

Economics and Marketing

Charles Hall
Section Editor and Moderator

Market Valuation of Invasive Plants Widely Grown in Georgia Nurseries

Forrest Stegelin

University of Georgia, Department of Agricultural
and Applied Economics, Athens, GA 30602-7509
fstegelin@agecon.uga.edu

Index Words: invasive plant species, market valuation, sales revenue, severe/serious threat

Nature of Work: There is ample discussion at the national level, the regional and state-wide trade organizations, as well as local communities and counties as to what constitutes an invasive plant species, what should be done about them, and what the marketing impacts would be if the propagation and sales of these species were forbidden. There is not a consensus list of plant species that are considered either a severe or a serious threat. Differences exist, for instance, in Georgia between the Georgia Exotic Pest Plant Council (GEPPC), the Georgia Department of Agriculture (GDOA), the Georgia Green Industry Association (GGIA), the University of Georgia Center for Applied Nursery Research (CANR), as well as among individual commercial growers and marketers.

The signing of the Invasive Species Executive Order, February 3, 1999, laid forth a definition for an invasive species as an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. A frustration in the trade has arisen because many of the so-called invasive plant species have become economically important as a revenue generator for the growers and propagators, as well as the landscapers and marketers. Some plants are deemed as invasive due to the same characteristics and reasons that have made them so popular in the trade. The consensus list of characteristics defining an invasive plant species in Georgia are (1) some produce lots of seed; (2) effective dispersal methods; (3) rapid maturation; (4) vigorous vegetative growth; (5) long-lived; (6) highly adaptable to a variety of habitats; and (7) easily established.

A mail survey was developed and administered by the Georgia Department of Agriculture to identify and quantify relative sales volume (as a percent of total annual sales) and the willingness of respondents to stop selling or growing or installing the plants listed as the DOA's top ten severe threats [645 usable responses]. Another survey was developed and distributed by the University of Georgia Department of Agricultural and Applied Economics to gain further insight into the growers' and marketers' understanding of invasive plant species (list provided by the CANR), their views on the species cited as either a severe or a serious threat, and what the market value of these plants were in their operation [655 usable responses]. Although some overlap occurred between the two surveys, each survey relied on different invasive plant species. The combined results of these two surveys are summarized in the following table.

Results and Discussion: The Georgia DOA survey had an overall 23% response rate, but only 17% usable responses. The ag econ survey had an overall response rate of 34% with 29% of the responses usable. Neither of the surveys had a follow-up reminder for responders to complete the survey, and each was returned “anonymously,” – no tracking capability, so there may be some double counting among the two surveys.

Marketing for a Greener Greenhouse

Lawrence S. Martin and Robin G. Brumfield
Rutgers, The State University of New Jersey,
New Brunswick, NJ 08901-8520

Larrymartin@rcn.com, Brumfield@aesop.rutgers.edu

Index Words: Marketing, mass market, greenhouse, floriculture, profit

Significance to Industry: How are independent garden centers (wholesale and/or retail) coping with changing customer preferences while at the same time competing with (or profitably selling to) the Big Boxes? This paper is an attempt to help growers formulate their own strategies, concepts, ideas, and “common sense” approaches not only to survive; but, to thrive.

Nature of Work: In the past two years we have visited over 80 garden centers, nurseries, and greenhouses to collect data and information regarding marketing strategies including maintenance of market share, promotional plans and programs, product mix, value added, agri-entertainment, advertising, demographics, pricing policies, and market channels. This paper incorporates that data and information. Our objectives were to determine how the industry is responding to current trends. What can producers learn from our research results? How can they incorporate these results into their existing marketing program?

Results and Discussion: Low prices of big box stores are sometimes BELOW break-even costs. When a Big Box store moves into town most reactive/resulting strategies boil down to “Snooze & Loose” or “Change & Prosper.” Producers who have changed not only stay alive; but also, compete and thrive in the shadow of the Big Boxes. The Big Boxes have made producers re-think their marketing strategies. Successful businesses are competing by:

- Knowing their costs.
- Developing a niche.
- Making lemonade out of lemons.
- Listening carefully to what the customer wants.
- Adding value/service.
- Making buying an experience.
- Not reinventing the wheel.

Acknowledgements: Thanks to the producers who were willing to share data and to the USDA Risk Management Agency who provided funding for this research

Profitability of Producing Outdoor Cut Flowers

Robin Brumfield
Rutgers University
Brumfield@aesop.rutgers.edu

Index Words: Cut flowers, costs and returns, profitability

Significance to Industry: Generally, field-grown cut flower production is a low-overhead business. Because it doesn't require a lot of capital to get started in this business, competition can develop rapidly. Worse, some producers may give profitability a low priority.

Business longevity is dependent upon producers knowing their costs and returns. Every flower business faces its own unique circumstances and costs. Costs and returns vary firm to firm, season to season, and crop to crop. Weather conditions and pest and disease problems further complicate forecasting and management even within the same firm. Controlling diseases and insects is critically important because the market is unforgiving if flowers have blemishes. Other factors that affect costs include location, size, managerial skill and style, market channel, and time of year.

Nature of Work: Table 1 gives an outline of the costs that growers need to consider for a "typical" one acre cut flower operation. This is based on a small wholesale grower selling bunches of 10 stems with an average of 4 stems per square foot. This example is meant to be a "benchmark" but is no substitute for producers doing their own cost accounting.

Costs are composed of variable and fixed (overhead) costs.

Variable costs vary with production. Variable costs include materials such as fertilizer, lime, plants, chemicals, etc. Production labor is also a variable cost. Other factors - social security, workmen's compensation, unemployment and disability insurance, and paid holidays - comprise total labor costs per hour - not just the hourly rate. As with most businesses, labor is the biggest single cost of production.

Fixed or overhead costs are considered fixed on an annual basis and do not vary with production. Since they remain constant regardless of what crops are produced, the overhead cost per unit decreases more units are produced. Examples include depreciation on buildings, irrigation equipment and vehicles; interest on average investment; repairs; taxes; business and licensing fees; dues and subscriptions; office supplies; land; and insurance.

Profits are equivalent to gross income minus total costs.

Producers need to keep good records and be cognizant of all costs involved on a daily basis. They must develop a business plan and stick with it. In general, it is wise for producers not to increase the size of their business until they know it is profitable. In general, investing in new technology results in labor (read: cost)

savings can be substantial. They also need to understand local environmental regulations, both current and impending.

Markets & Marketing: Due to the highly perishable nature of cut flowers, growers must develop an intensive marketing strategy. When considering selling to wholesale or retail florists, some important questions to ask are: What problems exist with current sources and product? What bunch weight or stem count is expected, and at what price? What size flower or seed head and stem length are most desirable? What varieties are purchased most often? How should the material be packaged?

If the target market is a local wholesaler, the price may be less than what a retailer would pay, but it is likely the wholesaler will purchase more products. The greatest benefit of wholesaling is there is an established market for and producers don't have to spend a lot of time finding individual customers. Products may garner a higher price at a farmers' market, but the volume is lower. Deciding what the target market is will be crucial in determining costs and returns.

Producers considering selling to a wholesaler should visit the wholesaler to see what kinds of products he/she offers. Because wholesalers do most of their business in the morning, they will have more time for talking with potential new suppliers in the afternoon. One important point to clarify with wholesalers is transport: will the wholesaler pick up the flowers, will the producer deliver to his/her door, or will the producer ship?

Although direct marketing can offer the benefit of higher prices than wholesaling, this strategy requires additional time and expense. The range of possibilities for direct marketing includes retail florists, farmers' markets, bucket shops, street corners and craft fairs. Local, niche markets are often the best choice for small growers.

You may find it advantageous to develop a mixture of marketing avenues. For instance, you may decide to sell fresh cut flowers to retail or wholesale florists and at the farmers' market. This way, you can sell long stems to florists and shorter stems to buyers at the farmers' market. Selling at the farmers market will also increase short-term cash flow, since wholesalers usually pay their accounts only once a month.

Producers may choose to dry their crop when prices for fresh cuts drop — selling them at a later date when the market is better. Drying flowers requires extra labor and storage space. These costs should be factored into the decision of whether or not it is advantageous to dry the flowers.

Prices: The market sets the price that the consumer will pay. Prices depend on several things: supply and demand, time of year, production costs, type of market, and location.

Producers should always know how much it costs to produce a crop to make key marketing decisions. For instance, if daisies are selling for 30 cents a stem and each one costs 40 cents to produce, producers may want to discontinue growing

daisies. Or, they may be able to cut production costs or find another market that will pay 40 cents a stem. They may decide to keep growing daisies, however, because they are needed in bouquets. Or, they may be able to buy reliable quality daisies at a lower price from another producer to use in making bouquets.

The USDA Agricultural Marketing Service publishes reports on ornamental crops every week. These reports give demand, supply, and price of cut flowers in several important markets in the U.S. (<http://www.ams.usda.gov/fv/mncs/fvwires/htm>).

Results and Discussion: Although growing cut flowers is no more difficult than growing vegetables, it does demand different skills. The key to success seems to be to identify several species as specialty products while always looking for new species. This reduces the price risk since low market prices for a species in oversupply are not generally a problem for all species at any given point in time.

This is an example of a typical budget for a one acre business. It is meant as a guide to help producers develop their own budgets. However, each producer's costs are unique and will not necessarily be the same as the ones in this example or those faced by any other producer.

Acknowledgements: Thanks to the producers who were willing to share data and to the USDA Risk Management Agency who provided funding for this research.

Table 1. Cut Flowers "Typical" Budget.

Item	Unit	Price	Quantity	Times	Labor	Acre	Bunch
Bunches	Bunch	\$5.00	8500			\$42,500.00	\$4.50
Variable Costs							
Calcium Lime	Ton	\$30.00	0.5			\$15.00	\$0.00
Soil Test	Acre	\$1.00	1			\$1.00	\$0.00
10-10-10 w/ mi-cronutrients – Pre-plant	lb.	\$0.12	800	1		\$96.00	\$0.01
20-20-20 w/ micronutrients-foliar feed	lb.	\$0.15	400	1		\$60.00	\$0.01
Herbicides		\$15.00		1		\$15.00	\$0.00
Fungicides		\$30.00		3		\$90.00	\$0.01
Insecticides		\$30.00		10		\$300.00	\$0.03
Plants		\$0.12	21780			\$2,613.60	\$0.30
Labor							
Soil Test	Hrs	\$10.15	0.1	1	0.1	\$1.02	\$0.00
Apply Lime	Hrs	\$10.15	0.5	1	0.5	\$5.08	\$0.00
Plowing	Hrs	\$10.15	0.5	1	0.5	\$5.08	\$0.00
Disk	Hrs	\$10.15	0.25	1	0.25	\$2.54	\$0.00
Apply Herbicide	Hrs	\$10.15	0.25	1	0.25	\$2.54	\$0.00

SNA RESEARCH CONFERENCE - VOL. 51 - 2006

Item	Unit	Price	Quantity	Times	Labor	Acres	Bunch
Apply Pre-Plant Fertilizer	Hrs	\$10.15	0.25	1	0.25	\$2.54	\$0.00
Plant	Hrs	\$10.15	50	1	50	\$507.50	\$0.06
Irrigation	Hrs	\$10.15	0.25	48	12	\$121.80	\$0.01
Apply Foliar Fertilizer	Hrs	\$10.15	0.25	1	0.25	\$2.54	\$0.00
Apply Pesticide	Hrs	\$10.15	0.25	10	2.5	\$25.38	\$0.00
Apply Fungicide	Hrs	\$10.15	0.25	3	0.75	\$7.61	\$0.00
Harvesting & Grading	Hrs	\$10.15	20	12	240	\$2,436.00	\$0.28
Packing	Hrs	\$10.15	2	12	24	\$243.60	\$0.03
Loading and Hauling to Market	Hrs	\$10.15	2.75	12	33	\$334.95	\$0.04
Total Labor					364.35	\$3,698.15	\$0.42
Marketing							
Plastic buckets		\$0.60	850			\$510.00	\$0.06
Packing Boxes		\$2.25	730			\$1,642.50	\$0.19
Sleeves and Barcodes		\$0.06	8500			\$510.00	\$0.06
Brown Paper		\$0.07	8500			\$595.00	\$0.07
Selling Charge		4.00%				\$1,700.00	\$0.20
Interest on Operating Capital		8.00%				\$360.63	\$0.04
Total Variable Costs						\$15,905.04	\$1.82
Fixed							\$0.00
Depreciation	Acre	\$3.96	1			\$6,150.00	\$0.71
Interest	Acre	\$7.17	1			\$1,340.00	\$0.15
Repairs	Acre	\$7.17	1			\$1,318.00	\$0.15
Taxes	Acre	\$7.17	1			\$626.00	\$0.07
Insurance	Acre	\$7.17	1			\$1,682.00	\$0.19
Oil and Gasoline	Acre	\$7.17	1			\$2,180.00	\$0.25
Land Charge	Acre	\$160.00	1			\$160.00	\$0.02
Leases	Acre	\$7.17	1			\$1,133.00	\$0.13
General Overhead	Acre	\$7.17	1			\$2,971.00	\$0.34
Total Fixed Costs						\$17,560.00	\$2.01
Total Fixed and Variable Costs						\$33,465.04	\$3.84
Management Fees			7.00%			\$2,331.35	\$0.27
Total Costs						\$35,796.39	\$4.11
Net Returns						\$6,703.61	\$0.77

The Changing Face of the American Gardener

Bridget K. Behe, Michigan State University
Jennifer H. Dennis, Purdue University
behe@msu.edu, jhdennis@purdue.edu

Index Words: consumer, marketing, survey

Significance to Industry: As the American population becomes more ethnically diverse, marketers may desire to target specific gardening products to selected ethnic groups. Our understanding of the garden participation and purchases of African-Americans, Asian-Americans, and Hispanic-Americans is minimal. This study was initiated to identify differences in gardening participation and purchases by ethnic background. Since income and ethnicity were related, the sample of 1024 home-owner respondents was stratified by income into four categories. The number of differences in garden-related activity participation and purchases decreased as income level increased across ethnic groups. For marketers, this shows a heterogeneous market at lower-income levels and a more homogeneous market at upper-income levels. A smaller percentage of African-Americans gardened with fruits, vegetables, or herbs at household income \leq \$25,000. A higher percentage of Hispanic-Americans engaged in water-gardening activities and purchased seeds at income \leq \$25,000. At the highest income level, the only two differences were that fewer African-Americans controlled pests or purchased pest control items. Especially at lower-income levels, there are gardening differences by ethnic heritage which may warrant separate marketing strategies, especially at the lower income levels.

Nature of Work: Consumer participation in gardening and purchases of garden-related products are often described demographically. The National Gardening Association (NGA) tracks consumer participation and spending for selected gardening activities. The NGA's 2005 study showed lawn and garden retail sales totaled \$35 billion with 89 million households participating in lawn and garden activities (Butterfield, 2006). Despite Americans spending \$38 billion on lawn and garden purchases, sales have remained flat since 2000. On average, Americans spent \$387 on lawn and garden materials in 2005, down \$48 from 2000. Some of this decrease may be attributed to the use of maintenance services. However, the decrease in dollars spent could signal a greater challenge in the lack of fascination of gardening by some American consumers.

Of the 281 million U.S. residents, 211 million (75%) of them were classified as Caucasian, 34.7 million (12.3%) of them were classified as African-American, 35.3 million (or 12.5%) of them were classified as Hispanic or Latino, and 10 million (3.5%) were classified as Asian (Table DP-1, Census 2000). Although majority of Americans fall into the Caucasian category (75%), we have very little understanding of the gardening participation and purchases of the 25% minority population.

In September 2004, a survey was conducted by Knowledge Networks (California) to determine the gardening participation, purchases, and attitudes of a representative sample of Americans. They drew a sample representative

of the U.S. population on average, but over-sampled for three ethnic groups: African-Americans, Hispanics, and Asians. Responses totaled 1610, of which 1591 complete responses were used in analyses.

We asked participants questions about their participation in seven gardening activities: mowing the lawn; gardening with annuals or perennials (flower gardening); gardening with trees or shrubs; gardening with fruits, vegetables, or herbs; water gardening; control of pests, insects, or weeds; or another gardening activity. They were asked in separate questions if (a) they personally participated in the activity and (b) whether another adult in the household participated in the activity. In separate questions, they were asked about household purchases of 12 products: annuals and perennials; trees and shrubs; vegetables, fruit trees or plants, or herbs; water garden plants; composting devices or implements; motorized tools; non-motorized tools; seeds; pest control supplies; fertilizer; garden sculpture or art, garden furniture; and other gardening purchases. All analyses were conducted by SPSS.

