, statistical data on the flower, nursery, bulb and allied industries are more sparse than those for most sectors of agriculture. A series of data on annual production, sales, prices and other economic attributes exists for most agriculture commodities. In the case of the flower and nursery industries the five-year censuses of agriculture report the number of growers, the acreage and square feet of greenhouse area in production and the value of sales for all commodities in a class; i.e., flowers and flowering plants, nursery products, bulbs, etc. No data relate to the numerous individual commodities which comprise this complex group of crops.

Each ten years since 1949 the Bureau of the Census has also conducted a special census enumeration pertaining to specific flower and nursery

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products. These data, traditionally collected by mail questionnaire, provide information on the number of producers, number of units produced and value of sales of specific flower, nursery and bulb items. One of the apparent shortcomings of the special census, as also may have been the case with the 1969 regular census which was conducted by mail, is that information on some growers may not be included in the enumerated data. It is likely that follow-ups are more complete for certain other segments of agriculture than for the flower and nursery industry. For example, many nurseries are located in metropolitan areas and occupy very small acreages in comparison with other crops. Some inconsistencies between census and Florida Department of Agriculture and Consumer Services (FDACS) data are also delineated.

In 1957 the Crop Reporting Board of the U.S. Department of Agriculture initiated estimates of the annual production and prices of five major cut flowers—carnations, pompon chrysanthemums, standard chrysanthemums, gladiolus and roses. Initially begun in five states, in 1966 these estimates were expanded to 23 states, which accounted for some 95 percent or more of the national production of major cut flowers. Tropical foliage plants were added to the list of commodities included in 1967.

A similar survey relating to annual production and sales of major nursery products was initiated in the late 1950s. However, it failed to meet with a favorable reception and was discontinued after several years.

Objectives

The purpose of this paper is threefold: (1) to present a summary of the major findings of the 1970 Special Census of Horticultural Specialties; (2) to compare data on the nursery industry reported in the two enumerations, that by the regular census done in 1969 and the special census in 1970; and (3) to analyze the trends in regular census nursery industry data and to ascertain possible reasons for the approximately \$4 million decline from 1964 to 1969 in nursery products reported by the census when the Florida Department of Agriculture showed increases in acreage and other indicators would note an increased demand for nursery products.

1970 Special Census Findings

The number of growers of all types of horticultural specialty products in the United States de-

clined from some 18,000 in 1959 to fewer than 12,000 in 1970. The same trend held for each type of product. In each of the years California led with the largest number of producers of all products and was followed by Pennsylvania, Ohio, New York and Florida. Florida, with 812 producers in 1970, reported some 342 below the 1959 number.

Sales of all flower, nursery, bulb and related products in the United States were \$961 million in 1970 (Table 1). Only 2 percent of marketings was made by those firms with sales of \$10,000 or less. The similar percentage for Florida in 1970 was 1 percent. The \$420 million in California sales compared with \$102 million in Pennsylvania and \$88 million in Florida.

In 1970, as in earlier enumerations, cultivated mushrooms were included in the special census figures. With the \$95 million in mushrooms sales in 1970 subtracted from the U.S. all products total of \$961 million, the figure for flower, nursery, bulb and allied products was \$856 million. When only flower, nursery and related products are considered, Florida was in second place and Pennsylvania in fourth, with a value of flower, nursery and bulb sales of \$44 million.

According to the special census, Florida had more than 10,000 persons employed in the growing of flowers, nursery products, bulbs and related items in 1970. These were 135 fewer persons than in 1959.

It is of interest to note that over half of all sales throughout the United States were made by those firms with sales of \$250,000 and over. Florida and California both reported that almost two-thirds of all marketings were made by those firms which had \$250,000 more in sales. In each of the major states and in the U.S. as a whole, the proportion of sales made by firms with sales of \$250,000 and more was substantially larger in 1970 than in 1959.

More than 273,000 square feet—6,300 acres—

Table 1. Sales of flower, nursery and related products in five major States, 1959 and 1970.²

State	All establishments		Establishments with sales of \$10,000 or more	
	1970	1959	1970	1959
California	240	89	230	85
Pennsylvania	102	55	100	51
Florida	88	48	87	45
Ohio	68	49	67	27
Illinois	37	29	36	27
U.S. total	961	585	939	542

²Includes 1970 sales of cultivated mushrooms as follows, in millions: California--\$12; Pennsylvania--\$8; Ohio--\$2; Illinois--\$4, and U.S.--\$95. The same data pertain to firms with sales of \$10,000 or more.

