

SECTION 11 MARKETING

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Environmental Marketing: An Opportunity for Garden Centers

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Nature of Work: Americans are increasingly concerned about the quality of their environment. In the 90's, the buying decision of consumers will be affected by their view of whether the product in question is good or bad for the environment. The retail Garden Centers are in a unique position to educate the public and create a demand for ornamental plants. Garden Centers are a primary consumer interface for the ornamentals industry. Information presented in this paper will be necessary to distinguish the Garden Center from the lower price mass merchant. If Garden Centers do not create a "value-added" product, they will be forced to compete with mass merchants on a price basis. The Garden Center is in a unique position to satisfy the consumer's desire to improve their environment and to create greater demand and higher margins for ornamental plants.

Results and Discussion: The new promotion concept presented in this paper is simple: promote plants by their environmental use/benefit. To a consumer, plant names do not, a) indicate how to use the plant (where to plant, how to group plants etc.), b) explain what the plant can do for the environment, or c) enhance the consumer's chance of success. All of these factors are important to motivate impulse spending, a majority of Garden Center purchases.

Garden Centers through their national association, Garden Centers of America, should consider development of Environmental Enhancement Centers™ as a part of their nursery. This fits the concept of promoting plants by use/benefit rather than by name. It also more accurately describes the potential educational role of Garden Centers. Each environmental benefit would be represented by a separate display. The displays would carry the same name as the environmental benefit they deliver (Figure 1).

To accomplish the dual objectives of educating the public and marketing product, the Environmental Enhancement Center™ displays must be prominent and carry a simple message (Figure 1). As the consumer enters the parking lot, it should be obvious that they are in an establishment with product that enhances the environment. The individual enhancement themes should be visible, self-explanatory (one-or two-word signs), self-contained (have plants and hardgoods displayed), and separate from other units. Each environmental enhancement unit consists of small display gardens labeled according to environmental benefit; e.g., Wildlife Habitat. Each display garden is a miniature yard showing the arrangement of plants and hardgoods in the landscape. Literature on how to accomplish the desired benefit and a list of appropriate plants is present in each display. The plant inventory for consumer purchase is directly behind each display. The quantity of suitable plant

varieties will likely exceed the available display area. This will allow the Garden Center operator to rotate plant varieties on display and in-turn promote plants with bloom, fall color, or special price. The power of this concept is in its simplicity and autotutorial manner. The display of plants by environmental benefit and the simulated landscape within each unit allows consumers to gain significant information with a quick glance.

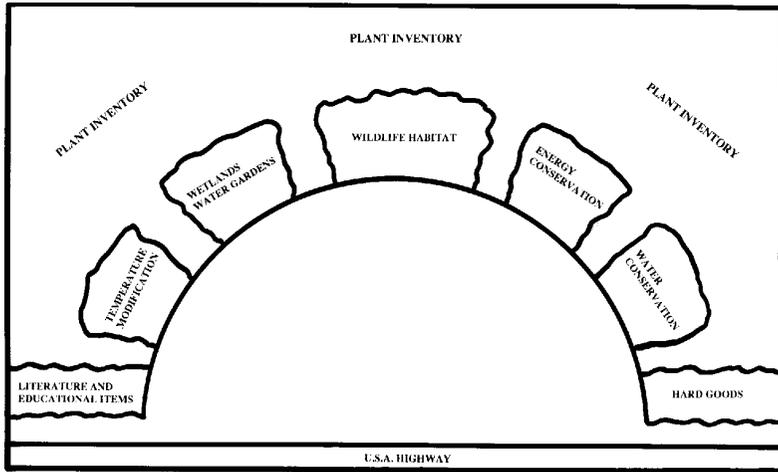


Figure 1. Schematic of an Environmental Enhancement Center™ (EEC).

The supporting information necessary to develop the environmental enhancement display is substantial for topics such as Wildlife Habitat (1, 2, 3, 4). In fact, there are two national organizations, the National Wildlife Federation and the American Audubon Society, that have well developed Wildlife Habitat programs. To get their involvement, we need to organize and promote the environmental enhancement aspect of our product and industry. The National Wildlife Federation offers homeowners the opportunity to certify their yards as a Wildlife Habitat if it meets certain criteria for food, shelter, and other features. The retail Garden Centers should become active participants in this program.

Significance to Industry: Garden Centers will be more successful when they position themselves as environmental educators. We must assume a leading role as environmental educators if we expect to be an integral part of emerging society. If we effectively educate the consumer about opportunities to enhance their environment with plants, they will be more inclined to spend discretionary income on our product.

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The Importance of Advertising Media and Store Characteristics in Landscape Plant Purchase and Retail Outlet Selection Decisions

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Nature of Work: The consumer choice of purchasing and where to purchase landscape plants is influenced by the individual's socioeconomic characteristics, store characteristics, and advertising. Recently, Kelly evaluated the effectiveness of various advertising and promotion media, as perceived by owners and managers of garden centers. The objective here is to examine the perceived consumer importance of store characteristics and advertising on the landscape plant purchase and retail store selection decision. Since these sets of factors are controllable by management, the perceived importance by consumers might influence managerial decisions.

Results and Discussion: The Survey Research Center of the University of Georgia conducted a random telephone survey of Georgia residents in the fall of 1990. Of the total sample of 447, 235 had purchased landscape plants in 1990. Included in the questionnaire were questions about the dollar amount of landscape plants purchased in 1990, the percent of purchases at different outlets, and the most important store characteristic and most influential advertising media when making landscape plant store selection decisions. The different outlets analyzed were large retail stores (K-Mart, Sears, etc.), large garden centers (Pike's, Frank's, etc.), and local garden centers. Chi-square tests were used to test the hypothesis that different consumers have different perceptions about the importance of various store characteristics and advertising media.

The perceptions toward store characteristics and advertising media of purchasers and nonpurchasers will be discussed, followed by the perceptions of the purchasers from the three different store types. Table 1 presents the most important store characteristics and advertising media as perceived by plant purchasers and non-purchasers.

Plant quality and location are perceived as much more important to buyers of plants than nonbuyers. There is no significant difference between purchasers and nonpurchasers' perception of the importance of low prices and knowledgeable staff. Nonpurchasers perceive courteous service as much more important than purchasers.

Significant differences existed between purchasers and nonpurchasers with respect to perceived importance of all the advertising media, except radio. In general, purchasers view newspapers and direct mail as most important while nonpurchasers consider television and billboards relatively more important.

Overall, this sample of consumers ranked plant quality, low prices, knowledgeable staff, location, and courteous service in order of importance. Their ranking of important advertising media was newspapers, television, direct mail and radio, and billboards.

Table 1 also presents the percentages of purchasers at specific retail outlet types who identified the various store characteristics and advertising media as most important. The reported Chi-Square statistics are for pair-wise comparisons. For example, the importance of plant quality is significantly less important to purchasers at large retailers while it is significantly more important to purchasers at local garden centers. Likewise, low prices are significantly more important to large retail purchasers while low prices are significantly less important to purchasers at large and local garden centers. Consumers at large garden centers view knowledgeable staff as significantly more important than consumers at the other types of outlets.

Consumers at local garden centers appear to view the importance of various advertising media in a significantly different way than consumers at the other two outlet types. Television and newspapers are less important, while direct mail is more important. On the other hand, direct mail is seen as less important by consumers at large retailers.

Significance to Industry: These results suggest that plant quality and newspapers are the most important store characteristic and advertising media, respectively. The newspaper result is in contrast to Kelly's findings. Explanation for the discrepancy can be found in the surveyed groups: garden center managers and owners (Kelly) and consumers. Since advertising is directed at consumers, this group would appear to be the appropriate sample to rank advertising effectiveness. As concerns different types of retail outlets, differences exist between consumer perceptions of important store characteristics and advertising media. These differences can and should be exploited to increase marketing effectiveness.