Results and Discussion: Participation in gardening activities was higher for home-owners (data not shown), so renters and those not paying for housing were excluded from analyses. Thus, 1024 responses were kept for additional analyses.

Income varied by ethnic background. A greater percentage of persons of Asian descent had a household income >\$75,000 in 2003 (26.6%) compared to Caucasians (14.8%), African-Americans (7.8%), and Hispanics (10.0%) ($\chi^2=100.471$, $p=0.000$). With differences in income, we stratified the remaining sample creating four income groups: (a) household income <\$25,000, (b) \$25,000 to \$49,999, (c) \$50,000 to \$74,999, and (d) > \$75,000. Gardening activity participation and purchases were compared by ethnic heritage within these four income groups.

Among home-owners with a 2003 household income \leq \$25,000, we found two differences in gardening-related activities and four differences in garden-related purchases (Table 1). A greater percentage of Asians participated in gardening with fruits, vegetables, and herbs compared to African-Americans. A greater percentage of Hispanic persons participated in outdoor water gardening compared to Caucasians, African-Americans, and Asians. No persons of Asian descent purchased trees or shrubs, but substantially more persons of Hispanic descent did, compared to Caucasians and African-Americans.

A similar percentage of home-owners from different ethnic backgrounds with household income \leq \$25,000 cared for their own lawn (69.5%, $p=0.624$), gardened with annuals and perennials (43.2%, $p=0.915$), gardened with trees and shrubs (43.2%, $p=0.520$), gardened with fruits, vegetables, and herbs (38.4%, $p=0.846$), controlled pests (50.5%, $p=0.681$), gardened indoors with flowering or foliage plants (42.6%, $p=0.441$), or had an outdoor water garden (31.6% ($p=0.661$)). A similar percentage of those individuals purchased annuals or perennials (50.5%, $p=0.125$), composting devices (13.2%, $p=0.125$), herbs and vegetables (27.9%, $p=0.081$), bulbs (23.2%, $p=0.081$), fertilizer (40.5%, $p=0.168$), non-motorized tools (20.5%, $p=0.135$), and garden furniture (8.9%, $p=0.091$).

Among those home-owners with a household income between \$25,000 and \$49,999, we found only one difference: a greater percentage of Caucasians purchased annuals, compared to African-Americans. Other activity participation and purchases were similar. We again saw only one difference among home-owners with a household income between \$50,000 and \$74,999. Very few African-Americans had another person in the household participate in water-gardening activities but ten times more Hispanics had another person in the household participate in water-gardening.

Two differences emerged in comparisons between ethnic groups among home-owners with a household income >\$75,000. Few African-Americans had another person in the household engage in pest control and purchased pest control supplies.

For garden-related retailers, these findings indicate the importance of understanding the demographic composition of the market area served, particularly the income level. Retailers serving lower-income groups may be more effective in reaching customers by segmenting the market by ethnicity. Retailers serving upper-income groups may be equally effective with less emphasis on market segmentation. Demographic information is available on-line, both free and for purchase by several companies. Demographic characteristics are easily obtained for most markets. Results here show that they can be a useful group of consumer variables to monitor.

Literature Cited:

1. Butterfield, Bruce W. 2006. National Gardening Association 2005. Conducted by Harris Interactive and published by the National Gardening Association, Burlington, Vermont.
2. Census 2000, Table Dp-1. Profile of General Demographic Characteristics: 2000, <http://censtats.census.gov/data/US/01000.pdf>. Accessed 11 October 2005.

Table 1. Percentage of home-owner survey respondents from four ethnic backgrounds, stratified by 2003 household income, who participated in garden-related activities and made purchases of garden-related products.

	Ethnic Group				Significance
	Caucasian	African-Am.	Hispanic	Asian	
Income < \$25,000	(n = 122)	(n = 28)	(n = 25)	(n=15)	(p level)
<u>Activities</u>					
Garden with fruits, vegetables (other person in household)	27.0%	3.6%	32.0%	33.3%	p=0.039
Outdoor water gardening (other person in household)	16.4%	14.3%	48.0%	26.7%	p=0.004
<u>Purchases</u>					
Trees and shrubs	13.9%	10.7%	36.0%	0.0%	p=0.004
Seeds	31.1%	14.3%	52.0%	13.3%	p=0.015
Motorized tools	12.3%	14.3%	4.0%	0.0%	p=0.034
Pest control	41.0%	32.1%	28.0%	33.3%	p=0.044
Income \$25,000 to \$49,999	(n = 209)	(n = 38)	(n = 56)	(n = 28)	
<u>Purchases</u>					
Annuals and perennials	8.4%	36.8%	42.9%	42.9%	p=0.034
Income \$50,000 to \$74,999	(n = 150)	(n = 22)	(n = 34)	(n = 28)	
<u>Activities</u>					
Outdoor water gardening (other person in household)	23.3%	4.5%	41.2%	32.1%	p=0.014
Income >\$75,000	(n =151)	(n = 16)	(n = 29)	(n = 61)	
<u>Activities</u>					
Pest control (other person in household)	55.6%	18.8%	48.3%	52.5%	p=0.045
<u>Purchases</u>					
Purchased pest control	58.9%	37.5%	44.8%	47.5%	p=0.020

Does Emotion Drive Gardening Purchases?

Jennifer H. Dennis, Purdue University
Bridget K. Behe, Michigan State University
jhdennis@purdue.edu, behe@msu.edu

Index Words: survey, consumer satisfaction, regret, consumers

Significance to Industry: Research and statistics have shown that gardening purchases have been stagnant. Understanding customer segments and examining overall consumption experiences may be one way to increase consumer purchases. An awareness of homogenous customer groups such as African-Americans, Asian-Americans, and Hispanic-Americans is important yet very little information exists. A study was conducted to examine differences in levels of satisfaction and regret for gardening purchases by ethnic background. This information provides insight into the overall consumption experience of the ethnic gardening consumer.

Nature of Work: The National Gardening Association survey shows that select gardening categories have leveled off (Butterfield, 2005). From 1998-2003, gardening activities for which spending actually decreased included: lawn care (-0.4%), flower gardening (-5.7%), indoor houseplants (-3.3%), vegetable gardening (-7.7%), shrub care (-12.7%), insect control (-3.6%), tree care (-5.0%), landscaping (-1.2%), container gardening (-9.1%), raising transplants (-5.0%), and water gardening (-12.0%). The decrease in dollars spent on 11 of the 16 categories listed could signal a greater challenge in the lack of fascination of gardening and by some American consumers. Could previous regretful or dissatisfying gardening experiences cause consumers to spend their money elsewhere?

In September 2004, a survey was conducted by Knowledge Networks (California) to determine the gardening participation, purchases, and attitudes of a representative sample of Americans. They drew a sample representative of the U.S. population on average, but over-sampled for three ethnic groups: African-Americans, Hispanics, and Asians. Responses totaled 1610, of which 1591 complete responses were used in analyses.

We asked participants questions about their participation in seven gardening activities: mowing the lawn; gardening with annuals or perennials (flower gardening); gardening with trees or shrubs; gardening with fruits, vegetables, or herbs; water gardening; control of pests, insects, or weeds; or another gardening activity. They were asked about household purchases of 12 products and about their level of satisfaction and regret with their purchases. The instrument was approved prior to testing or implementation by the university committee on research involving human subjects. All analyses were conducted by SPSS.

Satisfaction is a measure of consumer's expectations and performance of a particular product. It is generally attributed to the consumer's fulfillment response (Oliver 1997). Consumers make judgments about a product or service feature, or the product or service itself, evaluating the performance

received against their prior expectations. This standard comparison results in three outcomes: performance exceeding expectations (delight), performance meeting expectations (satisfaction), or performance failing to meet expectations (dissatisfaction). Consumers who are satisfied or delighted tend to purchase products again. However, those that are dissatisfied or regretful tend to switch to other activities or out of gardening altogether (Dennis et al., 2004b). Regret is differentiated from dissatisfaction as a cognitive emotion, brought on by consumers blaming themselves about their failed outcome, that accelerates switching to another product or industry when gardening experiences are not favorable for the consumer (Dennis et al., 2004a). Hicks et al. (2006) showed that delight, the positive cognitive emotion, was a better predictor of repeat purchases than satisfaction measures. Retailers should work towards minimizing the level of customer regret and maximize the level of delight in order to improve the likelihood of customers returning to make subsequent purchases.

A confirmatory factor analysis (CFA) was conducted to assess the reliability and validity for satisfaction, regret, and race used in each model and to also create factor scores to reduce and analyze the data. Satisfaction and regret were measured using four items, each with alpha values of 0.980 and 0.986 respectively. Factor scores derived from the CFA were then used to conduct t-test. These scores were then used in subsequent analysis to test differences in the scores between variables.

Results and Discussion: Satisfaction and regret scores were compared between home-owners of different ethnic backgrounds, stratified by income based on their most expensive purchases for the season (Table 1). A one-sample t-test was conducted based on satisfaction and regret factor scores and the ethnicity variable. Satisfaction and regret factor scores were analyzed using a t-test after filtering for race (Caucasian, African-Americans, Hispanics, and Asians). The t-test showed Caucasian ($t = 5.268, p = .000$) and African-Americans ($t = - 6.060, p = .000$) had a significant difference in their dissatisfaction scores. Hispanics and Asians were dissatisfied but not significantly from their Caucasian counterparts. In fact, Caucasian consumers were satisfied as shown with their positive mean score of 0.177. African-Americans, Hispanics, and Asians were on average dissatisfied with their most expensive purchases. When looking at regret scores, all ethnic groups were significantly different in the level of regret experienced showing there is a difference in the levels of regret based on ethnicity as a segmentation variable. At every income level, persons of Caucasian descent had a higher satisfaction average score and factor score, and higher regret mean score and factor score.

This indicated that Caucasians did experience greater satisfaction and less regret than persons of other ethnic backgrounds, regardless of income. At the lower income levels, home-owners of African-American descent showed less satisfaction and more regret, compared to Caucasian home-owners. At the highest income level, differences nearly disappeared among persons of different ethnic backgrounds.

Regretful customers have been known to switch and not repurchase products (Dennis et al., 2004b). If Caucasian consumers are the most targeted consumer

and the variability of knowledge and education varies for these mainstream customers, imagine the same frustration with the variability of other ethnic consumers. More could be done to improve the level of satisfaction and reduce regret among non-Caucasian customers which may lead to increased consumption of gardening products.

Literature Cited:

1. Butterfield, Bruce W. 2005. National Gardening Association 2004. Conducted by Harris Interactive and published by the National Gardening Association, Burlington, Vermont.
2. Butterfield, Bruce W. 2004. National Gardening Association 2003. Conducted by Harris Interactive and published by the National Gardening Association, Burlington, Vermont.
3. Churchill, G.A. and D. Iacobucci, 2002. *Marketing Research: Methodological Foundations*, 8th Edition, Hartcourt College Publishers: Fort Worth.
4. Dennis, Jennifer H. 2004a. "Happy Customer Buy More" Ph.D. Dissertation, Michigan State University.
5. Dennis, Jennifer H., Bridget K. Behe, R. Thomas Fernandez, and Robert Schutzki. 2004b. "Do Plant Guarantees Matter? The Role of Satisfaction and Regret when Guarantees are Present," *HortScience*, 41 (February) 142-145.
6. Hicks, Jessica M. Thomas J. Page Jr., Bridget K. Behe, Jennifer H. Dennis, and R. Thomas Fernandez. 2006. Delighted Consumers Buy Again. *Journal of Customer Satisfaction, Dissatisfaction, and Complaining Behavior*. 18:94-103.
7. Oliver, Richard L. (1996), *Satisfaction, A Behavioral Perspective of the Consumer*, McGraw-Hill.

Table 1. Satisfaction and Regret Scores by Income and Ethnicity.

	Satisfaction		Regret	
	Mean Score	Factor Score	Mean Score	Factor Score
Income < \$25,000				
Caucasian	0.140*	1.961	0.148*	2.077
African-American	-0.572*	-7.16	-0.575*	-7.10
Hispanic	-0.289*	-2.78	-0.293*	-2.77
Asian	-0.217 ns	-1.52	-2.65 ns	-1.87
Income \$25,000 to \$49,999				
Caucasian	0.179*	3.01	0.203*	3.44
African-American	-0.299*	-2.72	-0.279*	-2.49
Hispanic	-0.02 ns	-0.229	-0.02 ns	-0.204
Asian	-0.152 ns	-1.29	-0.156 ns	-1.32
Income \$50,000 to 74,999				
Caucasian	0.214*	3.05	0.204*	2.95
African-American	-0.093*	-0.504	-0.139 ns	-0.771
Hispanic	-0.204 ns	-1.40	-0.182 ns	-1.22
Asian	-0.146 ns	-0.96	-0.228 ns	-1.59
Income ≥ \$75,000				
Caucasian	0.175*	2.46	0.194*	2.72
African-American	-0.004 ns	-0.19	-0.030 ns	-0.144
Hispanic	0.139 ns	0.857	0.056 ns	0.349
Asian	0.044 ns	0.372	0.027 ns	0.233

ns is not significant at the $p \leq .05$ level.

Economic Impacts of the Turfgrass, Lawncare and Golf Course Industries in the United States

Alan W. Hodges, University of Florida
John J. Haydu, University of Florida
Charles R. Hall, University of Tennessee
awhodges@ufl.edu, jjh@ifas.ufl.edu, crh@utk.edu

Index Words: economic impacts, turfgrass, lawncare, golf, *Implan*

Significance to the Industry: Cultivated turfgrass is a pervasive feature of the urban landscape in the United States and many other developed regions of the world. Ornamental or aesthetic attributes of turfgrass are also highly regarded. Properly landscaped homes and businesses benefit financially from higher resale values when compared to poorly landscaped residences (Behe, et al, 2005; Des Rosiers, et al, 2002; Henry, 1999; Orland, et al, 1992).

Since the early 1970s the economic importance of the green industry has grown substantially, making it the second most important sector in agriculture (USDA/ NASS, 2004). This development was spurred primarily by rapid population growth and rising household incomes that began in the early 1990s and continues today. With an expanding economy, more disposable income, and extremely low interest rates, the demand for new home construction rose markedly as well. A strong upturn in the construction of homes, commercial businesses and schools translated into a similarly strong upturn in the demand for landscape materials, including turfgrass. As industries struggle for access to more water and land, the incentives to document their economic contributions to society have grown. As a result, a recent abundance of "green industry" studies funded largely by state trade associations and conducted by University economists and horticulturists have been published. The scope of industry publications and the methodologies employed vary widely, but all have a common theme and purpose of documenting the economic contribution of their respective industries. Over 50 such state-level publications spanning the period 1978 to 2004 were found. The present study extends findings from a previous study by the same authors (Hall, Hodges and Haydu, 2005) which estimated economic impacts for the Green Industry in the United States, of which turfgrass-related activity is an important component.

Nature of Work: The economic sectors associated with the turfgrass and lawncare industry in the United States include sod farms, lawncare services, lawn and garden retail stores, lawn equipment manufacturing, and golf courses, as indicated in Table 2. Definitions of these sectors were based on the North American Industry Classification System (NAICS, Executive Office of the President, Office of Management and Budget), at the five or six-digit level of detail. The five sectors shown in Table 2 are major components of the turfgrass industry that were used in estimating economic impacts. However, it should be noted that they do not represent all the sectors that contribute to the value of the turf industry. There are other turf-based recreational activities, such as racetracks and athletic fields, which were not included in the analysis due to a lack of data to estimate their economic impact. Consequently, the impact values presented

in this report for the turfgrass industry are considered a conservative estimate of the true value. In the same vein, it is also important to recognize that this study includes golf courses as part of the turfgrass industry's economic impact. Although it is logical to do so since turfgrass is a key input in golf operations, other aspects of golf operations are less directly attributable to turfgrass, such as restaurants or lodging establishments.

Economic information on the turfgrass industry was compiled from a variety of sources. The Census of Agriculture and Economic Census were considered to be the most reliable information sources available since they have well-established statistical methodologies with adjustment for small or non-responding firms and provide published confidence parameters.

