

**CONSUMER PREFERENCES FOR PRICE, COLOR HARMONY  
AND CARE INFORMATION OF CONTAINER GARDENS**

A Thesis

by

SHANNON CECILIA MASON

Submitted to the Office of Graduate Studies of  
Texas A&M University  
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2007

Major Subject: Floriculture

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Approved by:

Chair of Committee,	Terri W. Starman
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## **ABSTRACT**

Consumer Preferences for Price, Color Harmony and Care Information of Container Gardens. (December 2007)

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Chair of Advisory Committee: Dr. Terri W. Starman

Retail sales of container gardens have increased dramatically in the recent past and rose 8% from 2004 to 2005, to \$1.295 billion. The objective of this study was to determine consumer preferences for three attributes of container gardens. A Web-based survey was conducted on 18 Oct. 2006 with 985 respondents. Survey participants invited from an independent garden center's customer e-mail list were asked to complete a series of questions on a seven point Likert scale. Survey participants also answered questions about past experiences and future purchase intentions with container gardens, as well as demographics. A hierarchical set of levels were used to investigate three attributes of container gardens in a 3 X 3 X 3 factorial conjoint analysis including color harmony, price and care information level provided with the purchase. The surveys were analyzed using conjoint analysis which accounted for 99.8% of the variance in container garden preference. Relative importance decreased from price (70.7%), to care information level (22.9%), to color harmony (6.4%). Survey participants preferred a container garden with a price point of \$24.99, extensive information and the complementary color harmony. A significant portion (77.5%) of participants in this

study indicated that they would be more likely to purchase a container garden if extensive information was included with the purchase and 84.8% of participants said they would be willing to visit a Website that would provide more information on how to care for and maintain a container garden. Results of this study show that there is a potential to increase the value of a container garden through providing educational material with the purchase.

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## CHAPTER I

### INTRODUCTION

Historically, the floriculture and environmental horticulture industries, collectively being referred to as the green industry, have been production driven with less attention paid to developing marketing strategies (Singh, 1999). In the last ten to fifteen years marketing research in floriculture has increased and should continue in the future. To further compound the problem of a lack of marketing research, mass marketers have penetrated the market channel and are extending tremendous competitive pressure on other horticultural product outlets (Miller, 2001). In order for independent garden centers to be profitable they must distinguish themselves from the mass marketers by providing high quality, unique products and services to their customers.

A product that independent garden centers are offering more and more is container gardens. In 2005, 29 million households participated in container gardening. This was five million more households than the five-year average of 24 million. Total retail sales for container gardening in 2005 were \$1.295 billion; three percent more than the five year average (National Gardening Assn., 2006a).

A commodity can be defined as a product that is convenient, suitable, fit, proper

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This thesis follows the style of Journal of the American Society for Horticultural Science.

or useful (Carlson, 2004). Flats of bedding plants and hanging baskets have become commodities that are produced in massive quantities and offered at the lowest price possible to consumers (Carlson, 2004). Container gardens fit the commodity definition simply by being convenient and therefore care must be taken to protect their current high value from diminishing. Keeping container gardens from becoming a commodity is important and surveying current customers plays an instrumental role in determining attributes of a container garden for which customers are willing to pay more.

It would be worthwhile to direct some market research to determine what it is about mixing plants into one container that is so appealing to the consumer. Possible motivators could be: (1) inherent attributes of the different species of plants (form, texture, line) complementing each other; (2) soothing or exciting color harmonies; (3) beauty of the container itself; (4) ability of a container to fit on the patio or deck; or, (5) simply the convenience of having a pre-made garden. Planting monoculture pots and grouping them together, rather than planting a mixture of varieties per pot, may be the next trend in container gardening. How much does care information contribute to consumer's delight with the product and influence repurchasing decisions? Many of these issues were explored in this study. More specifically, consumer preferences for color harmony, price and level of care information provided at the time of purchase for container gardens were determined using the conjoint analysis methodology. The goal of this research was to determine the characteristics of container garden users and what motivates them to purchase.

The conjoint analysis used in this study, is a technique that allows researchers to analyze consumer purchases and has been used in several horticultural applications. This method was previously used to determine consumer preferences for bell peppers (Frank et al., 2001), geraniums (Behe et al., 1999), outdoor ornamental plants (Townsend-Brascamp et al., 1995), residential landscapes (Hardy et al., 2000), and table-top Christmas trees (Behe et al., 2005). After determining consumer preferences for a product, marketing strategies can be created or altered to better meet the desires of the consumer and in return increase profits. Growers should know what value consumers place on each attribute of a product in order to modify a product so that the consumer will have a more positive experience.

New and specialized crops, like container gardens, are something that consumers buy; however more research is needed to determine what consumers are expecting and what they are willing to pay for it. In addition to determining desirable product attributes, conducting consumer research also assists in uncovering not only what satisfies but delights our consumers.