Literature Cited

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Table 1. The Perceived Importance of Various Store Characteristics and Advertising Media by Purchasers of Landscape Plants at Large Retailers, Large Garden Centers, and Local Garden Centers and Nonpurchasers in Georgia, 1990

Store Characteristics	Purchasers:			Nonpurchasers	
	N 235	Retail Outlet Type			N-212
		Large Retailers N-147	Large Garden Centers N-90	Local Garden Centers N 102	
Percentage Citing as Most Important* (Chi-Square Statistic)					
Plant Quality	40.64 ⁺ (13.95)	37.41 ⁻ (2.96)	44.44 (.451)	48.04 ⁺ (2.97)	24.12 ⁻ (13.95)
Location	13.70 ⁺ (2.72)	13.61 (.248)	11.11 (.359)	13.73 (.149)	8.77 ⁻ (2.72)
Low Prices	19.63 (.864)	24.49 ⁺ (3.99)	13.33 (4.514)	12.75 ⁻ (6.54)	23.25 (.864)
Knowledgable Staff	17.81 (.002)	16.33 (.021)	25.56 (8.46)	16.67 (.001)	17.98 (.002)
Courteous Staff	4.11 ⁻ (6.72)	4.08 (.316) ^a	1.11 (4.16) ^a	4.90 (.020) ^a	10.53 ⁺ (6.72)
Advertising Media					
Radio	8.22 (.090)	9.52 (1.093)	7.78 (.019)	9.80 (.716)	7.46 (.090)
TV	14.61 ⁻ (22.24)	16.33 (.007)	14.44 (.320)	11.76 ⁻ (2.58)	33.77 ⁺ (22.24)
Newspaper	55.71 ⁺ (19.17)	56.46 (.926)	56.67 (.404)	48.04 ⁻ (2.61)	35.09 ⁻ (19.17)
Direct Mail	8.22 ⁺ (3.59)	5.44 ⁻ (2.72)	7.78 (.003)	11.76 ⁺ (4.29)	3.95 ⁻ (3.59)
Billboard	1.83 ⁻ (4.58)	2.72 (2.43) ^a	1.11 (.305) ^a	3.92 (5.30) ^a	5.70 ⁺ (4.58)

* Percentages might not add up to 100 due to nonrespondents.

⁻ Significantly different at .10 level in a negative way.

⁺ Significantly different at .10 level in a positive way.

^a Insufficient data - Chi-Square Statistic not valid.

Measuring and Assessing the Image of Retail Nurseries and Garden Centers

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Nature of Work: Image is the impression that the retailing public (customers and non-customers) has of your business. The image of one's business has a profound impact on the number of customers attracted and their purchasing patterns. Image analysis is an effective planning tool that can be used to identify and evaluate the relative strengths and weaknesses of retail stores and their competitors. Image studies can also provide information regarding market penetration, merchandising strategies, effectiveness of advertising and promotional efforts, feasibility of expansion, and store layout and design (Owensby and Vastine). Image analysis also provides the necessary data for the development of a detailed profile of the typical consumer in a trade area.

One method of image analysis that has been used for several years by the retail industry is to employ an image assessment survey (see Appendix A). While an image survey is readily applicable to any retail operation, retail nurseries and garden centers are the focus of this paper. By employing this type of survey, retail nurserymen and garden center operators are able to profile the image of their company and their competitors. In Texas, the Agricultural Extension Service (TAEX) assists retail nurseries and garden centers in measuring and assessing their image. This paper outlines the procedures used in conducting such a survey.

Results and Discussion: Developing an image survey can be a beleaguering task. To aid in the survey development process, garden center operators are provided an example of previously successful surveys. The garden center operator then modifies the sample image assessment survey to meet the needs of the garden center being analyzed. Questions may be added or deleted as the manager sees fit. The survey instrument is quite flexible and can be altered to provide the exact information desired by the management of the cooperating garden center.

One of the important attributes of the survey is third party representation. That is, the survey is distributed with a cover letter on Texas A&M letterhead. This allows the cooperating garden center to remain anonymous, which in turn helps to remove any biases the respondent may have. We theorize that it also enhances the response rate.

Obtaining a representative mailing list is usually the responsibility of the garden center manager. There are, of course, numerous companies that can assist with this task. Mailing lists can be readily segmented by numerous ways (by income, age, etc.). Most mailing list companies will also duplicate the cover letter, the survey instrument, and the return postage envelopes.

As administrators of the survey, TAEX often supplies the following: (1) all outgoing envelopes, (2) a camera-ready copy of the cover letter (on Texas A&M letterhead), (3) a camera-ready copy of the survey instrument, and (4) a camera-ready return envelope.

The mailing list service then duplicates the cover letter, the survey instrument, and the return postage envelope. The return envelope has the address of the Department of Agricultural Economics at Texas A&M University. Details such as the number of surveys to be sent, time frame for obtaining results, modification of the survey instrument, etc. depend on each individual garden center situation. These details need to be defined prior to the survey being sent out.

After the surveys are returned, data are entered and tabulated. A personal computer version of SAS is used to handle statistical procedures. A report is generated which summarizes the survey results and a meeting is held with the garden center operator to assist in interpreting the results of the survey.

Significance to the Industry: There are many advantages of image assessment surveys to retail nurserymen and garden center operators. Besides being able to develop a demographic profile of trade area populations, the results may be used to determine market share, to assess impacts of merchandising programs, and to identify marketing strategies based on an analysis of strengths and weaknesses relative to competitors.

Literature Cited

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APPENDIX A Sample Garden Center Survey

- | | |
|--|--|
| (1) In what garden center do you usually shop? Store name: | (2) In what other garden center do you frequently shop? Store name: |
| Approximate distance from your home.
(Circle the appropriate distance.) | Approximate distance from your home.
(Circle the appropriate distance.) |
| A 0-1 mile | A 0-1 mile |
| B 1-2 miles | B 1-2 miles |
| C 2-4 miles | C 2-4 miles |
| D 4+ miles | D 4+ miles |

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(3) What is your most important source for information about retail nurseries and garden centers? Please rank all items below with 1 being most important, 2 being the next most important, ..., and 6 being least important.

- A Newspapers
- B Radio
- C Television
- D Direct Mail
- E Yellow pages
- F Friend or relative

(4) Which newspaper do you most frequently read? (Circle one please)

- A Newspaper # 1
- B Newspaper #2
- C Newspaper #3
- D Other or None

(5) Where are you currently residing? (Circle one please)

- A Own house
- B Rented House
- C Apartment
- D Mobile home

(6) What is the age of your house or dwelling. (Circle one please)

- A 0-5 years
- B 5-10 years
- C 10-15 years
- D 15+ years

(7) Please indicate your age? (Please circle the appropriate response)

- A 18-25
- B 26-30
- C 31-40
- D 41-50
- E 51-60
- F 60+

(8) Number of children under age 12 in your household. (Circle one please)

- A 0
- B 1
- C 2
- D 2+

(9) Please estimate your household income? (Please circle your response)

- A Less than \$20,000
- C 21-35,000
- D 36-50,000
- E 51-65,000
- F 65,000+

(10) If a friend asked your advice on the one best garden center to buy lawn and garden products, regardless of location, what garden center would you recommend?

Store name:

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Please rate the garden centers listed below that you are familiar with. Here is the rating system we would like for you to use.

- A Excellent
- B Good
- C Fair
- D Poor

Example:

	Store X	Store Y
Prices	A B C D	A B C D

Garden Center Attributes	Garden Center #1	Garden Center #2	Garden Center #3	Garden Center #4
Quality of bedding plants, herbs, etc	A B C D	A B C D	A B C D	A B C D
Quality of landscape plants	A B C D	A B C D	A B C D	A B C D
Quality of foliage/houseplants	A B C D	A B C D	A B C D	A B C D
Quality of gardening/lawn care equipment	A B C D	A B C D	A B C D	A B C D
Prices of bedding plants, herbs, etc.	A B C D	A B C D	A B C D	A B C D
Prices of landscape plants	A B C D	A B C D	A B C D	A B C D
Prices of foliage/houseplants	A B C D	A B C D	A B C D	A B C D
Prices of chemicals/fertilizers	A B C D	A B C D	A B C D	A B C D
Prices of pots/containers	A B C D	A B C D	A B C D	A B C D
Price of soil mixes, soil amendments	A B C D	A B C D	A B C D	A B C D
Price of gardening/lawn care equipment	A B C D	A B C D	A B C D	A B C D
Return merchandise policy of the store	A B C D	A B C D	A B C D	A B C D
Ease of credit payments	A B C D	A B C D	A B C D	A B C D
Resolution of customer complaints	A B C D	A B C D	A B C D	A B C D
Technical competence of employees	A B C D	A B C D	A B C D	A B C D
Friendly/courteous staff	A B C D	A B C D	A B C D	A B C D
Appearance of employees	A B C D	A B C D	A B C D	A B C D
Efficiency of employees	A B C D	A B C D	A B C D	A B C D
Hours of business	A B C D	A B C D	A B C D	A B C D
Waiting time for checking out items	A B C D	A B C D	A B C D	A B C D
Waiting time for general assistance	A B C D	A B C D	A B C D	A B C D
Parking facilities	A B C D	A B C D	A B C D	A B C D
Convenient location	A B C D	A B C D	A B C D	A B C D
Store layout for ease of shopping	A B C D	A B C D	A B C D	A B C D
Overall cleanliness of the garden center	A B C D	A B C D	A B C D	A B C D
Attractiveness of displays	A B C D	A B C D	A B C D	A B C D
Variety/selection of merchandise	A B C D	A B C D	A B C D	A B C D
Plant labeling (varieties, care, planting)	A B C D	A B C D	A B C D	A B C D
Products clearly priced	A B C D	A B C D	A B C D	A B C D
Overall signage in and out of the store	A B C D	A B C D	A B C D	A B C D

Profile of the Owner or Active Manager of a Perennial Plant Business

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Nature of Work: A rapidly expanding segment of the ornamental plant industry is the perennial plant market. The total value of perennials has been estimated at \$66 to \$150 million (Voigt, 1990). There are indications that this market has increased in the last decade and should continue to increase (Market Watch, 1986; Market Watch, 1990). Increased demand is partly due to a desire for colorful plants and the perceived low maintenance required by perennials (Behe and Raudsep, 1984). Despite recent growth, perennial plant businesses may be too small to have the capability and financial resources to initiate primary data collection on their own.

This study was initiated to establish a profile of the owner or active manager of perennial plant businesses. The Auburn University Horticulture Department, Alabama Agricultural Experiment Station, and The Perennial Plant Association, collaborated in a study of perennial plant growers in the United States. A mail survey was sent to 439 Perennial Plant Association members; forms were mailed to each firm two weeks apart in July 1990. Two surveys were sent to each member in order to increase the return rate on 1 July and 23 July (Dillman, 1987). We requested that the person who made managerial decisions on a daily basis, the owner or active manager, answer these questions. One-hundred-fifty firms returned surveys yielding a 34% response rate.

Results and Discussion: Sixty-two percent of the respondents had no formal business education while 42.5% had no formal horticultural education. Twelve percent of the respondents had 3 to 4 years of business education and 26.1% had 3 to 4 years of horticultural education. While 73.2% of the respondents held college degrees, 12.5% held them in business and 30.5% held them in horticulture.

Almost half (48%) of the respondents had between 10 years and 20 years of work experience. Twenty-three percent of the respondents had over 20 years of work experience (23%). The mean number of years of work experience for a owner or active manager in this study was 17 years. The owner or active manager's education level had no effect on the size of the business managed while years of work experience had a positive effect; this may demonstrate that experience is more important to the management of a relatively large business than formal education (Table 1). However, when comparing education and experience, it is important to note that over 70% of the respondents held college degrees.

Sixty-two percent of the respondents in this study were male. While the majority of respondents indicated that revenues generated by this business was the primary source of income for their households (60%), there were some differences between genders. The majority of female respondents indicated that this income was not

the primary source of income for their households (78%). A smaller percentage of the male respondents reported that this was not the primary source of income for their households (23%). Many of the respondents employed at least one family member on a full time basis in their business (63%), with about the same number of those employing one family member (42%) and two family members (38%). A small percentage of the total respondents employed more than two family members (12%). The size of the business influenced the importance of the income from that business to the owner or active managers household. As total sales increased so did the likelihood that the income from that business was primary to the managers household.

Size of the business also affected the number of family members involved in the business. As the size of the business increased, the importance of the income from that business to the owner or active managers household grew, and the probability that family members were directly involved in the business. The number of previous businesses owned or operated did not increase with the years of experience. A majority of these had owned or operated one previous business (58%). The businesses grew to the point that they could primarily support the owner or active managers households and provide employment for other members of their families.

Significance to Industry: The results of this study indicate that the average owner or manager of a perennial plant business in the United States is a well educated individual with a solid educational background combined with at least several years of work experience. The information gained from this study provides a profile of a owner or active manager of a perennial business in terms of education, experience, and the role their businesses play in their lives.

Literature Cited

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3. Market Watch. 1986. *American Nurseryman*. 163:5.
4. Market Watch. 1990. *American Nurseryman*. 171:11. Voigt, A.O. 1990. Perennial plant production. *Perennial Plants*. 23:19-20.

Table 1. Correlation matrix of the characteristics of perennial plant business owners or active managers.

Variables	Previous Business	Years of Experience	Size of Business	Formal Education	Primary Income From Business
Previous Business					
Years of Experience	-0.06 (0.4393)				
Size of Business	-0.12 (0.1536)	0.24 (0.0042*)			
Formal Education	0.81 (0.8089)	-0.10 (0.2074)	-0.09 (0.2912)		
Primary Income From Business		0.22 (0.0115*)	0.57 (0.0001*)	-0.12 (0.1636)	
Family Members in Business					0.26 (0.0019*)

*Significant at $P \leq 0.05$.

Merchandising Strategies of Perennial Plant Businesses

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Nature of Work: The market for herbaceous perennial plants has grown rapidly in the past decade (Market Watch, 1990). The value of this industry has been estimated to be a minimum of \$110 million (Voigt, 1991). Consumers appear to demand colorful alternatives to annual plants (Behe and Raudsep, 1984). Since the industry is most likely comprised of small businesses, little market research has been funded to determine its size and scope. The only available statistics on herbaceous perennial plants are collected each decade by the government yielding little specific crop information or current trends.

This study was initiated to define business characteristics of perennial plant businesses. The Auburn University Horticulture Department, Alabama Agricultural Experiment Station, and the Perennial Plant Association collaborated in this study of perennial plant firms. A mail survey was sent to 439 Perennial Plant Association members whose classification category was plant production in July, 1990. Two forms were mailed to each firm two weeks apart to increase the response rate. The owner or active manager was requested to complete the questionnaire. One-hundred-fifty firms returned forms yielding a 34% response rate.

Results and Discussion: Survey participants had a mix of wholesale and retail sales, but had greater wholesale sales. Average wholesale sales were \$241,416 while average retail sales were \$36,703. The sale of perennial plants was the primary business income for 46% of the firms.

Sales within the state the business was located ranged from 0% to 100% with an average of 77% while sales outside the state where the firm was located ranged from 0% to 95% with an average of 21%. Businesses had a merchandising strategy which concentrated in a relatively limited geographic area.

Many perennial plant businesses sold product lines other than perennials. The sale of herbaceous perennial plants accounted for an average of 58% of total firm sales. Other product lines sold included annuals (average of 11% of sales), woody plants (15%), hardgoods (1%), chemicals (1%), florist crops which were flowering plants other than annuals and perennials (4%), and other products (9%). The merchandising strategy of these businesses can be described as broad as they relied on more than one product line to generate sales for the firm.

Within the product line of perennials, firms sold an average of 31 of 71 listed species. The number of perennial plant species a single business sold ranged from 1 to 71. Twenty-nine species were produced by over half of the firms (Table 1). The species grown by the most firms were *Coreopsis* (66%), *Aquilegia* (64%), *Echinacea* (62%), *Chrysanthemum* (62%), and *Achillea* (62%). Most firms did not specialize in the production of only a few species, rather it appeared that the firms needed to produce a relatively broad product mix within the product line. This would indicate that the plant producers in the firm would need diverse experience with 30 species in order to provide a wide product line.

Firms were asked to indicate what percentage of plants were sold in different container sizes when the perennials were sold wholesale. An average of 10% of the plants were sold bare root, 1% sold as plugs, 15% in pints and 4-inch containers, 33% in gallons and 6-inch pots, and 21% in other container sizes.

When perennials were sold at retail, the average perennial plant businesses merchandised 7% bare root, less than 1% plugs, 14% pints and 4-inch containers, 27% gallons and six-inch containers, and 13% other container sizes. Thus, somewhat larger containers were used to retail plants.