For sod farms, national and state information on number of farms and production area were taken from the Census of Agriculture for 2002. Area and value of turfgrass harvested were estimated from industry survey data, with harvest value based on regional average prices. In this survey, a total of 581 sod farms were sent questionnaires of which 159 were returned, for a response rate of 27 percent. To determine value, respondents were asked their production area, percent of area harvested, average price (farm gate price, i.e., delivery not included), and share of total sales as sod products, and the share of sales that to customers outside their state.

For the sectors of lawncare services, retailing, equipment manufacturing and golf courses, information on number of establishments, employment, and sales (receipts) were taken from the 2002 Economic Census Industry Report Series for U.S. totals (U.S. Census Bureau, 2005). State-level information on number of firms, employment and payroll were taken from County Business Patterns (U.S. Department of Commerce), and were adjusted to match the U.S. totals. For some states in which employment and wages were non-disclosed because of a small number of firms reporting, employment was estimated at the midpoint of the range indicated, and payroll was estimated at the national average annual wages per employee.

Information on specific lawncare-related landscape services was taken from Dun & Bradstreet (Dun and Bradstreet Information Systems, 1997). A total of 18 specialty sectors were delineated representing over 53 thousand establishments nationwide. For the activities of lawn and garden services, garden maintenance and planting services, and landscape contractors, the share of total revenues that were turfgrass-related was estimated at 29.5 percent, based on data from the Economic Census. Retail sales of lawncare goods were taken from the National Gardening Survey for 2002, which was conducted by Harris Interactive for the National Gardening Association (Butterfield, 2005). Information on manufacturing of specific lawn equipment was taken from the *Current Industrial Report on Farm Machinery and Lawn and Garden Equipment Manufacturing* (U.S. Census Bureau, 2003b). Lawn equipment was segregated into six different categories, accounting for a total of \$6.15 billion in sales in 2003.

To evaluate the broad regional economic impacts of the turfgrass and lawncare industry in the United States, regional economic models were developed for each state using the *Implan* software system and associated state datasets (MIG, Inc., 2004). The *Implan* system includes over 500 distinct industry sectors. The *Implan* data used for this analysis was based on fiscal year 2001. The information for these models was derived from the U.S. National Income and Product Accounts, together with regional economic data collected by the U.S. Department of Commerce, Bureau of Economic Analysis. Input-output models represent the structure of a regional economy in terms of transactions between industries, employees, households, and government institutions (Miller and Blair, 1985).

Economic multipliers derived from the models were used to estimate the total economic activity generated in each state by sales (or output) to final demand or exports. This includes the effects of intermediate purchases by industry firms from other economic sectors (indirect effects) and the effects of industry employee household consumer spending (induced effects), in addition to direct sales by industry firms. The regional *Implan* models were constructed as fully closed models, with all household, government, and capital accounts treated as endogenous, to derive Social Accounting Matrix (SAM) type multipliers, which represent transfer payments as well as earned income. Separate multipliers were provided for output (sales), employment, value added, labor income, and business taxes. Differences in values of the multipliers reflect the structure of industry sectors and regional mix of supplier industries.

The calculation for the producer and service sectors assumes that only the export portion of output is sold to final demand and, therefore, is subject to the indirect and induced effects multipliers, while the remainder of in-state sales is subject to intermediate demand from other business sectors and to direct effects multipliers. Data on exports were taken from the *Implan* database for 2001 or 1999, except in the case of the nursery and greenhouse sector, where information for some states was taken from a national nursery industry survey (Brooker, et al, 2005). The calculation for the retail lawn and garden store sector assumed output is reduced to reflect only the gross margin on sales (29.5 percent) according to national averages (U.S. Census Bureau, 2004b). In some cases, impact results for 2002 values were restated 7.36 percent higher to express in current dollars terms, using the Gross Domestic Product (GDP) Implicit Price Deflator (U.S. Dept. Commerce, 2005) for April 2002 and April 2005.

Results and Discussion: As defined in this study, the five sectors comprising the U.S. turfgrass and lawncare industry in 2002 generated total output (revenue) impacts of \$53.5 billion (Bn), employment impacts of 771,325 jobs, value added impacts of \$32.3 Bn, labor income of \$21.2 Bn, and \$2.2 Bn in indirect business taxes to local and state governments (Table 3). The value added impact represents total personal and business net income. If these values are expressed in 2005 dollars, the total output impact was \$57.4 Bn and the total value added impact was \$34.7 Bn.

Among individual sectors, sod producers created nearly \$1.8 Bn in output impacts, \$1.3 Bn in value added, and 17,028 jobs. Lawn equipment manufacturers contributed \$8.0 Bn in output, \$2.5 Bn in value added, supported

nearly 34,000 jobs. The lawncare goods retailing sector produced \$4.3 Bn in output impacts, contributed \$2.9 Bn in value added, and sustained 62,770 jobs. The lawncare services sector generated nearly \$19.8 Bn in output impacts, \$13.3 Bn in value added, and 295,841 jobs. Golf courses had \$23.3 Bn in output impacts, \$14.5 Bn in value added, and 361,690 jobs. Because of the significance of golf courses, an important caveat is that all of its economic impacts have been included in these estimates, even though turfgrass is only one input to golf operations among other activities such as restaurants and lodging establishments.

The total economic impact is comprised of direct, indirect and induced components. Direct output impacts, representing sales by the turfgrass industry sectors, amounted to \$44.5 Bn; indirect output impacts were \$2.9 Bn., representing the value of purchased goods and services by the turfgrass industry; induced impacts were \$10.1 Bn, arising from consumer spending by industry employees.

Employment impacts of the turfgrass industry are summarized by sector, state and region in Table 4. The turfgrass industry has significant activity in all areas of the United States. The top ten individual states in terms of employment impacts were California (95,917 jobs), Florida (81,797), Texas (48,511), Ohio (31,188), Illinois (28,915), Pennsylvania (28,571), North Carolina (27,373), Georgia (25,954), South Carolina (24,546) and New York (22,317). Regionally in the U.S., the Southeast was the largest in terms of employment impacts (190,304 jobs), followed by the East-Central. (148,833), Western Coastal (123,425), South-Central (102,287), North-Central (91,586), Western-Interior (60,672) and the Northeast (54,218).

Literature and Information Sources Cited:

1. Behe, B., J. Hardy, S. Barton, J. Brooker, T. Fernandez, C. Hall, J. Hicks, R. Hinson, P. Knight, R. McNiel, T. Page, B. Rowe, C. Safley and R. Schutzki. 2005. Landscape Plant Material, Size, and Design Sophistication Increase Perceived Home Value. *J. Env. Hort.* Vol. 23(3):127–133.
2. Brooker, John C., C. Hall, D. Eastwood, J. Haydu and A. Hodges. 2005. The Fourth National Industry Survey of Production and Marketing Practices. Southern Nursery Association, Vol. 49:38–43.
3. Butterfield, B. 2005. National Gardening Survey, 2004. National Gardening Association, Burlington, VT.
4. Campbell, Ramsey and Robert Sargent. 2001. Water Crisis May Strike Here by 2006. *The Orlando Sentinel*. November 27, p.A1.
5. Carriker, R.L. 1993. Agriculture, Water Quality, and Public Policy. Univ. of Florida, Inst. of Food & Ag. Sci., Food Res. Econ. Dept., SP-96-15.
6. Des Rosiers, F., M. Theriault, Y. Kestens and P. Vleeneuve. 2002. Landscaping and House Values: An Empirical Investigation. *Journal of Real Estate Research*. 23(1-2):139–161.
7. Dun and Bradstreet Information Systems. 1997. Industry reports, available at <http://www.zapdata.com/IndustryReports/About.do> (login required).
8. Executive Office of the President, Office of Management and Budget. North American Industry Classification System (manual), United States, 1997. U.S. Government Printing Office, Washington, D.C. 1247 pages.

9. Hall, C., A. Hodges and J. Haydu. 2005. Economic Impacts of the Green Industry in the United States. Final report to the National Urban and Community Forestry Advisory Committee (USDA/NUCFAC). 81 pages, June. Available at <http://www.utextension.utk.edu/hbin.greenimpact.html>.
10. Haydu, John J., Richard C. Beeson and Jean Caron. 2004. Economic Analysis of Five Irrigation Technologies for Container-grown *Viburnum odoratissimum*. *Acta Horticulturae* 664:309–316.
11. Henry, Mark S. 1999. Landscaping Quality and the Price of Single Family Houses: Further Evidence from Home Sales in Greenville, South Carolina. *J. Env. Hort.* 17 (1):25–30.
12. Lawn & Landscape Magazine. 2004. *2004 State of the Industry Report*. October 13. Available at <http://www.lawnandlandscape.com>.
13. MIG, Inc. 1999. *Implan Professional*, version 2.0, *Social Accounting & Impact Analysis Software: User's Guide, Analysis Guide and Data Guide*. Stillwater, MN. 418 pp. April
14. MIG, Inc. 2004. *Implan 2001 50 State Data Package*. Stillwater, MN. January.
15. Miller, R.E. and P.D. Blair. 1985. *Input-output analysis: Foundations and extensions*. Prentice-Hall, Englewood Cliffs, NJ. 464 pp.
16. National Golf Foundation. 2005. Number of U.S. golf facilities. Jupiter, FL. Website: <http://www.ngf.org/cgi/home.asp>.
17. Orland, B., J. Vining and A. Ebreo. 1992. The Effect of Street Trees on Perceived Values of Residential Property. *Environment and Behavior* 24(3):298–325.
18. University of Florida. 2005. Sod Producer Survey, 2005. Unpublished data. Institute of Food & Agricultural Sciences, University of Florida, Gainesville, FL.
19. U.S. Census Bureau. 2003. Farm Machinery and Lawn and Garden Equipment Manufacturing: 2002. Current Industrial Reports MA333A(02)-1. United States Department of Commerce, Washington, D.C., August.
20. U.S. Census Bureau. 2004a. 2002 County Business Patterns, EPCD, County & State Database on NAICS Basis. United States Department of Commerce, Washington, D.C. Available at <http://www.census.gov/epcd/cbp/view/cbpview.html>, accessed Dec. 2004.
21. U.S. Census Bureau. 2004b. *Annual Benchmark Report for Retail Trade and Food Services: January 1992 through February 2004*. Current Business Reports BR/03-A. U.S. Department of Commerce, Washington, D.C. March.
22. U.S. Census Bureau. 2004c. Amusement, Gambling, and Recreation Industries, 2002 Economic Census, Arts, Entertainment, and Recreation Industry Series, EC02-711-03. United States Department of Commerce, Washington, D.C., August.
23. U.S. Census Bureau. 2004d. *Annual Benchmark Report for Wholesale Trade: January 1992 through December 2003*. Current Business Reports BW/03-A. U.S. Department of Commerce, Washington, D.C., March.
24. U.S. Census Bureau. 2004e. *Annual Estimates of the Population for the United States and States, and for Puerto Rico. April 1, 2000 to July 1, 2004 (NST-EST2004-01)*. Population Division, December 22.
25. U.S. Census Bureau. 2004f. Lawn and Garden Equipment & Supplies Stores, 2002 Economic Census, Retail Trade Industry Series, EC02-

- 441-08. United States Department of Commerce, Washington, D.C., September.
26. U.S. Census Bureau. 2004g. Services to Buildings and Dwellings, 2002 Economic Census, Administrative and Support and Waste Management and Remedial Services Industry Series, EC02-561-07. United States Department of Commerce, Washington, D.C., June.
 27. U.S. Census Bureau. 2005. *2002 Economic Census Industry Report Series for U.S. Totals*. United States Department of Commerce, Washington, D.C.
 28. U.S. Department of Agriculture, National Agricultural Statistics Service. 2004. *2002 Census of Agriculture. United States Summary and State Data, Vol. 1, Geographic Area Series, Part 51, AC-02-A-51*. United States Department of Agriculture, Washington, D.C., June.
 29. U.S. Department of Agriculture. 2005. *Floriculture and Nursery Crops Outlook*. FLO-04. Available on-line at <http://usda.mannlib.cornell.edu/reports/erssor/speciality/flo-bb/flo04.pdf>.
 30. U.S. Department of Commerce. 2005. Gross Domestic Product: Implicit Price Deflator, 1970–2005, Quarterly. Available at <http://research.stlouisfed.org/fred/data/gdp/gdpdef>.
 31. U.S. Department of Labor. Standard Industrial Classification (SIC) System electronic search engine. Available online at <http://www.osha.gov/pls/imis/sicsearch.html>.

Acknowledgements: This study was sponsored in part by the International Turfgrass Research Foundation, Turfgrass Producers International, Rolling Meadows, IL.

Table 2. Classification of sectors associated with the turfgrass and lawncare industry.

Sector	Industry Sector(s) (NAICS code)	Implan Sector Name (Number)
Sod Farms	Nursery and Floriculture Production (11142)*	Nursery & Greenhouse (6)
Lawncare Services	Landscaping Services (56173)*	Services To Buildings And Dwellings (458)
Lawncare Retail Stores	Lawn and Garden Equipment and Supplies Stores (4442)* and Home Centers (44411)*	Building Material And Garden Supply Stores (404)
Lawn Equipment Manufacturing	Lawn & Garden Tractor and Home Lawn and Garden Equipment Manufacturing (333112)*	Lawn & Garden Equipment Manufacturing (258)
Golf Courses	Golf Courses and Country Clubs (71391)	Amusement, Gambling and Recreation Services (458)

* Turfgrass-related activity in this sector is a portion of the overall industry sector.

Table 3. Summary of economic impacts of the turfgrass, lawncare and golfcourse industries in the United States, by sector, 2002.

Sector	Output			Value Added (Mn\$)	Labor Income (Mn\$)	Indirect Business Tax (Mn\$)	Employment (Jobs)
	Total (Mn\$)	Direct (Mn\$)	Indirect (Mn\$)				
Sod Production	1,669.6	1,494.5	28.9	146.2	585.8	27.2	17,028
Lawncare Services	18,506.9	12,811.5	1,013.4	4,681.9	9,684.5	458.4	295,841
Lawncare Retailing	4,334.5	3,788.7	101.8	444.0	1,934.2	498.7	62,770
Lawn Equipment Manuf.	7,513.7	6,148.4	613.4	756.6	1,224.3	117.3	33,995
Golf Courses	21,772.3	17,433.8	941.8	3,396.7	7,926.7	1,145.6	361,690
Total	57,435.6	44,464.1	2,890.4	10,086.1	22,784.2	2,375.8	771,325

SNA RESEARCH CONFERENCE - VOL. 51 - 2006

Table 4. Employment impacts of the U.S. turfgrass, lawncare and golfcourse industries, by state, region and industry group, 2002.