## CHAPTER II

### LITERATURE REVIEW

#### **Competitiveness of the Market**

The United States floriculture industry's market channel has changed in many ways since its inception and continues to evolve today. Traditional retailers in floriculture now face stiff price competition from mass marketers who began penetrating the market in the 1960s and continuing into 1970s. While the mass marketers have an inherent right to enter the market, growers and consumers are concerned that they are not fully focused on the product and may not properly care for the product (Miller, 2001). In spite of this, mass marketers are seen as a positive force in the industry because they expose more consumers to floral products on an everyday basis (Behe, 1993).

In 2005 mass merchandisers, home centers and garden centers had more lawn and garden customers than in 2004. Hardware stores and mail-order companies had the same number of customers. Feed/seed stores and supermarket/drug stores experienced a decrease in customers (National Gardening Assn., 2006a). Forty five percent of households (41 million households) surveyed by the National Gardening Association purchased lawn and garden products from mass merchandisers, 48% (44 million households) from home centers and 38% (35 million households) from independent garden centers/retail nurseries (National Gardening Assn., 2006a). Independent garden centers and retail nurseries cannot compete on price with the mass merchandisers and

home centers and must compete on product quality and customer service if they are to remain in the marketing channel (Miller, 2001). A study conducted to determine consumer perceptions and expectations of independent garden center product and service quality suggested that a business could potentially achieve a competitive advantage by providing a high quality customer service (Hudson et al., 1997).

In 1998, Shaw wrote that consumers want value, and thus quality, and not only do consumers want quality; they are also willing to pay for it. Furthermore, Dennis et al. (2005) suggested that independent garden centers might be able to maximize their competitiveness by offering plant guarantees as a signal for plant quality. Customers were shown to choose an independent garden center for their purchases when they were making a major purchase or they were looking for information (Barton et al., 1998).

### **Container Garden Popularity**

Container gardening has a long history. Carved scenes on limestone walls of an Egyptian temple, dating back 3,500 years, depict frankincense trees growing in pots. King Nebuchadnezzar II installed the Hanging Gardens of Babylon for one of his wives who was homesick for Persia in the 6<sup>th</sup> century BC. Ancient Romans grew shrubs, vines, flowering plants and trees in containers placed on balconies, window ledges, and rooftops (Appell, 2001). Through the Middle Ages and the Renaissance in Italy, pot plants became common garden features. Later the same trend occurred in France and England (Container Gardening Associated, 2005). American visitors to the Old World are ever impressed with the elaborate container garden displays in and around homes, gardens, parks, businesses and public buildings (Container Gardening Associated, 2005).

Century-old ideas from these experienced countries can be adapted to our environments to achieve distinctive beauty. While container gardening certainly is not a new concept, growers and retailers are reaping the benefits.

In 2005, 29 million households participated in container gardening, five million more households than the five-year average of 24 million. Total retail sales for container gardening in 2005 were \$1.295 billion, three percent more than the five year average (National Gardening Assn., 2006a). Container gardens offer the benefits of gardening in minimal landscape space. People who live in apartments or condominiums usually do not have a place for traditional gardening, but do have a balcony or patio to accommodate a container garden. Container gardening is convenient and allows the users to have flowers, vegetables or herbs at hand for use when needed. Container gardens offer mobility as they can be moved around easily. They also offer the disabled and elderly easy access to a garden. In addition container gardens also offer solutions to problem soil and time constraints (Container Gardening Associated, 2005).

Today's consumer is "time-stressed" and they are seeking products that are ready-made, one of these being pre-made container gardens (Kelley, 2005). Ready-made container gardens are now being termed Do-It-For-Me (DIFM) (Starman, 2007). Forty four percent of those who participated in a survey responded that they "were overworked often or very often" (Galinsky et al., 2005). A lucrative response is to provide delivery and installation services and goods such as pre-made container gardens. Pre-made container gardens allow consumers to expend little time and space compared to other gardening methods, while still providing the benefits of gardening (Kelley, 2005). If

consumers would like to have “the sense of accomplishing the task themselves,” retailers can provide everything, including planting suggestions in a display to accommodate the consumer (Kelley, 2005). These types of container gardens are termed Do-It-Yourself (DIY) (Starman, 2007).

Growers need to continue to produce unique products that are less likely to become commodities. Suggestions on how to do this include incorporating new plant materials and products into the business, looking for new markets that don't presently exist and finding new markets for existing products (Carlson, 2004). A commodity is a widely available good or service that typically leads to smaller profit margins and diminishes the importance of other factors (i.e. brand) other than price (Merriam-Webster Online, 2007). Once a product becomes a commodity large retailers demand huge quantities from growers for extremely low prices. Eventually the product becomes uniform to meet buyer specifications and the price becomes constant throughout the industry (Carlson, 2004). In the container garden market, one way to avoid becoming a commodity may be through design. Using different textures and color harmonies each season can keep container gardens new, unique and from becoming a commodity.

Color harmony is defined as a pleasing arrangement of colors (Morton, 2007). A monochromatic color harmony is created by using tints and shades of one color and creates a quiet and soothing design. Using colors that are next to each other on the color wheel makes a more dramatic, analogous color harmony. For a design that demands attention, using colors that are across from each other on the color wheel is effective. This combination of colors creates a complementary color harmony (Starman, 2005).