Firms used a variety of merchandising methods to sell perennial plants. Telephone sales accounted for an average of 30% of total sales, mail accounted for 14% of sales, and walk-in or drive-in customers accounted for an average of 38% of total sales. Mail-order sales did not account for a large percentage of sales for these wholesale-oriented businesses. Their telephone and in-store sales people helped to create the majority of sales for these businesses.

Significance to Industry: This information can be utilized by firms currently producing and marketing perennial plants. The business characteristics of active firms can be compared with averages reported here to determine where the firm is operating in relation to the "average."

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Table 1. Twenty-nine of 71 perennial plant species which more than half of the perennial plant businesses sold.

Species	Number of firms selling species	Species	Number of firms selling species
Achillea	62%	Iberis	55%
Aquilegia	64%	Iris	57%
Aster	55%		
Astilbe	59%	Lavandula	55%
		Liatris	59%
Campanula	59%	Lupinus	51%
Chrysanthemum	62%		
Coreopsis	66%	Monarda	54%
		Ornamental Grasses	57%
Delphinium	53%		
Dianthus	61%	Phlox	59%
Dicentra	57%	Platycoden	51%
Digitalis	55%	Rudbeckia	58%
Echinacea	62%	Salvia	56%
Gaillardia	56%	Sedum	57%
		Veronica	57%
Hemerocallis	58%		
Heuchera	59%		
Hosta	61%		

Consumer Evaluation of a Soilless Potting Mix with Composted Broiler Litter

**Bridget Behe, Charles Gilliam, and Jim Donald
Alabama**

Nature of Work: Consumer demand for poultry products has doubled in the past ten years. For each pound of meat produced, one pound of broiler litter waste is generated, with over three billion pounds of waste produced in 1989, disposal presents a challenge (Blake and Donald, 1991). Some litter can be used as an agronomic fertilizer, spread on crop land. This disposal method causes some potential leaching of nitrates into surface and ground waters, potentially contaminating them.

One new use for broiler litter is as an amendment to a soilless potting mix (Gilliam, et.al., 1989). Researchers have developed a formulation of pine bark and composted broiler litter which will support and sustain plant growth. However, some consumers may perceive broiler litter as an unpleasant constituent of a potting mix. The purpose of this study was to determine consumer's perceptions of a soilless potting mix containing composted broiler litter.

We manufactured 300 bags of a soilless potting mix containing 45% composted broiler litter, 45% composted pine bark, and 10% horticultural perlite. This medium was labeled SMAL for soilless potting mix amended with litter. We also purchased bags of potting mix which were commonly available in Southern markets: Hyponex and Baccto. One-inch liners of Dallas fern [*Nephrolepis exaltata dallasii*, cv. Dallas Jewel] were transplanted into the three media types in four-inch pots. Pots were randomly assigned letters "A," "B," and "C" to comprise a set of ferns in three different media. Plants were grown in the greenhouse for two weeks to establish them in the new medium.

We recruited 125 garden club members in October, 1989, from several garden clubs in the Auburn-Opelika, Alabama, area. They were told that the study was to evaluate a new potting mix, but they were not told the mix contained composted broiler litter. Each participant was given a market basket containing three ferns in different media and a package of survey forms and envelopes. Consumers were asked to evaluate each plant on a weekly basis for six weeks on the following parameters: foliage color, amount of water required that week, odor emanating from the potting mix, and general health of the fern. Forms were mailed to the University in postage-paid envelopes. One-hundred-twenty participants completed the six week evaluation.

Results and Discussion: Each of the four characteristics was evaluated on a five-point scale. Fern color was rated as (1) yellow to (5) dark green. Amount of water applied was rated as (1) light amount of water required to (5) a heavy amount of water required. Odor was evaluated as (1) no unpleasant odor to (5) strong un-

pleasant odor. Overall health of the ferns was rated as (1) fair health to (5) excellent health. Differences were evaluated using a Duncan mean separation test.

Plant frond color remained relatively consistent from week one through week six. Baccto and SMAL received the same average rating for frond color of 3.6 (Table 1). The ferns in Hyponex received a lower rating of 3.0 for fern frond color, indicating that plants grown in Hyponex were a lighter green when compared with the ferns grown in Baccto or SMAL.

The amount of water the ferns required differed by the type of media in which they were planted. Hyponex plants required the greatest amount of water with an average rating of 3.3 (Table 1). Ferns planted in SMAL required slightly less water with an average water rating of 2.7. Ferns in Baccto mix required less water than either Hyponex or SMAL with an average rating of 2.4. Thus, the Baccto mix retained the most water while the Hyponex retained the least.

There was a statistical difference in the average rating of odor between the SMAL medium and the other two growing medium, but this difference was substantially small. The Baccto and Hyponex media had an average odor rating of 1.1 while the SMAL medium had an average rating of 1.2. While this differences was detected statistically, it is doubtful that a consumer could detect a substantial unpleasant odor from the SMAL medium.

The overall health of the fern plants was rated the same for the Baccto and SMAL media with an average rating of 3.7 and 3.6 respectively. The ferns planted in Hyponex received a lower average rating for overall health with an average rating of 3.1.

Significance to Industry: A potting mix amended with composted broiler litter performed as well as or better than two commercially available potting mixes in terms of water requirements, plant color, unpleasant odor, and general plant health. The perception of a potting mix containing broiler litter having a distinctly unpleasant odor needs to be addressed in a marketing strategy as it does not appear to be a real problem, rather a perceived one.

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Table 1. Average rating of four characteristics over a six week evaluation period for Dallas fern in three growing media.

Amount of water required			Unpleasant odor		
Hyponex	3.3	A*	SMAL	1.2	A
SMAL	2.7	B	Baccto	1.1	B
Baccto	2.4	C	Hyponex	1.1	B
Plant frond color			General plant health		
Baccto	3.7	A	Baccto	3.7	A
SMAL	3.6	A	SMAL	3.6	A
Hyponex	3.0	B	Hyponex	3.1	B

* Average ratings followed by the same letter are statistically the same using Duncan's mean separation.

Landscape Plants: Production and Marketing Trends

**John R. Brooker
Tennessee**

Nature of Work: The United States nursery industry experienced rapid growth during the decade of the 1980s. Aggregate greenhouse/nursery cash receipts for the United States totaled \$6.9 billion in 1988. However, this growth has not been uniform across the states. New Jersey's value of horticultural product sales (excluding floriculture) increased 107% between 1980 and 1988. During this same time, Oregon's sales value increased 45%, but Tennessee's decreased 20%. Recent survey data provide a base for examining some of the differences in production and marketing practices throughout the United States [Brooker and Turner]. Because of space and time constraints, only three states - New Jersey, Oregon, Tennessee - were selected to illustrate regional differences. Insight into the economic forces contributing to the expansion and contraction of ornamental production within various states should help individuals and firms when making long-run planning decisions and contribute to the efficient allocation of resources.

Results and Discussion: Types of Plants Sold and Root Media- Among the seven designated categories, respondents from Oregon and Tennessee indicated that 40% and 46% of their sales in 1988 were attributable to deciduous trees (Table 1).

New Jersey's distribution was not as concentrated in a particular category. Oregon and Tennessee had higher percentages of sales generated by propagating material than New Jersey. Oregon reported extensive use of containers and bare root, while New Jersey and Tennessee had more than half of the sales as balled and burlaped (Table 2). New Jersey reported only 4% of sales as bare root.

Transaction Methods and Prices- Tennessee nurserymen reported that 20% of annual sales were made at trade shows, compared to 11% in New Jersey and 6% in Oregon. Oregon respondents indicated that nearly two-thirds of sales were nonnegotiated, in-person sales. New Jersey reported about two-thirds of sales as in-person, but about equally distributed between negotiated and nonnegotiated. New Jersey respondents reported the highest average percentage of sales at the printed value, 88 percent. Tennessee was second at 76% and Oregon last with 71%. This was a bit surprising because of the high percentage of sales in Oregon reported as nonnegotiated (84%).

Sales with repeat customers averaged from 77% in New Jersey to 84% in Oregon. In New Jersey and Tennessee, the individual responses dropped as low as 10% and 15%. The lowest response in Oregon was 50%. This emphasizes the stability of customers for the Oregon nursery industry.