State/Region	Sod Production	Lawncare Services	Lawncare Retailing	Eqmt. Manuf.	Golf Courses	Total
Number of Jobs						
Total U.S.	17,028	295,841	62,770	33,995	361,690	771,325
Northeast	558	22,053	4,361	741	26,505	54,218
Connecticut	61	4,399	675	0	4,257	9,392
Maine	62	1,210	322	10	909	2,513
Massachusetts	30	6,038	693	0	6,576	13,336
New Hampshire	9	1,401	348	0	1,156	2,914
New York	248	7,540	2,019	722	11,789	22,317
Rhode Island	148	954	53	0	1,555	2,711
Vermont	0	511	251	10	263	1,035
Southeast	7,261	62,508	9,355	13,414	97,766	190,304
Alabama	1,115	4,177	852	59	5,354	11,557
Florida	3,544	25,281	1,967	67	50,938	81,797
Georgia	761	10,290	1,961	2,409	10,534	25,954
North Carolina	265	11,390	2,001	355	13,362	27,373
South Carolina	651	6,017	890	5,211	11,777	24,546
Tennessee	926	5,353	1,685	5,313	5,801	19,077
East Central	2,092	62,670	12,540	3,618	67,913	148,833
Delaware	41	1,238	186	0	1,308	2,773
Kentucky	237	2,271	1,501	7	3,528	7,544
Maryland	145	8,924	936	10	5,896	15,911
Michigan	317	6,820	2,041	522	10,925	20,625
New Jersey	583	9,200	848	54	7,231	17,916
Ohio	318	12,821	2,549	2,117	13,383	31,188
Pennsylvania	74	10,067	2,304	166	15,960	28,571
Virginia	363	10,370	1,854	741	8,440	21,767
West Virginia	14	960	321	0	1,243	2,538
North Central	1,166	27,875	13,389	9,604	39,552	91,586
Illinois	237	10,303	2,507	1,819	14,049	28,915
Indiana	169	5,907	2,159	1,133	8,053	17,422
Iowa	117	1,754	1,915	124	4,551	8,461
Minnesota	424	3,910	1,944	1,037	3,868	11,182
Nebraska	61	1,116	1,189	87	2,058	4,511
North Dakota	1	188	428	9	255	881
South Dakota	4	278	720	11	804	1,817
Wisconsin	154	4,418	2,527	5,383	5,915	18,398
South Central	4,085	34,481	11,119	4,932	47,669	102,287
Arkansas	347	1,671	827	2,511	2,642	7,998
Kansas	107	2,234	1,206	475	3,399	7,420
Louisiana	132	1,931	1,024	10	4,927	8,024
Mississippi	222	1,259	900	1,023	3,355	6,759
Missouri	308	4,238	2,247	815	7,799	15,407
Oklahoma	993	3,037	919	61	3,159	8,168
Texas	1,976	20,113	3,997	38	22,388	48,511

SNA RESEARCH CONFERENCE - VOL. 51 - 2006

Western						
Interior	975	26,371	4,905	913	27,507	60,672
Arizona	109	9,164	836	892	11,120	22,121
Colorado	287	7,133	1,077	11	5,320	13,828
Idaho	190	1,401	954	0	1,255	3,800
Montana	47	366	681	0	1,025	2,120
Nevada	31	4,959	258	0	5,379	10,627
New Mexico	45	1,322	344	0	1,171	2,882
Utah	245	1,744	614	11	1,758	4,372
Wyoming	21	280	141	0	479	921
Western						
Coastal	893	59,884	7,099	772	54,777	123,425
Alaska	4	173	72	0	77	326
California	553	48,547	4,265	693	41,858	95,917
Hawaii	7	1,653	101	0	3,848	5,609
Oregon	154	3,556	1,084	62	3,610	8,467
Washington	174	5,954	1,578	17	5,383	13,106

Regional Analysis of Trade Flows and Marketing Practice Trends in the United States Nursery Industry

Bryan Combs, Charles Hall, John Brooker and William Klingeman
The University of Tennessee, Department of
Agricultural Economics, Knoxville, TN 37996
crh@utk.edu

Index Words: National nursery industry survey, regional analysis, plant category sales, advertising expenditures

Significance to the Industry: Very little is known about the changing trade flow structure of the nursery and greenhouse industry. This includes sources of inputs, acreage, geographic distribution of operations, employment and distributions of sales by type of outlet and geographic location. Given the increasingly competitive nature of the market and variations in experience of the green industry across states, component assessments are needed to assist stakeholders in managerial decision making.

Nature of Work: Trade flow and marketing data have been collected as part of the S-1021 Research Committee's activity since 1988 (formerly S-103 and S-290). The first national nursery industry survey was conducted in 1989 and gathered data for the preceding year. Since the initial survey in 1989, subsequent surveys have been conducted at five year intervals with the most recently conducted in 2004. Data gathered from the 1989 survey and 2004 survey were evaluated regionally to determine change in trade flows and marketing practices over the 15 year period.

This study identifies structural adjustments in the nursery industry as indicated by regional trade-flow trends, production and marketing practices in the nursery and greenhouse industry from 1988 to 2003. This was accomplished through a comparison of responses to two national surveys of nursery and greenhouse operators conducted in 1989 and 2004.

Of 23 states included in the 1989 survey and 44 states included in the 2004 survey, there were 21 states that were involved in both surveys. These 21 states were placed into one of three regions for comparison (Table 1). To describe changes in the industry between the 1989 and 2004 surveys, one of two methods was used to compare the regional means. The method used depended upon the type of response given to the question. For questions with binary responses, a t-test was performed to determine significant differences in the two surveys. For questions with multiple responses, chi square tests of independence were performed. Significance at both the 0.05 and 0.01 level are shown in the results tables. A significant t-value or chi-square value leads to the rejection of the null hypothesis and acceptance of the alternative.

Some questions in each of the three subsequent surveys were modified since the 1989 survey to improve accuracy and capture changes in industry terminology. Due to these modifications, some questions and/or response categories were

unique to a particular survey and could not be used in time-series comparisons. It is also important to note that slight differences in the question response categories between the surveys did not allow for the comparison of all response categories. This resulted in the percentages of some of the questions not totaling to 100 percent.

Results and Discussion: Mean percentages of sales in various plant categories in the northern region declined in all categories with the exception of herbaceous perennials and Christmas trees (Table 2). Christmas trees demonstrated an increase from 1.9 percent in 1988 to 13.3 percent in 2003 while herbaceous perennials increased from 4.6 percent to 11.1 percent over the time period. The mean percentage of sales for both Christmas trees and herbaceous perennials are statistically significant at the 0.01 level. The northern region also had significant mean differences in narrow-leaved evergreen shrubs and evergreen trees. Both showed declines over the period accounting for 12.3 percent in 1988 to 3.4 percent in 2004 for narrow-leaved evergreen shrubs and 28.5 percent in 1988 to 14.9 percent in 2004 for evergreen trees.

The southern region also declined in all categories with the exception of roses, herbaceous perennials and Christmas trees. Unlike the northern region the southern region had a smaller percentage change in the herbaceous perennials and Christmas tree categories. However, the mean percentage of sales to these categories was still statistically significant at the 0.01 level. The major declines in sales were demonstrated in the deciduous shade/flowering trees and the broad-leaved evergreen categories. Deciduous shade/flowering trees decreased from 21.9 percent in 1988 to 13.6 percent in 2003 and the broad-leaved evergreens declined from 22.3 percent in 1988 to 12.2 percent in 2003.

The western region declined for all categories except deciduous shrubs and herbaceous perennials. Sales of herbaceous perennials increased from 7.1 percent in 1988 to 10.0 percent in 2003. This increase in the mean sales from herbaceous perennials was significantly different between the two surveys at the 0.01 level. The major decreases for the region are shown in the Christmas tree and broad-leaved evergreen shrub categories. Christmas trees moved from 11.8 percent in 1988 to 1.2 percent in 2003 while broad-leaved evergreen shrubs moved from 16.3 percent in 1988 to 7.9 percent in 2003.

The mean percentage of total sales spent on advertising for the northern region was statistically different between 1988 and 2003 moving from 2.1 percent in 1988 to 3.8 percent in 2003 (Table 3). Major changes in the northern region also occurred in advertising dollars allocated to yellow pages, radio/TV, and catalogs. The mean difference in the allocation of sales dollars in these categories are all statistical significant at the 0.01 level.

The southern region also had significant increases in the percentage of total sales spent on advertising. A mean of 2.4 percent of sales was used for advertising in 1988 increasing to 3.9 percent in 2003. Like the northern region, the southern region also had significant increases for the allocation of sales dollars for radio/TV and catalogs. Significant increases were also shown for the allocation of sales dollars to trade shows increasing from \$6,076 in 1988 to

\$24,567 in 2003. The mean percentage of sales spent on advertising increased from 1.8 percent in 1988 to 3.8 percent in 2003 for the western region. Along with the other two regions the western region also displayed significant mean differences in the dollar amount allocated to radio/TV advertisement. Another major change in the mean dollar amount spent on advertising occurred for trade shows. Mean dollars spent on trade show advertisement moved from \$4,675 in 1988 to \$8,746 in 2003 (values expressed in 2003 dollars using the GDP Implicit Price Deflator, U.S. Dept. Commerce).

All three regions increased in herbaceous perennials. This is not surprising since about 50 percent of total floriculture receipts are from bedding and garden plants, up from nearly 44 percent in 2000. Growth in sales is expected to increase for 2005 especially in the western states. This also correlates with a change in the market because the South and the West are narrowing the gap between the large markets in the Midwest and Northeast (Jerardo 2005). Another important reason for the increase in the bedding and gardening plants comes from the additional number of consumers that come into contact with nursery products as they are made more available by mass merchants (Hall, Hodges and Haydu 2005).

Recent growth in the nursery industry and more fierce competition has led to a greater focus on advertising. Catalogs and trade shows are still major marketing tools in the nursery industry. Catalogs not only identify products that nurseries produce but also aid customers in making buying decisions and identify specializations of the firm (Helms, Laurent and McCoy 1996).

There has been a great deal of change in the nursery industry between 1988 and 2003. Significant changes have occurred in the types of plants grown, plant form sales, sales transaction methods, sales to wholesale and retail outlets, allocation of advertising dollars and computerization. These changes indicate trends which are evident in the industry and are important to understanding trade flows and marketing practices.

Literature Cited:

1. Hall, C.R., A.W. Hodges and J.J. Haydu. Economic Impacts of the Green Industry in the United States. Final Report to the National Urban and Community Forestry Advisory Committee. 2005.
2. Helms, L.C., C. Laurent and M. McCoy. Marketing and promoting in the green industry: success stories from the field. Wholesale Nursery Growers of America. 1996.
3. Jerardo, A. Floriculture and Nursery Crops Situation and Outlook. FLO-04. USDA, Economic Research Service, Washington, DC. 2005.
4. Trade Flows and Marketing Practices within the United States Nursery Industry, Sou. Coop. Series Bull. 358, Published at The Univ. of Tenn. Agri. Exp. Sta. for Sou. Regional Research Project S-103, Oct. 1990.
5. Trade Flows and Marketing Practice within the United States Nursery Industry, Sou. Coop. Series Bull. 404, Published at The Univ. of Tenn. Agri. Exp. Sta. for Sou. Regional Research Project S-1021, 2005.

6. U.S. Department of Commerce. Gross Domestic Product: Implicit Price Deflator, 1970-2004, Annual. Available at <http://research.stlouisfed.org/fred/data/gdp/gdpdef>

Table 1. Breakdown of states participating in the national nursery survey categorized by regions for comparison.

	States				
Southern Region	AR	FL	GA	KY	LA
	MS	NC	OK	SC	TN
Northern Region	CT	DE	IL	ME	MI
	NJ	NY	OH	PA	
Western Region		CA	OR		

Table 2. Mean percentage of plant category sales for the northern, southern, and western regions from 1988 to 2003.

Categories	Northern Region			Southern Region			Western Region		
	N			N			N		
	1988	2003	Mean	1988	2003	Mean	1988	2003	Mean
Deciduous shade/flowering trees	601	796	19.39 (-12.34*)	635	895	21.93 (-12.34*)	201	276	13.67 (-1.35)
Deciduous shrubs	601	796	9.18 (-10.15*)	635	895	5.39 (-1.89)	201	276	3.84 (-0.67)
Broad-leaved evergreen (excl azaleas)	601	796	9.48 (-12.64*)	635	895	22.27 (-15.96*)	201	276	16.28 (-8.42*)
Narrow-leaved evergreen shrubs	601	796	12.29 (-22.63*)	635	895	10.52 (-22.16*)	201	276	8.02 (-4.33*)
Evergreen grees	601	796	28.54 (-16.21*)	635	895	12.94 (-10.66*)	201	276	10.81 (-7.08*)
Vines and ground covers	601	796	3.94 (-9.10*)	635	895	5.45 (-6.89*)	201	276	7.08 (-1.19)
Roses	601	796	0.85 (-1.23)	635	895	0.96 (-0.4)	201	276	3.44 (-1.19)
Herbaceous perennials	601	796	4.63 (11.32*)	635	895	3.04 (4.39*)	201	276	7.05 (2.90*)
Christmas trees (live or cut)	601	796	1.85 (17.63*)	635	895	1.35 (3.59*)	201	276	11.83 (-11.13*)
Tree fruits	601	796	2.91 (-9.60*)	635	895	4.08 (-1.98**)	201	276	4.24 (-1.18)
Propagated material (liners, cuttings)	601	796	3.13 (-2.70*)	635	895	6.72 (-3.16*)	201	276	7.77 (-2.43*)

t-values are shown in ().

*Significant at the 0.01 level.

**Significant at the 0.05 level.

Table 3. The mean percentage of total sales and the dollar value allocated to advertising methods for the northern, southern, and western regions from 1988 to 2003.

Categories	Northern Region						Southern Region						Western Region					
	N		Mean		N		Mean		N		Mean		N		Mean			
	1988	2003	1988	2003	1988	2003	1988	2003	1988	2003	1988	2003	1988	2003	1988	2003		
Percentage of total sales	601	704	2.07	3.76 (13.25*)	635	776	2.42	3.94 (8.63*)	201	235	1.81	3.77 (5.30*)	195	157	\$3,080	\$4,891 (2.45**)		
Yellow pages	580	462	\$1,414	\$4,020 (7.21*)	598	517	\$2,984	\$3,755 (2.45**)	195	157	40	970 (6.78*)	195	157	40	970 (6.78*)		
Radio/TV	580	462	639	4,553 (4.84*)	598	517	104	1,498 (6.78*)	195	157	40	970 (6.78*)	195	157	40	970 (6.78*)		
Billboards	580	462	373	321 (0.76)	598	517	74	149 (3.41*)	195	157	-	26 (3.41*)	195	157	-	26 (3.41*)		
Catalogs	580	462	5,145	19,874 (4.10*)	598	517	3,444	9,831 (4.23*)	195	157	14,566	6,668 (-4.23*)	195	157	14,566	6,668 (-4.23*)		
Trade journals	580	462	3,292	2,188 (-0.32)	598	517	1,986	5,814 (6.89*)	195	157	11,751	3,276 (-6.89*)	195	157	11,751	3,276 (-6.89*)		
Newsletters	580	462	2418.00	3,519 (4.08*)	598	517	1,784	1,377 (-0.41)	195	157	1,988	5,392 (-0.41)	195	157	1,988	5,392 (-0.41)		
Trade shows	580	462	3,523	6,420 (5.30*)	598	517	6,076	24,567 (5.43*)	195	157	4,675	8,746 (5.43*)	195	157	4,675	8,746 (5.43*)		
Other	580	462	8,9461.85	7,790 (1.12)	598	517	5,265	15,958 (2.66*)	195	157	9,888	5,073 (-2.66*)	195	157	9,888	5,073 (-2.66*)		

t-values are shown in ().

*Significant at the 0.01 level.

**Significant at the 0.05 level.

Enterprise Budgets for Container-grown Woody Ornamental Plants, Climatic Zones 8 and 9

Roger A. Hinson
Department of Agricultural Economics and Agribusiness,
La. State University AgCenter, Baton Rouge, LA 70803
rhinson@agctr.lsu.edu

Index Words: production costs; enterprise budgets; product diversification; enterprise diversification; marketing strategies

Significance to Industry: The ornamental plants sector of agriculture continues to grow in importance. A national economic impact study for 2004 shows the 'green industry' provided about \$147.8 billion in output, nearly 2 million jobs, about \$26 billion in sales and \$18.1 billion in value added (Hall, 2005). The impact in the Southeast region was about \$13.5 billion in 2004. This sector has been growing and has attracted the interest of farmers in commodity-oriented sectors. If a significant number of farmers switched to nursery production, or if existing growers were to expand their output, important changes in the supply/demand balance of plants could materialize, and the ability to hold or raise prices might be affected. Growers need a relevant information base to respond appropriately to these and other industry changes.

This project estimates cost of production (COP) budgets for selected container-grown ornamental plants. Enterprise budgets are an important component of the information base at several levels. Budgets help with choices involving risk, such as crop mix, choices regarding expansion, and pricing and price negotiations. Nurserymen are aware of the need for improved cost information and for risk management tools and strategies, and use their experience base and other information to generate better results through decisions that reduce risk and improve profitability. Budgets provide evaluation benchmarks for lenders in the form of objective evaluations of the variable and fixed costs of production. These objective benchmarks to evaluate production efficiency and reference materials for lenders have not been readily available. When weather or other damaging events occur, this absence of information makes losses harder to verify when monies such as disaster relief benefits are allocated. Decisions about the purchase of insurance are another example - choosing the option with best expected benefit is more difficult without cost information. At another level, industry leaders debate the impacts of regulatory requirements that may provide environmental benefits and impose costs on growers. These impacts are more difficult to illustrate without objectively-created budgets.