Table 2. Value of land, structures and equipment and land area covered in greenhouses (glass and glass substitutes), five leading States involved in the production of flowers, nursery products, bulbs and related crops, 1970.

State	Value of land, structures and equipment		Greenhouses (glass and glass substitutes)	
	Total	Avg. per establ.	Total	Avg. per establ.
	\$1,000		\$1,000	sq. ft.
California	269,536	67	71,357	80
Pennsylvania	127,793	100	16,451	23
New York	91,314	104	13,285	18
Ohio	87,922	94	29,258	38
Florida	84,345	104	13,962	45
U.S. total	1,280,965	99	273,130	32

Source: [3].

of the nation were covered with greenhouses. The average square footage per establishment was 32,000 in the U.S. as a whole compared with 80,000 in California and 45,000 in Florida. Average greenhouse area of establishments in New York and Pennsylvania was between 18,000 and 23,000 square feet.

The value of land, structure and equipment in 1970 totaled more than \$1.281 billion in the United States (Table 2). This value in Florida was nearly \$85 million with an average of some \$104,000 per establishment.

The value of production in the United States, in the leading State and in Florida for each major group or sub-group of flowers, nursery products,

bulbs, flower seeds and other horticultural products is shown in Table 3. Space precludes the presentation of data on individual species.

Comparative Nursery Census Data

Considerable discrepancies in nursery products data were noted when comparing results from the 1969 regular Census of Agriculture and the 1970 Special Census. In order to be included in the special census, growers had to have minimum sales of \$2000; this compared with \$2500 in the regular census. Thus, other than for a year of additional growth or change, it would be expected that nursery products data would be reasonable similar.

Sales of nursery stock reported for 1969 versus 1970 were examined in 10 major Florida counties which are leaders in nursery production (Table 4). Of these 10, only one county had sales levels in the two enumerations which were very close together. In five of the 10 major counties in Florida the sales reported by the special census enumeration in 1970 were higher than those in the 1969 census.¹ Yet,

¹From 1969 to 1970 wholesale prices of all farm products increased 3% at the wholesale level.

Table 3. Sales value of selected flowering and foliage plants, bedding plants, cut flowers and cultivated florists' greens, Florida and other leading States, 1970.

Product	Value of U.S. production 1,000 dollars	Production in leading State			Production in Florida		
		State	Value 1,000 dollars	Proportion of U.S. Percent	Value 1,000 dollars	Ranking No.	Proportion of U.S. Percent
1. Flowering and foliage plants, bedding plants, cut flowers, and cultivated florists' greens	484,670	California	107,458	22.2	65,104	2	13.4
a. Unfinished stock--unpotted plants, rooted cuttings, etc. for growing on	36,873	California	10,471	28.4	5,552	2	23.2
b. Unfinished stock--bedding plants	44,824	California	6,130	13.7	611	19	1.3
c. Finished potted plants--flowering plants	125,826	California	15,256	12.1	7,375	5	5.9
d. Finished potted plants--foliage or green plants	38,376	Florida	16,786	43.7	16,786	1	43.7
e. Finished cut crops--cut flowers	222,944	California	69,470	30.2	24,674	2	10.8
f. Finished cut crops--cut cultivated green	8,827	Florida	7,106	80.5	7,106	1	80.5
2. All nursery products	283,636	California	69,854	24.7	14,252	2	5.0
a. Lining out stock	12,960	California	1,877	14.4	1,480	2	11.4
b. Ornamental plants	232,584	California	54,586	23.4	10,865	3	4.7
c. Deciduous fruits and nut trees and grape vines	25,631	California	7,239	28.2	182	18	0.7
d. Citrus and subtropical fruits	6,320	California	4,010	63.4	1,646	2	26.0
e. Small fruit plants	6,143	California	2,135	34.8	79	12	1.2
3. Bulbs	10,375	California	2,320	22.3	716	5	6.9
4. Flower seeds	1,645	California	1,493	90.8	--	--	--
5. Vegetables grown under glass, cultivated mushrooms, vegetable seeds or plants and sod	180,592	Pennsylvania	59,475	32.9	7,832	5	4.3
Total	960,918	California	203,682	21.2	87,904	3	9.1

Source: [3].