The monthly pattern of sales appears to be somewhat dependent on location. Tennessee's best three months are February, March, and April. Oregon's best three are March, April, and May. New Jersey was slightly later with April, May, and June.

Advertising- The advertising function of ornamental nurseries was examined in two ways. The first examination focused on advertising as a percentage of sales, while the second focused on utilization of different advertising outlets. The average percentage of annual sales allocated to advertising ranged from 1.1% in Oregon to 3.7% in Tennessee. Overall, a large percentage of advertising dollars was directed to catalogs and trade shows (Table 3). Tennessee's advertising was concentrated on trade shows and catalogs. Oregon and New Jersey nurserymen used more of an assortment of outlets. Market Level Sales: The responding ornamental nurseries reported that the majority of their gross sales were wholesale sales (Table 4). New Jersey reported the highest proportion of sales as retail, 24%. Only 2 percent was reported as retail sales in Oregon. Of the wholesale sales, nurseries reported the percentage of sales to re-wholesalers, retailers, and landscapers (Table 5). Tennessee reported a fairly even distribution of wholesale sales to the three outlets. Oregon's low percentage of wholesale sales to landscapers implies that landscapers purchase more of their plants from re-wholesalers or retailers. New Jersey nurserymen made 55% of total sales to landscapers.

Trade Flows- Fifty eight percent of New Jersey's sales stayed within the state. In contrast, only 13% of Oregon's sales stayed within Oregon. Tennessee nurserymen reported that 27% of sales were to in-state buyers. Oregon and Tennessee had sales reported to 28 different states. New Jersey had sales to 13 states. Respondents

also reported percentage of sales to re-wholesalers, retailers, and landscapers in different states. New Jersey reported 53% to re-wholesalers within New Jersey while Oregon and Tennessee reported 10% and 29%, respectively. With respect to each state's distribution of sales to retail outlets, New Jersey reported a large percentage to in-state buyers, 55%, while in Oregon and Tennessee were nearly identical with 14% and 15%. Of the sales to landscape firms, higher percentages of in-state sales were reported for Oregon (26%) and Tennessee (28%) than to in-state re-wholesalers and retailers, but still much lower than the 63% of landscape sales to in-state firms.

Significance to Industry: Overall, the U.S. landscape-plant industry is quite integrated and inter-state product flow is heavy. Little export activity outside the United States was detected. Telephone and person-to-person transactions appear to be the dominant exchange method utilized. Terms-of-trade negotiation appears to occur within the industry. Monthly patterns of sales vary by region, with western states apparently having less seasonality in sales. The distribution of product shipments throughout the year is heavily influenced by weather and location. In general, heavy concentration of sales occur during the spring months. A severe decrease in sales occurs in summer with a rebound in sales in the fall and limited sales in the winter. Heavily populated states like New Jersey have more dependence on nursery sales to retailers. Oregon and Tennessee are "supply" states that emphasize sales to wholesalers. Also, the distribution of wholesale sales to re-wholesalers, retailers, and landscapers indicated that growers in different states utilize these outlets in different ways. Over half of Oregon's wholesale sales were to re-wholesalers. Over half of New Jersey's wholesale sales were to landscapers. Tennessee's wholesale sales were evenly divided between re-wholesalers, retailers, and landscapers. States with older, established nurseries tend to have lower advertising percentages, while states with newer industries tend to have higher percentages. A large percent of advertising dollars was directed to catalogs and trade shows.

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"SNA RESEARCH CONFERENCE - VOL. 36-1991"

Table 1. Distribution of sales by plant categories.

State	Respondents		Deciduous		Evergreen Shrubs		Evergreen Trees	Propa- gating Material	Other
			Trees	Shrubs	Broad-L	Narrow-L			
	No.	Percent	—	—	—	—	Percent	—	—
Oregon	58	90.6	40.5	8.0	21.3	10.4	6.2	6.1	7.5
New Jersey	97	91.5	27.5	9.9	13.6	15.6	19.9	0.5	13.0
Tennessee	93	94.7	45.7	10.3	9.6	3.9	10.4	6.2	13.9

Table 2. Distribution of sales by root/media holding categories.

State	Respondents		Balling		Balled		Field		Other
			Bare Root	and Burlap	Container	and Potted	Processed Balled	Grow Bag	
	No.	Percent	—	—	—	—	Percent	—	—
Oregon	60	93.8	41.0	9.4	43.2	6.2	a	a	—
New Jersey	97	91.5	4.1	54.5	33.6	3.7	0.1	0.8	3.1
Tennessee	94	95.9	20.9	58.9	16.4	1.5	1.7	—	0.6

Table 3. Distribution of advertising budget by outlet category.

State	Yellow Pages	Bill- Boards	Radio	Trade Show	News Paper	Trade Journal	Catalog	News- Letter	Other
New Jersey	10.2	a	1.6	19.5	9.7	9.8	30.4	14.2	4.6
Tennessee	3.9	0.3	a	44.1	1.4	12.2	30.8	2.0	5.3

Table 4. Distribution of gross sales in 1988 as either wholesale or retail.

State	Respondents		Wholesale		Retail	
			Firms	Sales	Firms	Sales
	No.	Percent	—	—	—	—
Oregon	58	90.6	98.3	98.0	15.5	2.0
New Jersey	96	90.6	87.5	76.2	63.5	23.8
Tennessee	91	92.9	96.7	88.8	27.5	11.2

Table 5. Distribution of wholesales sales by outlet.

State	Respondents		Re-wholesalers		Retailers		Landscapers	
	No.	Percent	Firms	Sales	Firms	Sales	Firms	Sales
Oregon	54	84.4	98.2	57.8	70.3	35.7	60.9	6.5
New Jersey	82	77.4	53.7	20.1	76.8	24.9	86.6	55.0
Tennessee	84	85.7	89.3	34.6	66.7	32.2	75.0	33.2

Economic Factors Affecting the Demand for U.S. Nursery Stock

Larry A. Johnson, Kim H. Jensen, John R. Brooker
Tennessee

Nature of Work: Ornamental Horticulture is one of the fastest growing industries in the U.S. with a recorded 10 percent growth rate during the 1980's. This follows a 12 percent rate of growth during the 1970's. The production of nursery stock and greenhouse plants now claim 10 percent of all agricultural crop cash receipts and ranks seventh among all agricultural crops (Johnson, 1990b.). While the U.S.D.A. does not specifically report nursery stock sales, the classification of Other Greenhouse and Nursery Products, which includes turfgrass, bulbs, groundcovers, other greenhouse plants, and nursery stock, currently comprise 59 percent of all Environmental Horticulture sales. Market share of this classification, however, has declined from 78 percent in 1966 as more households are now purchasing indoor and other greenhouse plants (Johnson, 1990a).

The purpose of this study was to identify and measure the economic factors that impact the demand for U.S. nursery stock. The analysis should provide growers with valuable insight into the macroeconomic forces impacting the demand for U.S. grown nursery stock.

Research methodology includes both a graphical presentation of trends in U.S nursery stock sales and accompanying economic variables along with an empirical analysis of the data. Regression analysis was used to determine the relative importance of each of the economic variables to the sale of nursery stock.

Annual sales estimates for greenhouse and nursery plants were obtained from the U.S.D.A.'s Floriculture and Environmental Horticulture Products. Updates and revisions of the data were obtained through consultations with U.S.D.A. analysts.

Economic variables hypothesized to impact the demand for nursery stock were collected from the Statistical Abstract and the Survey of Current Business. All data were adjusted by the Implicit Price Deflator where (1982=100).

The principle economic variables hypothesized to impact the domestic demand for nursery plants are Gross National Product (GNP), the Value of All U.S. Construction, U.S. Population, and the Inflation Rate. Real GNP reflects aggregate economic activity, while All U.S. Construction specifically targets nursery sales as they relate to such items as commercial construction, highway construction and residential housing. Nursery stock sales, of course, should increase with increases in U.S. population. Inflation was expected to have a negative impact on nursery stock sales.

Results and Discussion: Figure 1. illustrates the rapid increases in Ornamental Horticulture sales since 1966. Actual dollar sales show increases from \$800 million in 1966 to slightly over \$7.8 billion in 1990. Nursery stock sales also increased during the same period from \$600 million to just over \$4.5 billion.