Nature of Work: Enterprise budgets are a building block of growers' risk information base. COP estimates for woody ornamentals were produced in the late 1970s and updated in the early 1990s, but little research on cost has been completed since then. The early work was by Badenhop (1979) and others, using the Kurume Azalea produced in climatic zone 9 as the model plant. In subsequent work, COPs for several other widely grown plants were developed for Pfitzer Juniper, Pin Oak, Dogwood and Burford Holly. Taylor et al. (1986)

generated COP budgets for field-grown woody ornamentals for climatic zones 5 and 6 for slow- and rapid-growing evergreens, deciduous shrubs, shade trees and ornamental trees produced on 50 and 200 acre nurseries. Plants were grouped by similarity of production activities and management practices on the nursery. To make the budget process more manageable, these groups of plants were represented by the individual plant that was expected to be the largest seller and/or that was produced in largest quantity.

Perry et al. (1990) also placed the COP process in the context of a complete nursery operation with a variety of plants. Plant groups again were used as the basis for budgeting. Researchers estimated the proportions of the total operation that would be represented by each of these groups on a typical container nursery. To estimate COP for each plant, Perry identified (i) the sequence of operations required for production of the plant, (ii) machinery and equipment requirements for the activities, (iii) operating inputs along with rates and costs, and (iv) labor required. The procedure for capturing the procedures and inputs and their costs was referred to as economic engineering. This process took advantage of the accumulated knowledge base of experts in industry and in the public sector to identify these production practices and performance rates. Results were presented as capital requirements and costs for a 20 acre and a 40 acre production nursery. The groups, individual plants, percent of total space allocated, and cost per plant for 1-gallon containers were azalea (25%, \$1.02); narrowleaf evergreens (Juniper, 15%, \$1.29); broadleaved evergreens (Euonymus, 30%, \$1.03); deciduous shrub (Forsythia, 10%, \$1.03); and deciduous trees (red maple and pecan, 10 % each, \$6.96 and \$5.72).

Estimates of COP were prepared for field-grown woody ornamentals, but this kind of production is a relatively low and declining proportion of total production. Other work has addressed the issues of over-wintering costs. These costs are relatively low in climatic zones 8 and 9, but are significant in cooler climates.

Results and Discussion: This research builds on the approach described above, and on similar unpublished work by McNeil. However, most parameters have changed over time. Consumer demand has changed the proportions of plants and plant groups on a nursery. The increasing market share captured by mass merchandisers drives down price and forces cost reductions and innovation. Advances in inputs such as fertilizers and chemicals change production techniques.

Economic engineering, an efficient procedure, will be the basis for data collection. A team of horticulturalists and agricultural economists from Louisiana, Mississippi, Alabama, Arkansas and Tennessee has formed to conduct this work. The preliminary choice of plant groups and % of total production are azalea (20), holly (20), crapemyrtle (15), live oak (10), fig (5), herbaceous perennials (15), and ground covers (15). Using producer panels and their own knowledge base from research programs, horticulturalists will indicate appropriate updates to production systems for each plant, consisting of the sequence of operations and inputs. Operations imply that appropriate machinery and equipment must be identified and costs estimated. Labor costs for operations by plant group will be estimated. The Mississippi State Budget Generator (MSBG) will be used to

calculate costs. With MSBG, budgets can be updated annually in terms of prices, labels and input use rates. Individual users can modify the budgets to address particular needs. Additional crop budgets can be produced as needed. The procedure will be available for general public/private use.

Literature Cited:

1. Badenhop, M. 1979. Factors Affecting Southern Regional Production Advantages for Kurume Azaleas. Southern Regional Cooperative Series Bulletin 241, Tn. Agricultural Experiment Station, Knoxville, TN.
2. Badenhop, M. and T. Phillips. 1983. Costs of Producing and Marketing Container-Grown Woody Landscape Plants: Pfitzer Juniper. Southern Regional Cooperative Series Bulletin 299, Tn. Agricultural Experiment Station, Knoxville, TN.
3. Hall, C., A. Hodges and J. Haydu. 2005. Economic Impact of the Green Industry in the United States. University of Tennessee Agricultural Extension Service, Knoxville. www.utextension.utk.edu/hbin/greenimpact.html.
4. Perry, F., T. Phillips, L. Wilson and J. Adrian. 1990. Establishment and Operation of 20 and 40-Acre Container Nurseries in Climatic Zone 9. Southern Regional Cooperative Series Bulletin 341, Alabama Agricultural Experiment Station, Auburn, AL.
5. Taylor, R., H. Kneen, E. Smith, D. Hahn and S. Uchida. 1986. "Costs of Establishing and Operating Field Nurseries by Size of Firm and Species of Plant in USDA Hardiness Zones 5 and 6". Ohio Agricultural Research and Development Center, Research Bulletin 1177, Wooster.

Multistate Survey of Nursery Laborer Level Employees: OH, MI, DE, TN, FL, IN, AZ and RI Preliminary Results

Alejandra Acuña and Dr. Hannah Mathers
Horticulture and Crop Science Department. The Ohio State University,
Fyffe Ct, Columbus, OH 43210
acuna.6@osu.edu, mathers.7@osu.edu

Index Words: nationality, language, gender, average age

Significance to the Industry: The greenhouse and nursery industry is one of the most important agricultural sectors in the United States exceeding \$26 billion in value during 2002 (Hodges et al, 2005). Florida, Ohio, Arizona, Michigan, Tennessee, Delaware, Indiana and Rhode Island are eight nursery production states and represent a broad range of nursery production regions nationally.

Amid all the current immigration reform discussions and proposed legislation this project has taken on new significance. It is estimated that labor represents 40% of each unit produced in the industry. This cost is much higher than for other manufacturing sectors. The finding that only 20% of the workforce is currently composed of Americans and 13.7% from Puerto Rico in itself highlights the significance of this project and the industry's heavy reliance on foreign labor (66.3%). It also highlights the need to provide technical information in Spanish and English to workers for advancement opportunities. This study represents one of the first to characterize the workforce nationally and evaluate learning and training preferences within the workforce.

Nature of Work: The demographics of the nursery industry in the United States have changed dramatically in the past 10 to 15 years. Currently, the majority of the worker level of the nursery industry is believed to be Spanish speaking. However, there have been no workforce surveys conducted in this industry to support this belief.

From the only published survey that has been done (Mathers, 2003) in Oregon and Ohio nurseries, Hispanic employees represented the majority of the workforce and the technical needs of this audience were not being adequately addressed.

The major objective of this multistate survey is to determine the composition percentages by nationality and language of the nursery industry workforce in the United States. Other objectives are to determine the years of experience, technical information interests, work activities, gender, age and current technical information resources available to nursery workers in Ohio, Michigan, Delaware, Tennessee, Florida, Indiana, Arizona and Rhode Island. This paper summarizes the preliminary results of this project.

Results and Discussion: All research activities involving the use of human beings as research subjects must be reviewed and approved by The Ohio State

University (OSU) Institutional Review Board (IRB). An exemption was provided on August 22, 2005 by the OSU IRB. Exemptions were also obtained by others IRBs in other states working in the surveys between August and December 2005.

A randomly sample of 40 nurseries in each state was drawn from a list of United States (US) nurseries developed by Hodges et al.(2005) for their Economic Impact of Environmental Horticulture Industry in the United States. Researchers from the eight states, interested in participating in the survey were identified at the spring meeting (February/2004) of the S-1021 committee, "Technical and Economical Efficiencies of Producing, Marketing and Managing Environmental Plants." The eight researchers are Ursula Schuch, University of Arizona; Bridget K. Behe, Michigan State University; Brian Maynard, University of Rhode Island; Alan W. Hodges and John Haydu, University of Florida; Jennifer H. Dennis, Purdue University, Susan Barton, University of Delaware; John R. Brooker and Charles Hall University of Tennessee; Hannah Mathers and Alejandra Acuña, The Ohio State University (OSU). These researchers contacted each of the nurseries selected for their state. If 30 nurseries: 15 medium and 15 large firms could not be found to participate, in the first sample of 40, then additional random samples were drawn until 30 firms were obtained. Each nursery that agreed to participate provided a contact name and the number of Spanish and English surveys they would require.

A survey package containing a Self Administered Questionnaire with 31 questions and a return business reply envelope were sent and returned to OSU, Columbus, Ohio. To date 2628 surveys have been mailed to the 8 participating states. We expect to mail at least 1000 more. The current response rate is 8.6%. Data was analyzed using SPSS (@2006 SPSS Inc. Chicago, Illinois). From the current analysis the majority of the workforce nationally is male (57.5%). However, surprisingly, females represent 42.5% of the nursery industry workforce (Table 1). This is quite a change over the past five to seven years. Mathers (2003) surveying nursery workers from Ohio and Oregon during 1999 and 2001, found that less than 5% of those surveyed in either states were women.

By far the majority of US nursery workforce is composed of Mexicans (57.1%). Within this nationality the majority of workers are male 60.8% (Table 1). The next largest contributor to the workforce is the US at 20.5%. From the US the majority are females 55.6%(Table 1).

The primary language spoken at work is Spanish (75.1 %). Only 3.6% of the workforce considers themselves bilingual and 23.5% of the Spanish speakers indicated they understood "no" English at all (data not shown).

By nationality, Mexicans are the most interested in obtaining additional education (54.1%)(Table 2). Males (46.7%) were more interested in education than females (30.2%)(Table 2). Summed over two age groups 25 to 44 years, these ages represent the majority of those interested in technical courses opportunities (34.2%) (Table 2). There is a difference from Mathers(2003) where the majority of the respondents indicated their positive reception to receiving technical information in Spanish (93% in Ohio, 97% in Oregon).

Acknowledgements: Funding provided by the Horticultural Research Institute, Ohio Nursery and Landscape Association and The Ohio State University. Ursula Schuch, University of Arizona; Bridget K. Behe, Michigan State University; Brian Maynard, University of Rhode Island; Alan W. Hodges and John Haydu, University of Florida; Jennifer H. Dennis, Purdue University, Susan Barton, University of Delaware; John R. Brooker and Charles Hall University of Tennessee; Cheryl Cuthbert, The Ohio State University. U.S Nurseries and their anonymous participants. Department of Spanish and Portuguese. The Ohio State University. Terrell Morgan and Donna Long.

Literature Cited:

1. Hodges A., C.Hall, and J. Haydu. 2005. Economic Impacts of the Environmental Horticulture Industry in the United States. Proc. Southern Nurs. Assoc. Res. Conf. Vol.50 : 305-310.
2. Mathers, H. 2003. Technical information requested by Hispanic nursery employees survey results from Oregon and Ohio. J. Environ. Hort. 21: 184-189.

Table 1. Composition of the nursery workforce in 8 states (preliminary results) based on gender and country of origin.

			Worker gender		Total
			Female	Male	
Country of origin	United States	Count	25	20	45
		% within country of origin	55.6%	44.4%	100.0%
		% within worker gender	26.9%	15.9%	20.5%
		% of Total	11.4%	9.1%	20.5%
	Guatemala	Count	10	4	14
		% within country of origin	71.4%	28.6%	100.0%
		% within worker gender	10.8%	3.2%	6.4%
		% of Total	4.6%	1.8%	6.4%
	Puerto Rico	Count	5	25	30
		% within country of origin	16.7%	83.3%	100.0%
		% within worker gender	5.4%	19.8%	13.7%
		% of Total	2.3%	11.4%	13.7%
	Mexico	Count	49	76	125
		% within country of origin	39.2%	60.8%	100.0%
		% within worker gender	52.7%	60.3%	57.1%
	% of Total	22.4%	34.7%	57.1%	
Other	Count	4	1	5	
	% within country of origin	80.0%	20.0%	100.0%	
	% within worker gender	4.3%	.8%	2.3%	
	% of Total	1.8%	.5%	2.3%	
Total	Count	93	126	219	
	% within country of origin	42.5%	57.5%	100.0%	
	% within worker gender	100.0%	100.0%	100.0%	
	% of Total	42.5%	57.5%	100.0%	

Table 2. Education interest by Country of origin, gender and age.

			Education interest*	
			no	yes
Country of origin	United States	Count	18	24
		% of Total	8.3%	11.0%
	Guatemala	Count	2	12
		% of Total	.9%	5.5%
	Puerto Rico	Count	15	13
		% of Total	6.9%	6.0%
Mexico	Count	11	118	
	% of Total	5.0%	54.1%	
Other	Count	2	3	
	% of Total	.9%	1.4%	
Worker gender	Female	Count	24	64
		% of Total	11.3%	30.2%
	Male	Count	25	99
		% of Total	11.8%	46.7%
Worker age	18 to 24 years	Count	3	49
		% of Total	1.4%	22.7%
	25 to 34 years	Count	7	37
		% of Total	3.2%	17.1%
	35 to 44 years	Count	16	37
		% of Total	7.4%	17.1%
	45 to 54 years	Count	14	32
		% of Total	6.5%	14.8%
	55 to 64 years	Count	8	10
		% of Total	3.7%	4.6%
65 years or +	Count	1	2	
	% of Total	.5%	.9%	

*Considering the answer of the question: Are you interested in attending a training course or class?

America's Anniversary Garden™

Bonnie Appleton, Joyce Latimer, David Close and Leanne DuBois
Virginia Polytechnic Institute and State University, Blacksburg, VA 24061
bapple@vt.edu

Index Words: Commemoration, Community planting, Jamestown

Significance to Industry: America's Anniversary Garden™ (AAG), a project designed by Virginia Cooperative Extension (VCE) for the 400th anniversary commemoration of Jamestown, the first permanent English settlement in the New World, was designed in part to provide new marketing opportunities for green industries in Virginia. A distinctive logo, which combines the historic arrival of the English ships with horticulture via sails constructed of flowers, was developed to give a unique identity to this project.

Nature of Work: On December 20, 1606, three small ships carrying 144 men and boys set sail from England, bound for America. They came ashore on May 14, 1607, to begin a settlement named Jamestown in the colony of Virginia. As their journey ended, our nation's, and the start of European-influenced gardening, began.

In 2007, the 400th anniversary of our nation's birthplace at Jamestown, the first permanent English settlement in the New World, will be commemorated. Commemorations for Jamestown have occurred every 50 years since 1807, with the largest thus far being the Ter-Centennial Exposition of 1907. Like a world's fair, the 1907 event was a lavish showcase of historical, technological, military, and educational exhibits. Staged on 340 acres of the present-day Norfolk Naval Base, events lasted for eight months with 1.2 million visitors enjoying Virginia hospitality.

Plans are currently underway to observe America's 400th anniversary. Events began in May and will continue for 18 months through 2007. Cities and towns across Virginia have and continue to sign up to offer local programs, and many have been improving the appearance of their communities (including their landscapes) to impress an expected record number of visitors (1).

The goal of the AAG project is to unite anyone who is in any way connected with or interested in gardening and landscaping. First time gardeners to established nursery or greenhouse businesses can all become involved. To that end VCE developed a program based on gardens containing plants, both native and non-native, with red, white, and/or blue features.

Results and Discussion: A distinctive color logo, featuring the three English ships with one each red, white, and blue sail made from flowers, was designed and trade marked, thereby protecting the identity of this program (Figure 1). All of Virginia's green industry organizations - the Virginia Nursery and Landscape Association (VNLA), the Virginia Society of Landscape Designers (VSLD), the Virginia Flower Growers Association (VFGA), the Mid-Atlantic Chapter/ International Society of Arboriculture (MAC-ISA), as well as their "umbrella"

group, the Virginia Green Industry Council (VGIC), have partnered to help make this program a statewide success. The organizations are providing funding, publicity via newsletters (2,3), tradeshow, and other events, and advisors. Other organizations have likewise joined AAG as partners including the Virginia Native Plant Society, the Virginia Department of Transportation, the Virginia Federation of Garden Clubs, The Garden Club of Virginia, the Virginia Master Gardeners Association, and Scenic Virginia. These organizations have been crucial in helping to introduce this project to Virginia communities, and in disseminating the supporting materials.

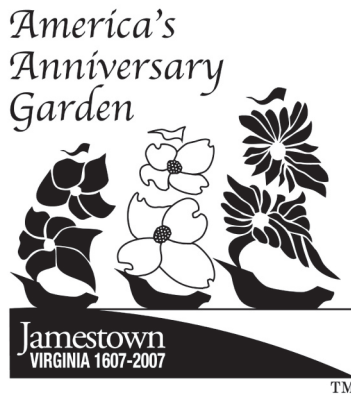
VCE has developed educational materials that can be used at any level, from garden club to school to retail garden center. There is an expanding series of extension publications with sample designs and plant lists (<http://www.ext.vt.edu/pubs/envirohort/426-210/426-210.html>) (5); (<http://www.ext.vt.edu/pubs/envirohort/426-211/426-211.html>) (4), promotional flyers, a color poster, and a CD containing templates, logos, marketing suggestions, and more. To date over 65 businesses have signed the no-obligation trademark agreement, received the VCE materials, and been posted on the AAG website (www.ext.vt.edu/americanagarden). In addition to the marketing and sales potential from plants, and design and landscape services, a series of AAG logo apparel and merchandise is also available.