Table 4. Comparison of a regular census (1969) and special census (1970) data on nursery sales, number of nurserymen and area in nurseries, 10 major Florida counties.

County	Sales		Growers		Area in production	
	1969	1970	1969	1970	1969	1970
	-\$1,000		No.		-Acres	
Baker	1,077	552	8	3	995	650
Broward	1,605	2,054	32	22	306	405
Bade	3,231	2,347	68	44	785	392
Hillsborough	873	1,060	38	19	166	149
Jefferson	417	429	4	4	267	285
Manatee	z	859	16	10	196	625
Orange	609	719	28	14	446	316
Palm Beach	2,115	1,436	32	17	564	182
Pinellas	750	415	19	12	172	80
Polk	1,139	1,343	26	15	285	174
Florida total	17,483	14,252	483	265	5,878	4,180

^zNo data reported.

Source: [2,3].

even in these counties, the numbers of growers reported in 1970 were lower than those in the earlier year. In only one of the 10 major counties in Florida was the same number of growers reported; it is well possible that the difference between 1969 and 1970 sales levels in that county could well have been due to chance. Overall, sales of all nursery stock reported in Florida by the regular census in 1969 were more than \$3.2 million higher than the 1970 Special Census data.

With the exception of Broward, Jefferson and Manatee Counties, the acreage reported by the special census was lower for each county than was reported in the regular census enumeration.

These data raise a large number of questions as to the accuracy of the data with respect to the nursery (and other components of horticultural specialty enterprises) in Florida. For some reason many operators were either not included on the list of operators to whom schedules were sent, failed to return the questionnaires sent to them, underreported the true value of their sales or else other factors were involved in the non-response.

Trends vs. Recent Low Nursery Figures

Despite substantial increases shown in the regular census reports for the nursery industry in other states, it was stated previously that a some \$4 million decrease in Florida was recorded from 1964 to 1969. The evidence at hand casts doubt upon the validity of these figures. Florida, with a larger rise in population than other major states as well as increases in houses, apartments and other structures and also in nursery acreage (according to the Division of Plant Industry [DPI] of the FDACS), would appear to have a growing nursery industry rather than a declining one.

When the 1969 Census of Agriculture reported sales of nursery stock in Florida amounting to only \$17.5 million, many persons, including the author,

were surprised. On the same basis of comparison, i.e., the inclusion of farms with sales of \$2500 or more, this compared with a census figure of \$20.8 million in 1964. It also compares with sales for all nurseries enumerated (i.e., also including those with sales of less than \$2500) of \$25.1 million in 1964.

Since 1958-59, when the DPI reported 8,800 acres in nursery stock, the trend in nursery area, as recorded in its reports, has been upward. For example, the 12,800 acres in non-citrus nurseries in 1968-69 were 28 percent larger than the 10,000 acres in 1963-64. This is certainly contrary to the census' reduction from 1964 to 1969 in acreage (and also in the value) of nursery stock sold in Florida.

It is hypothesized that many nursery operators in Florida who met the criteria for inclusion in the 1969 census enumeration were omitted. A survey of marketing practices in the nursery industry in Pinellas County in 1959 showed estimates of grower sales some 35 percent higher than the 1959 published census figure.

Of the 36 States with nursery stock sales valued at \$1 million or more in 1969, declines were registered in seven. The States showing declines and those with increases of 50 percent or more are denoted in Table 5.

In the fine print at the beginning of its report the Bureau of the Census notes that its data constitute a less than complete enumeration. There are many reasons for this: untrained enumerators, lack of follow-up of non-respondents, incomplete lists (used in mail enumeration), non-cooperation of respondents, underreporting by respondents and others (2). Many small units may be omitted in the nursery and certain other specialized industries with a high value of output per unit of land. For instance, some half acre container nurseries most probably have gross returns in excess of \$2500 and definitely should be included in census enumerations.