Figures 2 through 5 illustrate the relationships between nursery sales and GNP, value of construction, population and changes in the rate of inflation. Real GNP and population tracks closely with adjusted nursery stock sales while the real value of construction follows the general trend and a negative relationship with inflation.

Correlation coefficients suggest that GNP and U.S. population changes are highly positively correlated with changes in nursery stock sales. Correlation coefficients for these two variables are .96 and .97, respectively. Correlation coefficients between nursery stock sales and the value of construction and changes in inflation are .52 and -.08, respectively. The correlation coefficients indicate that domestic sales of nursery stock are closely related to changes in national income and general economic activity.

Regression analysis was performed incorporating all four explanatory variables. Possible collinearity problems, resulting from the highly correlated GNP and population variables, weakened estimation of the complete model. Therefore, population was dropped from the analysis. Final estimates are as follows:

$$NS = 255.142 + 1.185 \text{ GNP} - 3.945 \text{ VC} - 29.8141 \text{ I} \text{ with } R^2 = .942$$

(.077) (1.626) (13.100)

where, NS is Nursery Stock sales, GNP is Gross National Product, VC is Value of All Construction, I is changes in the rate of inflation, and standard errors are in the parentheses.

Overall, the simple model is a relatively good fit of the data explaining 94 percent of the total variation in nursery stock sales. The impact of GNP is positive at the 10 percent level and significant while VC and I are negative and significant. Changes

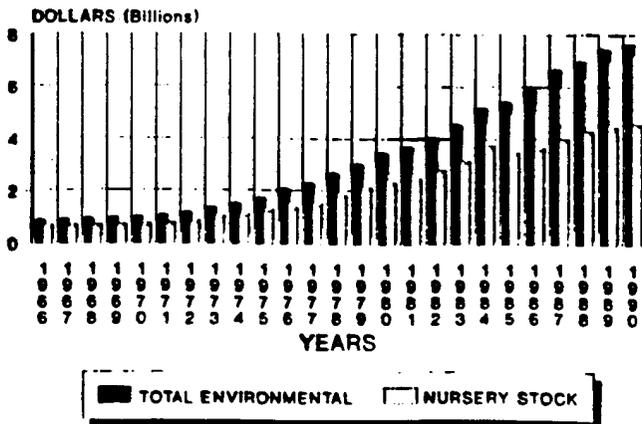
in GNP appear to best describe changes in nursery stock sales. The variable has a positive elasticity coefficient of 1.45, indicating a 1 percent change in GNP results in a 4.5 percent change in nursery stock sales.

Significance to the Industry: Results from this study show the positive economic impact of GNP on the sale of domestically produced nursery plants. The sale of nursery stock tracks closely with changes in the general economy and negatively with inflation, suggesting that growers can use the general economy to gauge the outlook for their industry. This relationship sets Ornamental Horticulture apart from other agricultural industries which typically act independent of general economic conditions.

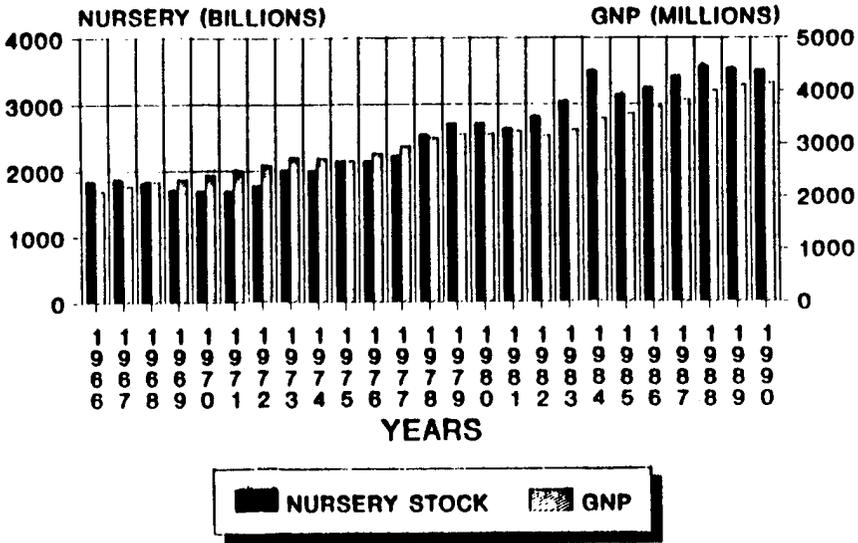
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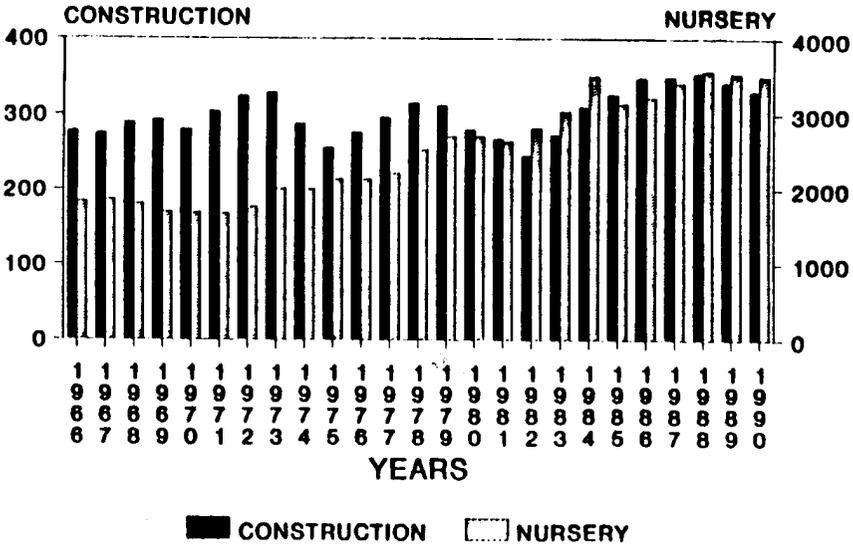
**FIGURE 1. GROWER CASH RECEIPTS
ACTUAL DOLLARS**



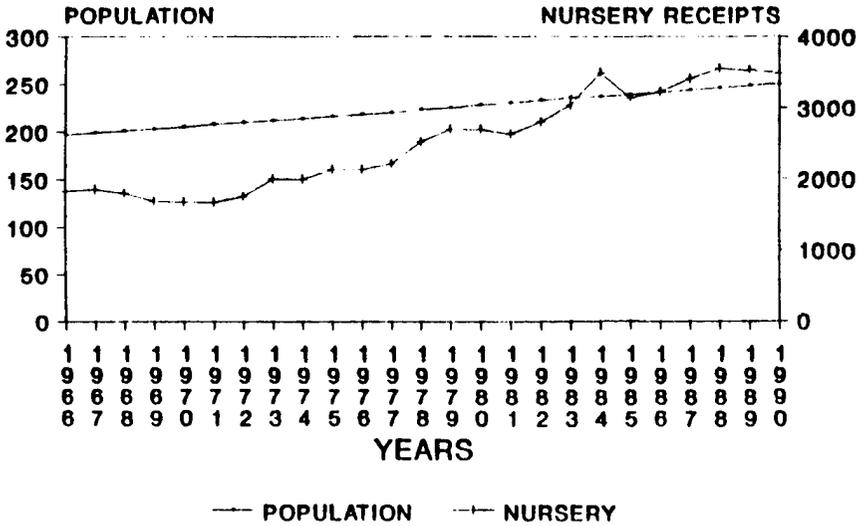
**FIGURE 2. GROWER CASH RECEIPTS
1982 DOLLARS**