It is hoped that the flower sails in the logo will lead to big flower sales for our green partners, starting in 2006 and continuing through 2007. We hope that demand for suitable plants for AAG projects will create opportunities for growers and designers, and boost nursery, greenhouse, and garden center revenue. AAG provides a coordinated plan for local governments, businesses, schools, public gardens, and residential landscapes across Virginia to support a common project. The short-term benefits to Virginia's green industry should be significant and may last well beyond 2007 by attracting and retaining many first-time gardeners. The AAG concept can serve as a model for other states interested in developing similar projects that can unite commercial, municipal, and consumer horticulture to raise the profile and increase the revenue of their green industries.

Literature Cited:

1. Anonymous. 2006 Jamestown 2007. <http://www.jamestown2007.org/home.cfm> (accessed 5/16/06).
2. Appleton, B. 2005. America's Anniversary Garden – Flower Sails for Flower Sales. *VNLA Newsletter* 75(6):17-18.
3. Appleton, B. 2006. "Red, White and Blue" is taking hold. *MAC-ISA Log* Spring 2006:11.
4. DuBois, L., E. Maurer, J. Latimer, B. Appleton, D. Close, and H. Scoggins. 2005. America's Anniversary Garden: A Statewide Corridor and Entrance Enhancement Program. Publication 426-211 of Virginia Cooperative Extension, Blacksburg, VA. 6 pp.
5. Maurer, E., B. Appleton, J. Latimer, L. DuBois, D. Close, and H. Scoggins. 2005. Plant America's Anniversary Garden. Publication 426-210 of Virginia Cooperative Extension, Blacksburg, VA 4 pp.

Figure 1. The trademarked logo of the America's Anniversary Garden™ project.



Production and Price Analysis of Selected Floriculture Crops: Implications for Nursery Growers

Safdar Muhammad, Fisseha Tegegne, Enefiok Ekanem and Surendra Singh
Institute of Agricultural and Environmental Research,
Tennessee State University, Nashville, TN 37209
smuhammad@tnstate.edu

Index Words: Floriculture, greenhouse and nursery, household expenditures, sales value

Significance to Industry: Floriculture is one of the important sub-sectors of the U.S. greenhouse and nursery industry and has shown steady growth in the last decade. This paper analyzes sales trends, prices and household expenditure on major floriculture crops. The growers can take advantage of this expanding sub-sector of the nursery industry by focusing on those floriculture crops which have shown increase in sales, steady and/or higher prices and received most household dollars spent on nursery products. It will provide growers with opportunities to evaluate their current business operations and make necessary adjustments by switching to high value floriculture crops. Such an approach will not only enhance their sustainability and profitability but better prepare them for highly competitive environment in the domestic and global markets.

Nature of Work: In 2005, floriculture represents about 33% of total greenhouse and nursery industry in the U.S. This sector has grown on an average annual rate of 4.85% since 1996. According to USDA/ERS (2005), total sales value of floriculture crops increased by 56%, compared to 42% for all greenhouse and nursery products during 1996-2005. The floriculture sales value increased from \$3,407 million in 1996 to \$5,300 million in 2005. On the other hand, sales value of total greenhouse and nursery products increased from \$11,300 million to \$16,011 million during the same time period.

The majority of floriculture crop sales value consists of annual bedding plants (36.63%), followed by potted flowering plants (15.74%) and herbaceous perennials (13.26%). Within floriculture sub-sector, sales value of herbaceous perennials increased by 939%, followed by propagative materials (64%) and annual bedding plants (41%) during 1996-2005. This paper will analyze production trends, prices and household expenditures on major plants within floriculture sub-sector. The results from this study will benefit nursery growers in making production and marketing decisions for profitable business operations.

Results and Discussion: The floriculture sub-sector of greenhouse and nursery industry has shown uniform growth in sales value in the last decade. The annual sales growth rate of 4.85% was observed since 1996 with the highest annual growth rate of 14.3% in 1997. In ten years, the industry has only shown small decrease (-0.1%) in 2003. Within the floriculture sub-sector there has been tremendous increase during the same period.

On average, each household in U.S. spent about \$144 on greenhouse and nursery products in 2005 compared to \$114 in 1996. During this time period, household expenditure for nursery crops increased by 25.85%. On the other hand, household expenditure for bedding and garden plants increased by 63.44% during 1996-2005. The average expenditure increased by only 7.94% for all flowering plants and decreased by 10.05% for cut flowers. The average household expenditures for nursery related products are shown in Table 6.

The floriculture sub-sector consists of cut flowers (7.88%), potted flowering and foliage plants (27.75%), bedding plants (49.59%), cut cultivated greens (1.64%) and propagative materials (7.51%). The percentage in sales value since 1996 in the floriculture sub-sector is shown in Table 1. Floriculture related sales increased by 55.55% compared to 41.69% for the greenhouse and nursery industry as a whole.

In cut flowers sales, lilies, roses and tulips were the most selling flowers in U.S. in 2005. The average household spent annually about \$0.70 on lilies, \$0.38 on roses and \$0.32 on tulips. Compare to prices in 2000, the domestic price index also indicates that prices for roses and tulips increased but decreased for lilies cut flowers.

For potted flowering and foliage plants, poinsettias, orchids and florist mums are the most sold plants in the U.S. In 2005, total sales value for these plants was \$252.8 million, \$130.2 million and \$76.5 million respectively. On average, U.S. household spend about \$2.27 for poinsettias, \$1.17 for orchids, and \$0.69 for florist mums annually. Compared with prices in 2000, the domestic price index indicates rise in price of poinsettias but decrease for orchids and florist mums. It has been observed that prices for potted flowering and foliage plants vary significantly by region. The average price per pot in different U.S. regions is shown in Table 4. The price of orchids was \$18.24 in the northeast region compared to \$7.04 in the west and \$7.35 in the southern region. On the other hand, prices of florist azaleas and Easter lilies were higher in the south compare to other regions.

In 2005, bedding and garden plants contributed significantly to the total floriculture sales in the U.S. The bedding and garden plants are further classified into annual (in flats, in pots and in hanging pots) and perennials. Annuals in flat category, pansy/viola, impatiens and petunias were the most sold plants. The total sale values were \$113.2 million, \$101.9 million and 95.3 million respectively. Similarly, price per unit for these plants were \$8.45, \$8.43 and \$7.90 respectively. On the other hand, geraniums (\$130.4 million), New Guinea impatiens (\$46.4 million) and pansy/viola (\$38.9 million) were the most sold plants for annuals in the pots category. The average price was \$2.08, \$1.76 and \$1.00 per unit respectively. In hanging pots annuals category, geraniums (\$38.5 million), New Guinea impatiens (\$33.3 million) and petunias (\$28.3 million) were significant plants with average price of \$6.91, \$6.47 and \$ 5.96 respectively. Hardy/ garden mums, Hosta and other perennials herbs were the top sold plant groups in the herbaceous perennials category.

Results of this study will assist nursery growers to design effective business strategies by examining sales, price and household expenditures for different nursery crops. Such an approach will enhance profitability and sustainability of their nursery operations.

Literature Cited:

1. Alberto Jerardo. "Floriculture and Nursery Crops Outlook". United States Department of Agriculture, Economic Research Service. FLO-04. September 2005.
2. United States Department of Agriculture, 2005. "Floriculture and Nursery Crops Situation and Outlook Yearbook." USDA-ERS, FLO-2005.
3. United States Department of Agriculture, Census of Agriculture (2002). National Agricultural Statistics Service.

Figure 1. Total floriculture sales in the U.S. and its growth rate, 1996-2005.

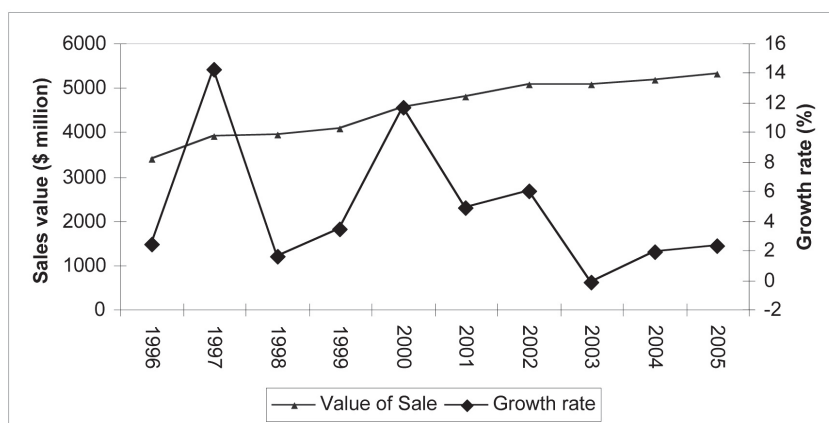


Table 1. Percent share and sales value of floriculture crops and percent change, 1996-2005 in the U.S.

	1996 (\$000)	%	2005 (\$000)	%	% Change
Cut Flowers	412,700	12.11	417,415	7.88	1.14
Flowering plants, potted	684,340	20.08	831,439	15.69	21.50
Foliage plants	508,947	14.94	638,979	12.06	25.55
Bedding plants, annuals	1,359,055	39.89	1,910,087	36.04	40.55
Herbaceous perennials	69,078	2.03	717,967	13.55	939.36
Cut cultivated greens	118,185	3.47	86,898	1.64	-26.47
Propagative materials	242,638	7.12	397,899	7.51	63.99
Total floriculture sales	3,407,320	30.15^a	5,300,140	33.10^a	55.55
Greenhouse & nursery crops	11,300,006		16,011,119		41.69

^aPercent share of floriculture sales of total greenhouse and nursery crops

Table 2. Top 5 cut flowers by sales, household expenditures and domestic price index in U.S, 2005.

Rank	Cut flowers	Sales value (\$000)	Sales per household	Domestic price index (2000=100)
1	Lilies	77,387	0.70	99.60
2	Roses	42,680	0.38	109.00
3	Tulips	35,855	0.32	106.00
4	Gerbera daisy	30,967	0.28	101.60
5	Gladioli	25,697	0.23	104.60

Table 3. Most sold potted and foliage plants in 2005, domestic price index and household expenditures in U.S.

Rank	Potted and foliage plants	Sales value (\$000)	Sales per household	Domestic price index (2000=100)
1	Poinsettias	252,802	2.27	110.10
2	Orchids	130,160	1.17	81.00
3	Florist mums	76,518	0.69	88.20
4	Spring bulbs	54,333	0.49	110.40
5	Florist azaleas	41,953	0.38	104.00

Table 4. Average unit price at whole of potted flowering plants in U.S., 2005 (dollar per pot).

Rank	Potted and foliage plants	U.S.	Northeast	Midwest	South	West
		\$	\$	\$	\$	\$
1	Orchids	7.44	18.24	10.63	7.35	7.04
2	Florist azaleas	4.3	5.07	7.93	8.02	4.36
3	Easter lilies	4.15	3.74	4.21	4.78	4.08
4	Poinsettias	4.09	3.93	4.32	3.89	4.34
5	Spring bulbs	2.87	2.75	3.04	2.5	2.62

Table 5. Top selling bedding/garden plants and unit price at wholesale in the U.S, 2005.

Rank	Bedding and garden plants	Sales value (\$000)	Unit price (\$)
	Annuals in flats	850,687	8.45
1	Pansy/viola	113,225	8.43
2	Impatiens	101,923	7.9
3	Petunias	95,306	8.42
	Annuals in pots	772,378	1.39
1	Geraniums, cuttings	130,433	2.08
2	New Guinea impatiens	46,379	1.76
3	Pansy/viola	38,867	1
	Annuals in hanging pots	287,022	6.29
1	Geraniums, cuttings	38,462	6.91
2	New Guinea impatiens	33,320	6.47
3	Petunias	28,303	5.96
	Herbaceous perennials	717,967	2.44
	Hardy/garden mums	139,655	1.98
	Hosta	49,630	3.47
	Other herb, perennials	528,682	2.52

Table 6. Average expenditures (\$) of U.S. household on nursery related products in 2005.

	Greenhouse and nursery	Bedding and garden plants	All flowering plant	Cut flowers
1996	114.48	14.47	6.93	4.18
1997	123.69	17.49	7.24	4.72
1998	124.67	18.53	7.29	4.07
1999	127.22	18.82	7.35	4.18
2000	130.79	19.87	7.58	4.08
2001	134.71	20.37	7.72	3.91
2002	140.67	22.25	7.82	3.96
2003	142.17	22.24	7.37	3.88
2004	142.66	23.02	7.41	3.83
2005	144.07	23.65	7.48	3.76
% Change, 96-05	25.85	63.44	7.94	-10.05

Export of Nursery Products from the United States: Challenges and Opportunities

Fisseha Tegegne, Safdar Muhammad, Enefiok Ekanem and Surendra Singh
Institute of Agricultural and Environmental Research,
Tennessee State University, Nashville, TN 37209
ftegegne@tnstate.edu

Index Words: Greenhouse and Nursery Products, Export, Import, United States, Opportunities and Challenges

Significance to Industry: The Greenhouse and Nursery industry is the fastest growing sub-sector of Agriculture accounting for approximately \$15.6 billion in grower sales receipts in 2004. Between 2000 and 2004 grower sales receipts showed an overall increase of almost 14% with propagative material and herbaceous perennials registering the greatest increase, 59% and 58% respectively. Sales of Cut cultivated greens showed the greatest decline (26.73%) while receipt from cut Flower sales fell by 1.94%. Over the same period sales receipts from Nursery and other greenhouse crops showed an increase of about 15% (Table 1). The demand for nursery products is driven by a number of forces of which growth in population; urbanization and increasing income of households are the major ones. Increased export of nursery products from the United States would enhance income of those in the industry.

Nature of Work: This work assesses the trend in greenhouse and nursery crops export and import overtime using published data. It provides background for subsequent work that will explore strategies to promote export of nursery products from the United States. Focus group meetings will be organized with producers currently engaged in nursery export and those planning to start exporting to generate information on key challenges and opportunities.

Results and Discussion: In 2005, total export of United States agricultural products was worth \$62.9 billion compared to \$59.2 million for import. Agricultural export increased by 59.42% during 1990-2006 while import increased by 158.67% during the same period. The trade balance decreased from \$16.6 billion in 1990 to \$3.7 billion in 2005, a decrease of 77.81%. On the other hand, United States export of nursery products was \$293 million in 2004 compared to import of \$1,379 million. Despite a surplus in total United States agriculture trade, the nursery sector showed a trade deficit of \$1,379 million. Figure 1 shows export and import trend of greenhouse and nursery crops for the United States over the period 1990-2004. It can be discerned that the gap between import and export is widening with imports growing at a very fast rate and export showing very sluggish and irregular growth. The difference has been glaring especially since 1995. In terms of the total value of United States imports between 1995 and 2004, an increase of about 61% is observed which is primarily accounted for by the growing import from Canada, Central and South American, East Asian, and some European Union member countries (Table 2). In contrast, the overall value of U.S. exports increased only by about 22% during the same period. Canada, China, Caribbean, and some European Union member countries such

as Denmark, the Netherlands and Spain were the sources for the increase. Regions that contributed to decline in the value of United States exports were South and Central America, Asia and some countries in the European Union such as Belgium, and Germany (Table 3). The gap between the value of United States exports and imports of greenhouse and nursery products can be bridged by increasing production and exporting a portion of it. The above results indicate that opportunities for increased export of greenhouse and nursery products from the United States exist especially to Canada, European countries and China. To realize this it is critical to carefully assess the needs of consumers in these and other countries in terms of such attributes as the type and quality of nursery products they desire. It is also important to have access to efficient transportation, storage and refrigeration facilities to ensure timely delivery of fresh products and understand regulations governing importation of plants into these countries.