An examination of nursery industry statistics

Table 5. Decreases and increases in nursery products sales from 1964 to 1969 in those States with \$1 million or more in nursery products sales in 1969.²

Decreases		Increases	
State	Percent	State	Percent
Arizona	-44.6	Iowa	78.1
Kansas	-16.1	Mississippi	76.9
Florida	-15.8	Washington	75.1
Texas	- 6.6	Connecticut	64.7
Indiana	- 3.6	Ohio	64.7
Delaware	- 2.4	Oregon	53.6
Alabama	- 1.4	Minnesota	53.2

²Includes all States with decreases and only those States with increases of 50 percent or more.

Source: [3].

in Broward County provides an example of variations in Census and DPI data. With estimated sales of \$10,000 per acre² from the 757 acres in nursery stock reported by DPI, cash receipts from marketings would have been some \$7,500,000 in 1969. The Census reported \$1,735,000 in 1964 sales from 435 acres. It is obvious that there is a problem which merits corrective action. A portion of it may well be due to underreporting or failure to report on the part of nurserymen.

Of the 757 acres in non-citrus nurseries in Broward County in 1968-69, 713 acres were in nurseries of a half acre or larger in size. The 80 operators with a half acre or more in nurseries accounted for only a third of the total number. The 1969 census recorded data from only 32 operators.

The results of an analysis of comparative data on nursery acreage in Florida are shown in Fig. 1. The DPI data show increases from 1959 to 1965 and then a slight decline to 1969. However, the acreage reported for non-citrus nurseries tended to follow an upward trend.

The census nursery acreage data for 1959, 1964 and 1969 are also plotted on the chart. Rises, following the DPI data, occurred from 1959 to 1964. The 1964 census data pertain both to all nurserymen and to those with minimum sales of \$2500. In each case the 1964 level tended to follow but be lower than the DPI acreage trend.

When 1969 census figures were compared with DPI acreage figures, however, a vastly different relationship became apparent. Instead of following the upward trend in acreage data shown by the DPI, a decline of some 2500 acres in the census acreage data was recorded. This evidence is indicative of substantial underreporting on the part of the census.

Recommendations

A number of steps should be taken to upgrade the quality of nursery enumerations in future censuses. One of these is the acquisition and use of an up-to-date list of nursery operators such as that maintained by DPI. The enumeration should include contact of all nursery firms in Florida with an acre or more in production. A 100 percent follow-up should be done on all operators with 5 acres

²Estimate by Palm Beach Extension Agent Robert Pryor. Dr. George Perkins, IFAS Extension Economist, reports that better container nurseries have sales of some \$30,000 per acre.

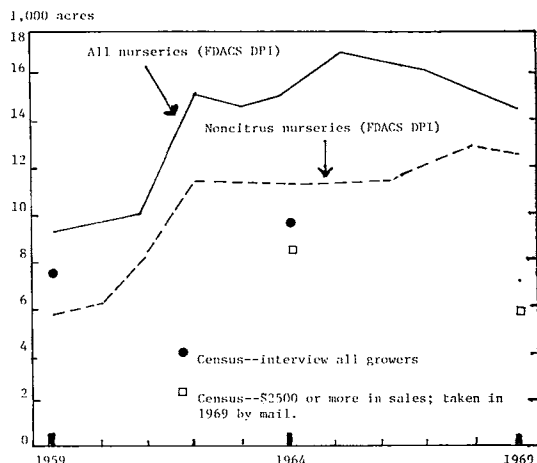


Fig. 1. Statistics on acreage in nurseries in Florida, 1959-1969.

or more in nursery stock with a sample follow-up of operators between 1 and 5 acres in size. Since many small operators, especially those with container nurseries, may sell some \$5000 to \$30,000 per acre in nursery products, it is suggested that the DPI be requested to estimate (through its local nursery inspectors) whether nurserymen with less than 1 acre have probable sales of \$2500 or more. These small operators with probable sales of \$2500 or more should be enumerated on the same basis as nurserymen with from 1 to 5 acres.

Most counties in Florida with large nursery acreages have specialized extension agents who work with commercial operators. These agents can assist in supplying lists of commercial nurserymen and also in communicating with nurserymen on the importance of cooperating in the census enumeration.

National, state and local trade groups and nursery publications and newsletters can also aid the effort by promoting and requesting cooperation in the census count.

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