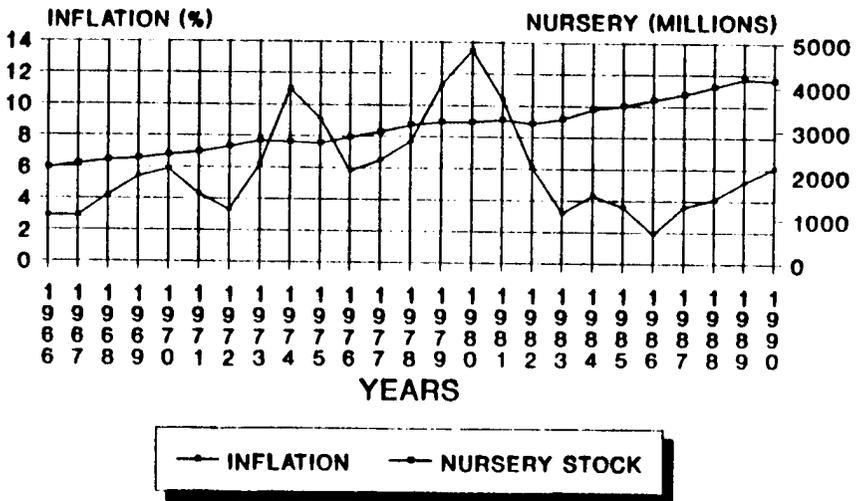
**FIGURE 3. VALUE OF CONSTRUCTION
1982 DOLLARS (BILLIONS)**



**FIGURE 4. U.S. POPULATION
MILLIONS**



**FIGURE 5. GROWER CASH RECEIPTS
VERSUS INFLATION
1982 DOLLARS**



Trends in International Markets for Greenhouse and Nursery Products That Impact the United States

Kim H. Jensen, Larry A. Johnson, John R. Brooker
Tennessee

Nature of Work: During the second half of the 1980's, there has been a marked growth in the import market for greenhouse and nursery products in the major importing countries. Imports into West Germany, the U.S., France, and the United Kingdom comprise over 60% of the value of the import market, West Germany being the leader in value of imports (Johnson).

The objective of this study was to analyze the effects of general economic conditions on the import market for greenhouse and nursery products in the U.S. and to compare these effects to those in other major importing countries. A comparison with Canada is also included, because it is an important export market for U.S. products.

In order to analyze these effects, the behavior of the real value of imports (VIM) is compared with the behavior of the real value of gross domestic product (GDP) during the 1980's. Real values were obtained by adjusting nominal values with an index measuring the general level of inflation in the economy. Comparisons of the real value of imports and real GDP are made via graphs and through use of regression analysis. Regressions were performed with the real value of imports hypothesized to be influenced by real gross domestic product. Data used in the analysis were from: Floriculture and Environmental Horticulture Products, International Financial Statistics, and Economic Accounts for Agriculture.

Results and Discussion: The real value of imports and gross domestic product for each of the countries are shown in Figures 1A and 2 through 5. Notably, in each of the countries, there appears to be a high degree of correlation between the general level of activity in the economy and the value of imports of greenhouse and nursery products. During the early 1980's, when the growth of the economies of these countries slowed, the growth in imports also slowed. However, during the second half of the 1980's, when these economies began to pick up pace, real import values also began increasing more rapidly.

The results from the regressions showed that, historically, a 1% change in US GDP produced about a 2.9% change in RVIM. In the United Kingdom and France, a 1% change in GDP produced greater than a 4% change in RVIM. A percentage change in Canadian GDP produced about a 1.8% change in RVIM. In West Germany, a percentage change in GDP brought about a 1% change in the RVIM.

Comparisons between the growth in real GDP and domestic grower receipts were also made. In the U.S., real grower receipts exhibited patterns similar to those of

real GDP and to the real value of imports, as shown in Figures 1A and 1B. As the economy grew during the second half of the decade, the market for greenhouse and nursery products grew, whether the product was imported or domestically produced. Although not shown here, in the United Kingdom, France, and W. Germany, grower receipts did not show a positive correlation with real GDP or the real value of imports. In fact, in these countries, real grower receipts declined or were stagnant during the period of economic growth in the second half of the 1980's.

Significance to the Industry: The results from this study show that in the U.S. and in other major importing countries, the level of real value of imports is highly dependent on the level of real economic activity. As the country experiences real economic growth, the value of imports of greenhouse and nursery products increases. In the U.S., over the last ten years, as the level of economic activity increased, not only did the import market grow, but the domestic market for nursery and greenhouse products grew.

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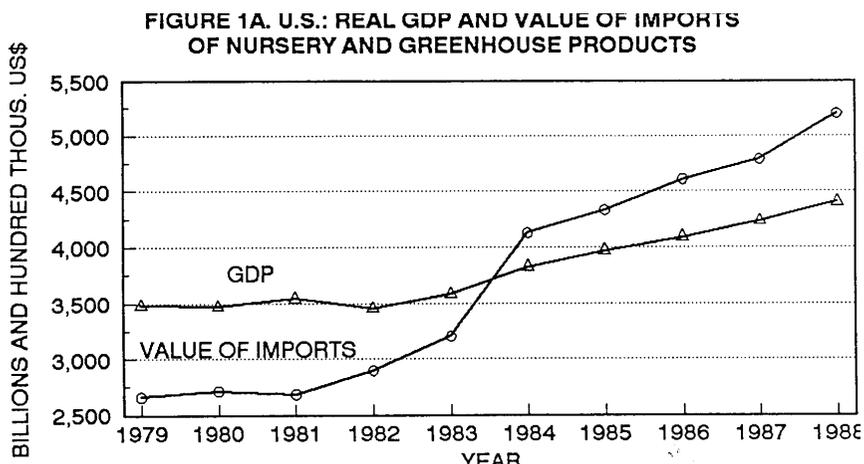