Literature Cited:

1. United States Department of Agriculture, 2005. "Floriculture and Nursery Crops Situation and Outlook Yearbook." USDA-ERS, FLO-2005.
2. United States Department of Agriculture, Census of Agriculture (2002). National Agricultural Statistics Service.

Figure 1. Export and Import of Greenhouse and Nursery Crops in U.S., 1990-2004.

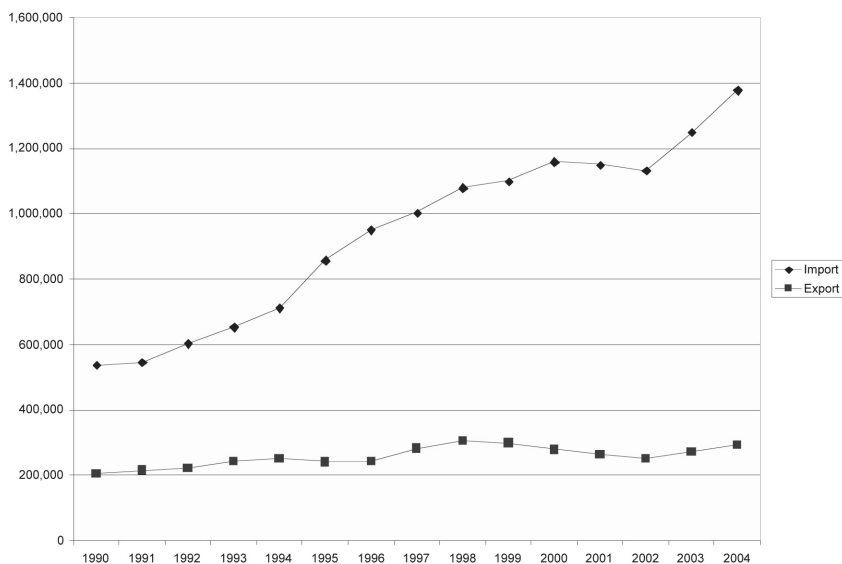


Table 1. Greenhouse and nursery crops: Grower sales receipts and percent change 2000 to 2004.

	2000	2001	2002	2003	2004	% change 2000-04
Cut Flowers	429,963	418,103	427,081	422,982	421,631	-1.94
Potted Flowering plants	799,599	824,750	843,940	803,462	815,136	1.94
Potted Foliage plants	560,192	650,590	622,560	649,681	638,979	14.06
Annual Plants	1,661,392	1,680,770	1,789,783	1,788,854	1,845,495	11.08
Herbaceous perennials	434,028	495,732	611,166	634,872	687,050	58.30
Cut cultivated greens	126,168	112,358	113,773	102,065	92,445	-26.73
Propagative materials	242,638	313,922	345,871	367,971	386,310	59.21
Floriculture expanded wholesale value	4,576,498	4,802,555	5,089,514	5,082,172	5,179,696	13.18
Christmas trees	501,912	512,904	517,304	506,410	506,021	0.82
Nursery and other greenhouse crops	8,692,404	9,082,612	9,571,865	9,959,958	9,983,521	14.85
Total greenhouse and nursery crops	13,770,814	14,398,071	15,178,683	15,548,540	15,669,238	13.79

Table 2. Value of U.S. imports by region and country, 1995-2004.

Source country	1995	2000	2004	% Change (95-04)
	...Million Dollars...			%
NAFTA	162.1	328.4	369.0	127.61
Canada	131.0	282.7	333.6	154.77
Mexico	31.2	45.7	35.4	13.54
Central America	40.6	58.7	73.1	79.81
Costa Rica	27.3	39.9	50.5	85.23
Guatemala	11.5	17.1	20.4	77.44
Caribbean	3.6	2.6	2.7	-26.12
South America	375.7	447.9	570.6	51.88
Brazil	0.6	0.8	4.5	679.78
Chile	1.5	5.5	5.9	307.62
Colombia	321.8	349.0	421.1	30.86
Ecuador	50.5	89.3	134.4	166.16
Peru	0.6	2.5	2.7	340.52
European Union	228.6	254.0	272.8	19.34
Belgium	1.4	2.0	3.1	128.89
France	4.1	4.2	2.9	-30.47
Italy	4.4	6.9	9.3	109.47
Netherlands	209.9	230.2	249.9	19.03
United Kingdom	5.1	7.3	4.2	-17.41
Asia	27.0	36.9	52.2	93.20
East Asia	8.7	20.8	33.0	280.20
China	4.3	6.9	14.9	244.87
South Korea	0.9	1.0	2.1	129.97
Taiwan	2.2	11.2	14.2	551.10
Southeast Asia	11.0	10.1	10.2	-6.77
Philippines	1.9	2.8	1.8	-5.58
Thailand	8.0	5.9	7.0	-13.01
South Asia	7.4	5.9	8.9	21.34
India	7.3	5.2	8.7	19.26
Oceania	5.7	7.8	13.4	136.60
Australia	3.4	3.1	2.2	-35.02
New Zealand	2.2	4.5	11.0	405.76
Middle East	9.5	16.6	17.7	85.60
Israel	9.4	16.4	17.4	84.99
Africa	5.6	6.7	7.7	37.39
South Africa	2.7	3.9	4.7	74.13
Rest of the world	0.3	0.3	0.1	-63.44
World	858.8	1,159.8	1,379.3	60.60

Table 3. Value of U.S. exports by region and country, 1995-2004.

Destination	1995	2000	2004	% Change (95-04)
NAFTA	132.0	161.4	178.4	35.18
Canada	109.1	134.5	154.6	41.70
Mexico	22.9	26.8	23.8	4.10
Central America	2.1	1.4	0.7	-66.77
Caribbean	3.7	8.6	6.2	65.35
Bahamas	0.5	5.0	3.5	561.22
Turks & Caicos Is.	0.2	0.1	1.0	481.24
South America	6.1	4.6	4.6	-24.81
Chile	0.5	0.2	0.7	55.21
Colombia	1.5	2.5	1.6	6.59
Ecuador	2.5	0.4	1.7	-30.92
European Union	62.8	65.0	86.3	37.41
Belgium	5.3	2.8	1.6	-69.57
Denmark	0.2	0.3	0.5	123.10
France	1.3	0.8	1.1	-14.03
Germany	15.6	13.3	9.6	-38.64
Italy	2.7	2.8	3.0	14.58
Netherlands	30.6	39.0	63.7	108.12
Spain	0.9	1.3	1.3	49.39
United Kingdom	5.1	4.4	4.7	-8.10
Asia	27.6	35.3	13.8	-50.00
East Asia	26.7	34.7	13.4	-49.95
China	0.3	1.1	1.3	412.92
Hong Kong	1.7	16.8	0.8	-52.90
Japan	20.7	14.2	8.3	-59.64
South Korea	2.3	0.2	1.0	-56.69
Taiwan	1.7	2.3	1.9	9.89
Southeast Asia	0.8	0.3	0.2	-77.47
South Asia	0.1	0.3	0.3	106.61
Oceania	1.7	0.8	1.2	-29.58
Australia	1.3	0.6	0.8	-38.01
Middle East	1.8	0.8	1.3	-25.07
Africa	0.7	0.3	0.3	-52.68
Rest of the World	2.5	0.7	0.4	-84.12
World	241.0	278.8	293.2	21.64

Evaluating Nursery and Greenhouse Industry in Tennessee: Census 2002 Data

Crystal A. Doss and Safdar Muhammad
Institute of Agricultural and Environmental Research,
Tennessee State University, Nashville, TN 37209
smuhammad@tnstate.edu

Index Words: Greenhouse and nursery industry, sales value, production expenses, net income

Significance to Industry: Analysis of most current census data (2002) will generate information that will be helpful to nursery growers, policy makers, researchers and potential new nursery growers. The results will help to better understand trends related to production, supply and demand, expenses and income. The comparison of key demographic and socio-economic characteristics of the nursery industry with rest of the agriculture sector will provide information that is critical in promoting nursery industry in Tennessee.

Nature of Work: The nursery industry is one of the fastest growing sub sectors of U.S. agriculture, with grower cash receipts of \$15.7 billion in 2004. The Southern U.S. contributes about 40 percent of the total U.S. grower cash receipts for the greenhouse and nursery industry. In 2004, three Southern states were among the top five states in the U.S. with the highest shares of total sales receipts. Among the top five states, Florida ranked second, Texas third and North Carolina fifth, with shares of total U.S. sales receipts of 10.4%, 8.9%, and 6.0%, respectively. Together these three states represent about 25% of total sales receipts in the U.S.

In Tennessee, the greenhouse and nursery industry represent significant sector of the state's agriculture. The annual gross value of sales has increased from 172.5 million in 1995 to 272.5 million in 2004, an increase of about 57.98%. On the other hand, number of farms and total value of sales has decreased for all other farms in Tennessee. For all other farms, gross value of sales decreased from 2,263 million in 1997 to 2,199 million in 2002, decrease of 2.79%. The increase in domestic production, imports and per capita consumption of nursery products indicates an opportunity for nursery growers to expand nursery business operations. Similarly small farmers can take advantage by adopting nursery as a high value alternative enterprise to enhance their income. The objective of this paper is to examine production, consumption, economic and demographic characteristics of nursery operations and compare with rest of agriculture sector using data from Census of Agriculture, 2002.

Results and Discussion: According to census 2002, there were 2,350 nursery farms in Tennessee with 48,336 acres in the open and 17,836,110 square feet area under glass or other protection. The top five counties in Tennessee contribute significantly in the total state nursery industry representing 34% of farms, 66% open area and 24% of total protected area. The number of farms in open, under protection, and percent distribution is shown in Table 1. The average

farm size in Tennessee is 20.57 acres for open and 7,590 square feet for area under glass or other protection. Warren County has the most open acreages and protected area for nursery production in the state. Majority of nursery farms are very small, about 72% of total farms are less than 49 acres (31.67% with 1 to 9 acres and 40.40 % with 10 to 49 acres). The distribution of nursery farms by size and comparison with all farms is shown in Table 3. On the other hand, market value of total sales is much higher for nursery farms compared to all farms. According to census data, about 77% of all farms has annual gross sales value less than \$10,000, compare to only 38.51% nursery farms in the same sale category. The average value of sale per farm was higher for nursery businesses \$128,852 compared to \$25,790 for all farms.

Total production expenses for nursery farms were also higher than all farms, \$73,168 and \$22,798 respectively. Most of production expenses for all farms were feed purchase (19.37%), supplies, repair, and maintenance (10.48%) and animal purchased (8.77%). On the other hand, most production expenses for nursery farms were hired labor (35.86%), purchase of seed, plants, vines and tree (18.45%) and supplies, repair and maintenance (10.63%). The detailed production expenses for each farm group are shown in Table 5.

Average net income per farm for nursery business was \$55,579 compared to \$4,185 for all other farms. The higher net income indicates an opportunity for small and limited resource farmers to adopt nursery as high value alternative enterprise. Along with higher net return, rapidly growing production and import of nursery products to meet domestic demand expect a promising future for this sub-sector.

The demographic and other characteristics of nursery businesses showed that majority of businesses have full owners (80%), with two operators (92%), 18% with female operator, and only 53% indicated nursery as their primary occupation. The comparison of demographic with all farms is shown in Table 7. The analysis indicates that nursery operators are younger than all farm operators and have less experience. The nursery operators have an average of 16.2 years experience or more years. The average age of a farm operator is 52.2 years for nursery, compared to 56 years for all farms. Only 16% operators in the nursery businesses are older than 65 compared to 28% for all other farms. The census data also showed that nursery businesses contribute more to the household income than all farms. A majority of (16.65%) operator indicated that nursery businesses contribute 100% in their household income compared to only 5.15% for all farm. The business organizational structure of the nursery industry has more partnership and corporation form of business than all farms. The results will help to understand similarities and differences of nursery businesses with all other farms that will lead small farmers to make important decisions about increasing profitability of their farm operations.

Literature Cited:

1. United states Department of Agriculture, 2005. "Floriculture and Nursery Crops Situation and Outlook Yearbook." USDA-ERS, FLO-2005.
2. United States Department of Agriculture, Census of Agriculture (2002). National Agricultural Statistics Service.

Table 1. Top Five Counties by Number of Farms and Operated Area in Tennessee, 2002.

County	Number of Farms		Area under Glass or other Protection		Open Area	
	Farms	%	(Sq. ft.)	%	Acres	%
Warren	512	21.79	2,161,057	12.12	22,016	45.55
Grundy	101	4.30	48,448	0.27	3,041	6.29
Franklin	95	4.04	212,904	1.19	4,089	8.46
DeKalb	86	3.66	397,960	2.23	2,073	4.29
Knox	85	3.62	1,520,944	8.53	534	1.10
Tennessee	2350	100	17,836,110	100	48,336	100

Table 2. Per Farm Protected and Open Acreage for Top Five Counties in TN.

County	Protected Area (Sq. ft.)	Open Area (Acres)
Warren	4,221	43.00
Grundy	480	30.11
Franklin	2,241	43.04
DeKalb	4,627	24.10
Knox	17,893	6.28
Tennessee	7,590	20.57

Table 3. Distribution of Nursery Farms by Area and Compared with all Farms in Tennessee, 2002.

	All Farms	Nursery Businesses
Acres	%	%
1 to 9	6.93	31.67
10 to 49	36.66	40.40
50 to 69	11.18	6.39
70 to 99	11.49	6.12
100 to 139	10.25	4.45
140 to 179	6.21	2.47
180 to 219	4.06	1.66
220 to 259	2.63	0.85
260 to 499	6.27	3.42
500 to 999	2.79	1.98
1,000 to 1,999	1.02	0.54
2,000 or more	0.50	0.04

Table 4. Market Value of Agricultural Products Sold and Government Payments, Nursery and all Farms, 2002.

	All Farms	Cumulative	Nursery	Cumulative
	%	%	%	%
<\$1,000	24.75	24.75	3.06	3.06
\$1,000-\$2,499	22.39	47.14	9.94	13.00
\$2,500-\$4,999	15.44	62.58	9.45	22.45
\$5,000-\$9,999	14.44	77.02	16.06	38.51
\$10,000-\$24,999	11.71	88.73	21.32	59.83
\$25,000-\$49,999	4.36	93.09	12.91	72.74
\$50,000-\$99,999	2.45	95.54	10.62	83.36
\$100,000-\$249,999	2.19	97.73	7.92	91.27
\$250,000-\$499,999	1.32	99.05	4.00	95.28
\$500,000-\$999,999	0.65	99.70	2.16	97.44
> 1 million	0.30	100.00	2.56	100.00

Table 5. Production Expenses for Nursery and all Farms, 2002.

		All Farms	%	Nursery	%
1	Fertilizer, lime, and soil conditioner	171,689	8.60	4,856	3.00
2	Chemical purchased	101,619	5.09	2,113	1.30
3	Seeds, plants, vines and tree	105,870	5.30	29,896	18.45
4	Livestock and poultry purchased	175,145	8.77	99	0.06
5	Feed purchased	386,790	19.37	303	0.19
6	Gasoline, fuel and oils	93,416	4.68	6,573	4.06
7	Utilities	51,715	2.59	5,079	3.13
8	Supplies, repair and maintenance	209,225	10.48	17,234	10.63
9	Hired farm labor	173,255	8.68	58,118	35.86
10	Contract labor	34,127	1.71	8,069	4.98
11	Custom work and custom hauling	27,000	1.35	1,768	1.09
12	Cash rent for land, building, and grazing fees	73,368	3.67	2,120	1.31
13	Rent and lease expenses for machinery, equipments, and farm share of vehicles	13,812	0.69	912	0.56
14	Interest expenses	147,275	7.38	8,802	5.43
15	Property tax	94,350	4.73	2,843	1.75
16	Others	138,141	6.92	13,279	8.19
	Total Production Expenses	1,996,798	100	162,066	100
	Per farm	22,798		73,168	

Table 6. Summary of Gross sale, Production Expenses and Net Income for Nursery and all Farms, 2002.

	All Farms	Nursery
Land in farms (acres)	11,681,533	150,877
Average Farm size (acres)	133	68
Total Value (\$000)	2,259,045	286,461
Average Value per farm (\$)	25,790	128,862
Total Production expenses (\$000)	1,996,798	162,066
Average Expenses Per Farm (\$)	22,798	73,168
Total Net cash income (\$000)	366,526	123,108
Per farm (\$)	4,185	55,579

Table 7. Demographic Characteristics of Nursery and all farms.

Tenure	All Farms	Nursery
	%	%
Full owners	73.38	79.76
Part owners	22.65	14.57
Tenants	3.96	5.67
Number of operators		
1 operator	66.39	60.55
2 operators	28.98	31.26
3 operators	3.20	5.49
4 operators	0.94	1.66
5 or more operators	0.48	1.03
Women operators		
1 operator	94.39	91.62
2 operators	4.91	6.93
3 operators	0.55	0.93
4 operators	0.08	0.21
5 or more operators	0.07	0.31
Total Women operators	31,880	1,075
Gender of operator		
Male	89.25	82.23
Female	10.75	17.77
Primary occupation		
Farming	50.35	46.56
others	49.65	53.44

Table 7. Demographic Characteristics of Nursery and all farms (cont).

	All Farms	Nursery
Years on present farm		
2 or less	3.38	3.64
3 to 4	6.86	8.91
5 to 9	18.18	21.23
10 or more	71.58	66.22
Average year on farm	20.1	16.2
Age group		
< 25	1.14	1.84
25 to 34	4.20	4.81
35 to 44	16.22	20.96
45 to 49	11.45	14.22
50 to 54	13.90	16.37
55 to 59	13.34	14.80
60 to 64	11.86	11.02
65 to 69	9.67	6.88
70 or more	18.22	9.09
Average age	56.0	52.2
Race		
White	98.19	98.61
African American	1.20	0.18
American Indian or Alaska Natives	0.27	0.54
Native Hawaiian/ Pacific Islander	0.01	0.00
Asian	0.07	0.18
More than one race reported	0.26	0.49
Percent of Household Income from Farming		
<25%	76.85	57.06
25 to 49%	8.64	8.84
50 to 74%	6.33	11.10
75 to 99%	3.05	6.35
100%	5.14	16.65
Type of organization		
Family or individuals	94.60	88.00
Partnerships	4.56	5.45
Corporation	0.52	5.77
Other-coop, estate or trust etc	0.32	0.77

Table 8. Participation in crop insurance, conservation, and organic practices by nursery and all other farms.

	All Farms		Nursery	
	Farms	Acres	Farms	Acres
Land enrolled in Conservation Reserve or Wetland Reserve Program	4,346	227, 996	12	1,721
Land used to raise certified organic crops	38	417	2	-
Land enrolled in Federal or other crop insurance programs	5,973	1,900,567	232	18,508

“It’s Cool 2 B Square”: the Market Potential for Square Watermelon

Dixie Watts Reaves
Virginia Tech, Dept. of Agricultural &
Applied Economics, Blacksburg, VA 24061
dixie@vt.edu

Index Words: Niche Market, Marketing Plan, Watermelon Consumption

Significance to Industry: With the recent tobacco buy-out, many tobacco producers are seeking alternative enterprises to enhance farm income. Tobacco has traditionally provided one of the highest levels of net income per acre for farm commodities. Following the buyout, average prices dropped from approximately \$1.86 per pound to about \$1.44 per pound. Many producers have chosen this time to exit the tobacco business. Square watermelon could provide a niche market for former tobacco producers.

Nature of Work: During the 2005-06 academic year, the Virginia Tech student National Agri-marketing Association (NAMA) team created a marketing plan for square watermelon. Desiring to create a plan for something unique and interesting, with potential for assisting Southeastern U.S. producers, team members Morgan Allen, Rose Bradshaw, Jeff Kidd, John Muncy, Wendy Slusher, Devon Smith and Kathryn Taylor (advised by Dixie Watts Reaves and Scott Sink) set out to determine production characteristics and marketing potential for square watermelon. The team learned that square watermelon had already been successfully produced and marketed in Japan, but was not yet commercially available in the United States.

Team members conducted primary and secondary market research to determine the appropriate target markets for square watermelon; developed goals and objectives for a three-year roll-out; set pricing and promotional strategies; estimated three-year financial projections; and determined a strategy for monitoring and measuring the success of the plan. Given the results of their initial market research, they chose a specific target market which led them to create a marketing plan for a representative farm in Southern California. The success of square watermelon that they predict for a Southern California grower could be replicated in the Southeast. Results of their marketing plan for the California farm will be presented.

Results and Discussion: Team members chose the name “Watermelon-squared” or W^2 for their innovative square watermelon. W^2 watermelons are a medium sized (13 to 15 pound) seedless variety. During early growth stages, watermelons are placed into plastic growing boxes to gradually shape them into a cube. Utilizing the slogan, “It’s cool 2 B square,” W^2 is recommended for release in upscale grocery chains in densely populated areas.

While any consumer can enjoy the taste, convenience, and ease and safety of cutting square watermelon, the recommended initial primary target market is

high-income Asian-American families. The following characteristics justify the selection of this primary target market:

- Average annual U.S. per capita consumption of watermelon is 13 pounds (1).
- Asian-Americans consume more watermelon per capita than any other ethnicity (1).
- 78% of Asian-Americans purchased watermelons in the last year, the highest of any ethnicity (1).
- By 2010, the Asian-American population is projected to grow by a third (2).
- Of households with two to three children, 80% purchased watermelon in the last year (1).
- “Kids have a major influence over what goes into the shopping cart (3).”
- 56% of Asian-American households have children, compared to a national average of 32% (4).
- Of consumers with high income (\$75,000 and above), 75% buy watermelon at least once a year, while 55% purchase two to three times per month (1).
- Asian-American average income is 28% higher than U.S. average income (1).
- Asian-Americans are more health conscious than their non-Asian counterparts, believing that “a healthy lifestyle depends on eating nutritious foods, especially fresh produce (5).”
- “In general, Asian people are very trendy and fashionable, and they like quality (6).”
- W^2 will appeal to consumers who are increasingly health conscious.
- 71% of shoppers are trying to include more fruits and vegetables in their diets (7).
- 40% of women and 24% of men are trying to lose weight at any given time (8).
- 74% of consumers would be more likely to purchase watermelon if they knew of its health benefits (1).
- “Watermelon is...nutritionally low in calories and considered an ideal diet food, and is high in energy, making it a great energy boost (1).” It is fat-free, and contains high levels of vitamin A, vitamin B6, vitamin C (1).
- Among fresh fruits and vegetables, watermelon is the leader in Lycopene, which has been shown to reduce the risk of prostate cancer and lower the incidence of heart disease (9).

The unique square design of W^2 meets the need for convenience and the desire for trendy products.

- “Creative packaging and taste go a long way in influencing [children’s] decisions (1).”
- “Many shoppers are willing to pay for convenience (10).”
- Other convenience attributes include ease and safety of cutting and space-saving storability.

Survey results indicate that consumers are willing to pay a premium for square watermelon. A retail price of \$14.99 is recommended in upscale, trendy California grocery stores (*Whole Foods and Trader Joe’s*) and a chain targeted to Asian-Americans (*99 Ranch Market*).

Three-year financial projections for a representative farm in Southern California, producing 13, 20, and 36 acres of square watermelon in years one through three,

respectively, is shown in Table 1. Revenues are based on a wholesale price of \$6.80 per melon, significantly higher than the per hundredweight price generally received by melon producers. With the projected sales and estimated costs of production, the representative farm shows a net profit ranging from \$109,000 in year one to \$365,000 in year three.

It is anticipated that consumers will initially purchase W^2 due to its uniqueness and trendiness. However, the ease and safety of cutting, and the ease of storage, combined with the sweetness of the melon will lead to repeat buyers. W^2 can initially fill a niche market for specialty watermelon and offer a profit potential for former tobacco producers.

Literature Cited:

1. www.watermelon.org
2. U.S. Ethnic Population Profile, 2002
3. www.melonmania.org
4. 2003 U.S. Census
5. California Department of Health Services
6. *Asian Week*, March 1998
7. *Food and Technology*, 2003
8. www.Entrepreneur.com, Devlin Smith
9. USDA Carotenoid Database
10. *Natural Foods Merchandiser*

Table 1. Three-year Financial Projections.

Watermelon-squared, W²	2007	2008	2009
Units	43,350	68,760	124,890
Selling price	\$6.80	\$6.80	\$6.80
Gross Sales Dollars	\$294,780	\$467,568	\$849,252
Less: Returns & Discounts	58,956	93,514	169,850
Net Sales	235,824	374,054	679,402
Variable Costs			
Land preparation	\$3,091	\$4,778	\$8,431
Production costs	41,240	63,735	112,473
Vine turn	1,839	2,842	5,015
Box fitting	3,940	6,089	10,746
Harvest & Transport costs	37,620	58,140	102,600
Interest on operating capital	3,729	5,762	10,169
Watermelon Check-off Program	1,734	2,750	4,996
Total Variable Costs	93,193	144,096	254,429
Fixed Costs			
Boxes	10,002	12,867	20,045
Land	2,838	4,386	7,740
Insurance	396	612	1,080
Total Fixed Costs	13,236	17,865	28,865
Total Cost of Goods Sold	106,429	161,961	283,295
Gross Margin	129,395	212,093	396,107
Marketing and Development Costs	20,001	23,084	30,871
Net Profit	\$109,394	\$189,010	\$365,236

A Survey of Horticulture Internships: Importance of Personnel Management, Shipping Skills, and Familiarity with Equipment

Mack Thetford

West Florida Research and Education Center, Milton Campus
thetford@ufl.edu

Index Words: green industry, education, work experience, training

Nature of Work: The horticulture internship has become an increasingly popular component of horticulture education with many institutions providing extensive manuals to outline the responsibilities of all parties (1). Additionally, assistance in identifying potential intern programs or opportunities is now available online (2). These internship opportunities are varied and require a variety of skills and experiences prior to beginning. In 2004, a horticulture internship survey was distributed to 500 green industry businesses from Florida, Alabama, North Carolina and Georgia. The mailing list was developed from lists of businesses attending the 2003 Southern Nursery Association Trade Show (Atlanta, Georgia) and the Gulf States Horticultural Expo (Mobile, Alabama). A survey booklet was mailed to each participant with optional instructions to complete the survey using a web-based survey only accessible using an independent 3 digit identification code. The objectives of the survey were to obtain opinions from green industry businesses to determine the variety and importance of experiences employers include within the structure of an intern program.

The survey instrument consisted of 28 questions related to skills or knowledge an intern may be expected to have prior to entering an internship program. For each question, respondents were asked to indicate a level of importance for specific skills or knowledge related to an area of horticulture expertise. A sample question is represented in Figure 1. An additional eleven questions were included to help characterize the nature of the business responding to the survey. Responses below a numerical score of three were interpreted as representing a less than important ranking among respondents while numerical rankings of 3 or greater were interpreted as representing a ranking of important among respondents.

Results and Discussion: Eighty surveys were completed and returned for evaluation. Respondents characterized their type of business as 63 % grower/rewholesaler, 19% as a landscape business, 8% as garden center retailer or mass merchandisers and the remainder as other allied green industry professionals. When asked to describe their business activities respondents identified as container growers (60%), landscape design build firms (30%), greenhouse growers (29%), plant propagators (25%), field stock growers (25%), landscape installation or maintenance firms (23%), rewholesalers/brokers (16%), sellers of retail green goods (14%) or retail hard goods (7%), grounds maintenance (13%), lawn care providers (7%), landscape architects (6%) or providers of education/extension or research (6%). Very few respondents identified as arborists (2%), interior landscape design/maintenance firms (1%), sellers of retail giftware (5%), manufacturers/distributors (5%), retail/wholesale

florists (5%), or as an allied business (5%). The identification of these varied business activities by these firms reflects the increasing diversity of business activity within horticulture businesses.

The firms responding represented a variety of business sizes with 37% employing 1-5 employees, 10 % employing 6-10, 6% with 11-15 employees, 9% with 16-20 employees, 19% with 21-50 employees and 19% with over 50 employees. Annual business volume for these businesses was 18% with less than \$100,000, 35% between \$100,00 and \$999,999, 23% between 1 and 2.9 million and 19% with 3 million or more. An annual business volume did not apply to 5% of the respondents.

Respondents were asked to identify the highest level of education an intern should obtain prior to applying for an internship based on five categories. Some college (technical college, community college, or 4-year program) was preferred (53%) by the majority. However, 34% indicated graduation from high school or a general education degree certificate was sufficient. Interestingly, 7% of respondents indicated less than a high school degree was necessary prior to applying for an internship while an equal number (7%) indicated completion of a college bachelor's degree was not necessary. No respondents felt completion of a post graduate degree was necessary prior to applying for an internship.

When respondents were asked if internship opportunities were available at their business only 32% indicated yes. Of the businesses currently offering internship opportunities, 33% assisted the intern with locating affordable housing, while 9% had on-site housing available for intern use. A majority of the firms with existing internship programs provided training seminars or field trips for interns on-site (72%) or off-site (68%). When firms without an active internship program were asked if they would be interested in sponsoring an internship 46% responded yes. This suggests there is a greater potential to identify and develop internship programs within the green industry.

Respondents provided their opinion of the importance of several business and personnel management experiences or skills and were then asked the importance of having these skills prior to beginning the internship as well as the capability of the business to provide these skills as part of the internship (Table 1). Respondents ranked all of the experiences or skills greater than 3 indicating all were important components of an internship program but only organization of work loads or tasks, basic field record keeping, and supervision of coworkers retained this level of importance when considering the skills or experiences interns should have prior to beginning the internship. Respondents indicated they were capable of providing these experiences if the interns did not have them prior to beginning the internship. Additionally, these businesses were capable of providing experiences in the training of coworkers and sales. While experiences with computerized data management, budgeting, and basic financial book keeping were recognized as a necessity in an internship, these skills were not identified as being necessary prior to the internship and the respondents did not indicate a strong capability to provide these experiences or skills.

Additional questions assessed the respondent's opinions of the importance of communication skills, shipping skills, and familiarity with equipment and tools. An ability to speak and read English (4.7), and communication with work team members (4.5) were identified as most important while public education skills (public speaking) and customer service skills were also identified as highly important. Spanish speaking skills (3.2) were also identified as important reflecting the impact of Spanish speaking workers on the communication skills employers seek when considering personnel management skills of potential employees or interns. This combined with the high importance of the ability to speak and read English suggests employers would place a high importance on bilingual skills of interns or employees.

Shipping skills were also identified as important for interns. Grading plants (3.7), pulling orders (3.5), and loading trucks (3.1), were all identified as important skills for an intern while packaging (2.9) was of lower importance. When asked the importance of an intern having familiarity with equipment or tools prior to the internship only a few items were ranked as important by the survey respondents. Familiarity with sprayers (3.4) and tractors (3.3) were the only items identified by the industry as important prior to beginning an internship. However, importance was placed on familiarity with pumps (2.9), proportioner/injectors (2.9), mowers (2.9), hedge trimmers (2.8), string trimmers (2.6), and plumbing tools (2.6). Tools of least importance were blowers (2.4), edgers (2.4), carpentry tools (2.3), engine mechanic tools (2.3) and electrical tools (2.3).

Significance to Industry: The internship survey provided a brief profile of the importance green industry employers place on including various skills and experiences in an internship program. For potential employers not currently providing an internship program this survey provides a baseline of information on the importance other industry professionals place on personnel management, shipping skills, and familiarity with equipment.

Literature Cited:

1. Internships for Horticulture Handbook 2002. Undergraduate Programs Department of Horticulture, University of Arkansas. 34 p.
2. Online Internships in Horticulture.<http://hcs.osu.edu/hcs/Ed/Interns.html>. Accessed. 30 May, 2006.

Figure 1. Sample survey question.

4. How important is it for an intern to have the following communication skills	Most Important		Least Important		
English speaking and reading skills	⑤	④	③	②	①
Spanish speaking and reading skills	⑤	④	③	②	①
Customer service skills	⑤	④	③	②	①
Public education skills (public speaking)	⑤	④	③	②	①
Communication with work team members	⑤	④	③	②	①

Table 1. A summary of industry opinions on the importance of personnel management experiences or skills included as part of an internship program.

Personnel Management experience or skill	necessity in internship	prior to internship	provided in internship
Organization of work loads or tasks	4.48	4.05	3.95
Basic field record keeping	3.82	3.27	3.40
Supervision of coworkers	3.62	3.03	3.48
Training of coworkers	3.41	2.77	3.38
Sales	3.36	2.69	3.41
Computerized data management	3.27	2.91	2.70
Budgeting	3.24	2.76	2.71
Basic financial book keeping	3.03	2.65	2.62