FIGURE 1B. UNITED STATES: REAL GROWER RECEIPTS

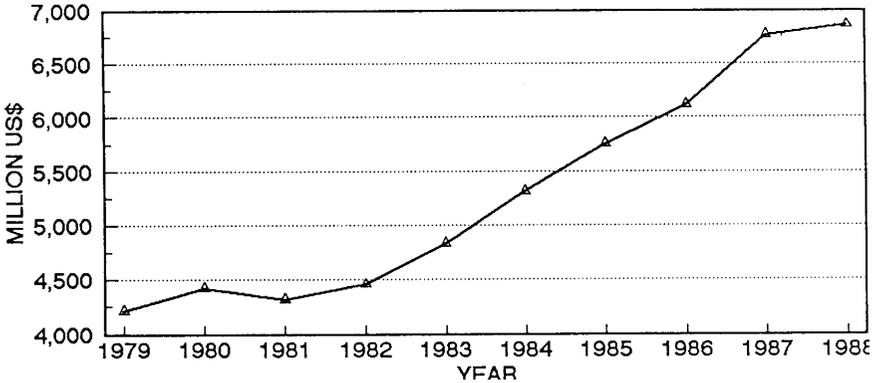


FIGURE 2. W. GERMANY: REAL GDP AND VALUE OF IMPORTS OF NURSERY AND GREENHOUSE PRODUCTS

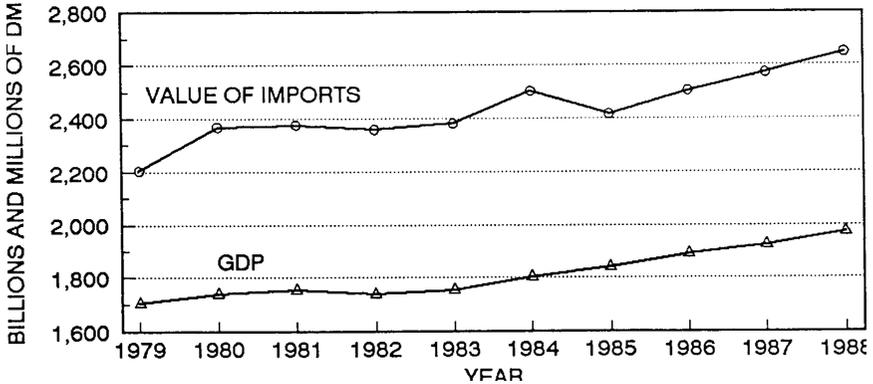


FIGURE 3. U.K.: REAL GDP AND VALUE OF IMPORTS OF NURSERY AND GREENHOUSE PRODUCTS

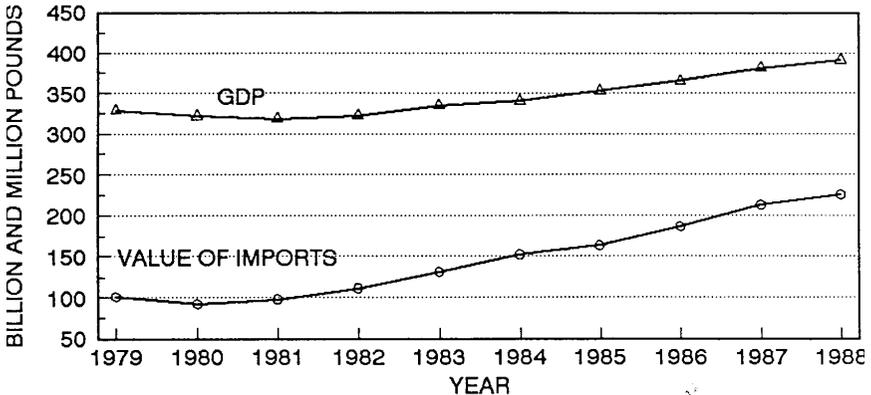


FIGURE 4. FRANCE: REAL GDP AND VALUE OF IMPORTS OF NURSERY AND GREENHOUSE PRODUCTS

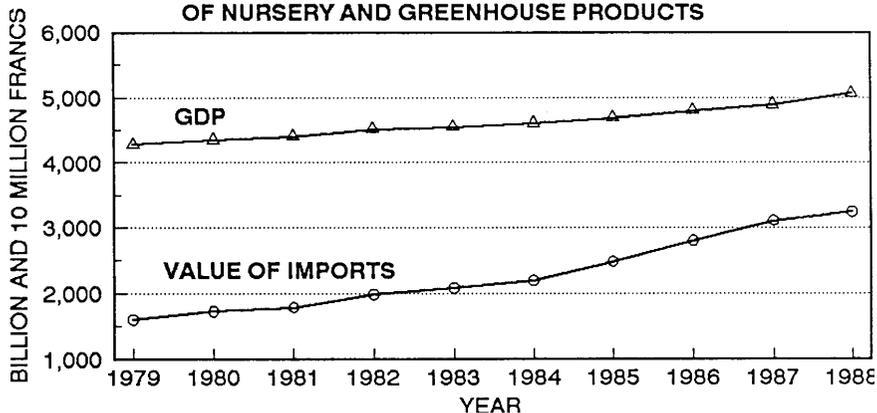
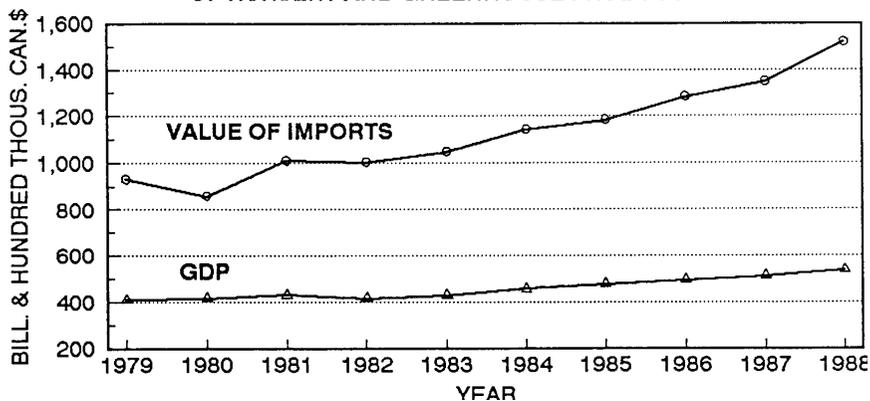


FIGURE 5. CANADA: REAL GDP AND VALUE OF IMPORTS OF NURSERY AND GREENHOUSE PRODUCTS



A Study of Nursery Crop Insurance in Tennessee

**Surendra P. Singh and Sam Osawaru
Tennessee**

Nature of Work: In theory, agricultural insurance is an efficient risk-sharing mechanism. In practice, however, agricultural insurance has been a costly means of transferring risk from farmers to governments and other insurers (1).

Federal crop insurance, which is available for over fifty crops, covers all natural risks, including unavoidable losses from drought, excessive rain, and storm damage. An agricultural producer can purchase individualized coverage for either 50%, 65% or 75% of the normal yield, and at one of three different price selections. Crop insurance policies provide protection against unavoidable losses that can otherwise cause financial havoc on even the best managed farm business. At present, nursery crop insurance covers only nursery crops grown in standard nursery containers; therefore, field grown nursery crops are not insured. In 1989, more than 66 percent of the total cash receipts in Tennessee from farm marketings of nursery and greenhouse crops were from field grown crops, and only nine percent were from container grown crops. Field grown nursery crops are therefore, very important for the state's nursery industry but for which insurance is not available.

The objective of the study was to determine awareness, and to examine the need for a multi-peril insurance program. A survey of 164 randomly selected certified nursery and greenhouse operators was conducted in Tennessee during the Summer of 1990.

Results and Discussion: About one-third of the respondents said that they were aware of nursery crop insurance (Table I). In general, many operators were interested in a subsidized policy. A majority (37 percent) preferred deductible of less than \$5,000 and 19 percent preferred a \$5,000 dollar deductible. Only fourteen percent preferred a greater than \$10,000 dollar deductible.

The perils and dangers for which nursery crop insurance might be provided and their ranking within three categories, are presented in (Figure 1).

Conclusion and Significance To Industry: Nursery operators should treat crop insurance as a risk management tool and should be approached as any other financial decision. The important point to consider is that crop insurance is protection for working capital that the operator will need for reinvestment in order to maintain and increase income. Crop insurance is not designed to fully protect the operator against year-to-year ups and downs in yields. It is protection against unavoidable economic catastrophes.

A majority of nursery operators in Tennessee are not aware of the availability of nursery crops insurance. This is partly due to the fact the insurance is not available for nursery crops which: (1) are not grown in standard nursery containers; (2) are not classified as woody, herbaceous, or foliage landscape plants; and (3) are grown in the field and several other restrictive conditions including strict inspection and restricted production practices.

The results of the study should provide information to policy makers and the insurance industry in developing programs, terms and conditions to insure field grown nursery crops. Furthermore, there is a need for an aggressive educational program to educate the operators about nursery crops insurance.

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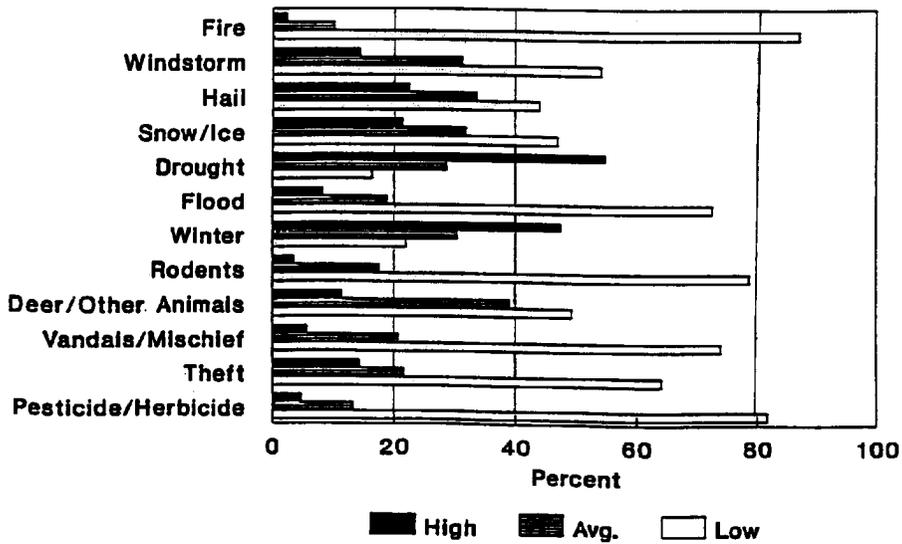
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Table 1

RESPONSES TO SELECTED QUESTIONS RELATED TO INSURANCE
Percent

	YES	NO
1. Are you aware of Nursery Crop Insurance?	32	68
2. Do you have knowledge of current insurance plans for nursery crops?	17	83
3. Do you carry Nursery Crop Insurance?	2	98
4. If subsidized Insurance policy is offered, would you be interested in one?	70	30

Figure 1 . Perceived Need To Insure
Nursery Crops By Peril - 1990



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