## **Conjoint Analysis**

Conjoint analysis has been used for consumer surveying in horticulture to study factors that affect purchasing decisions, despite the fact that the industry falls far behind others in marketing efforts. Industries ranging from automotive to clothing regularly survey customers to develop new products (Moore et al., 2000). Marketing research in the floriculture industry was summarized by Behe (1993) and found to be very limited. There is insufficient research to show how consumers perceive flowering plants and what product features consumers are seeking beyond color (Moore et al., 2000). Growth in nursery and greenhouse sales has stimulated the expansion of existing operations and the entry of new firms. Improved marketing information is needed to assist these new and old firms in making informed marketing decisions (Gineo, 1990).

Conjoint analysis is a technique that allows for the analysis of consumer purchases, gives insight of the relative importance of product attributes, defines product quality on the consumer's level, and allows the industry to adjust marketing strategies (Gaasbeek and Bouwman, 1991). This technique requires the surveyor to limit the number of attributes to be studied; however, it is still a valid approach, based on the fact that most consumers make their purchasing decisions based on only a few qualities. Conjoint analysis involves: (1) selecting a model to describe consumer preferences; (2) determining the data collection method; (3) constructing the experimental design which, in part, consists of selecting a group of relevant attributes and values for each of the attributes considered; (4) determining the stimulus to be presented; (5) assigning a

measurement scale to the dependent variable; and (6) surveying buyers and analyzing the data collected in the survey (Green and Srinivasan, 1978).

A conjoint study can be constructed to determine the relative importance of new product attributes in combinations before a new product is ever developed. For example, researchers can “test” a new product, using its attributes, to see what combination of attributes gives customers the most value. This was done to develop a new, packaged asparagus product using four asparagus attributes: spear diameter, length and segment used, price, and brand name (Behe, 2006).

Conjoint analysis allows researchers to simultaneously investigate a number of product attributes and determine the relative importance of each attribute in the consumer’s preference (Frank et al., 2001). Conjoint analysis is less biased than focus groups or traditional direct question-and-answer surveys because it embeds the topic of question within the context of an issue for a less-direct, more natural approach to a topic (Moskowitz et al., 2004).

Conjoint analysis has been used in several horticultural and floricultural applications. It was used to determine consumer preferences for color, price and Vitamin C content in bell peppers (Frank et al., 2001). Color was found to be the most important attribute, with a relative importance of 75%. The 435 consumers surveyed indicated a strong preference for green bell peppers. Brown had a largely negative effect on preference. Red, yellow and orange bell peppers were perceived as intermediate between the green and brown colors. Retail price had a relative importance of 23% over a range of prices between 69 cents per kilogram to \$3.69 per kilogram. The amount of Vitamin

C content had the lowest relative importance 2.5%. A cluster analysis dividing participants into six consumer segments suggested that any efforts to promote Vitamin C content would be most effective using the yellow and orange bell peppers. It was also shown that differential price sensitivities may explain the practice of individual pricing of green bell peppers while pricing other colors based on weight (Frank et al., 2001).

Behe et al. (1999) evaluated leaf variegation, price and flower color using conjoint analysis in geraniums. Three leaf variegations were studied: plain green leaf, green leaf with a white zone, and green leaf with a dark zone. Price points ranged from \$1.39 to \$2.79. Five flower colors were used: red, pink, white, coral and lavender. Leaf variegation was found to have little effect on purchasing decisions with a relative importance of 3%. Price accounted for 45% of the decision process and lower prices were preferred to higher prices. Flower color had the highest relative importance, accounting for 52% of the purchasing decision. It was determined that the most preferred color was the lavender cultivar, followed by the red cultivar. The most preferred combination was the lavender geranium with the green leaf with a white zone priced at \$1.39. It was concluded that plant breeders and marketers should focus more efforts on developing and selling different colors of geraniums as opposed to different leaf variegations.

Many forms, sizes, colors, and flavors of tomatoes are now available in local supermarkets. Simonne et al. (2006) conducted two Web-based conjoint analysis surveys to determine consumer preferences for tomato type, price, lycopene content, and production style. Two surveys were conducted to reach people in every region of the

United States. Five tomato types were investigated: cherry, grape, cluster, plum, and regular slicing. Three price points were used in the study: \$0.99/lb, \$1.99/lb, and \$3.99/lb. The three, lycopene levels were low, medium and high. Two production styles were included: organic and conventional. The most preferred tomato type was the regular slicing. In both surveys price was the most important factor with \$0.99/lb as the most preferred price point, followed by tomato type, lycopene content, and production style. Participants preferred the highest lycopene content. Production style had relatively low importance in the purchasing decision; however, when participants were grouped by age differences were seen. Participants under the age of 38 years placed the highest importance on production style, preferring organic production. In regards to price, participants over the age of 58 or under the age of 38 were found to be less sensitive to price than participants 39 to 57 years old. Marketers could use price insensitivity between these two age groups to target specific age segments (Simonne et al., 2006).

A similar study was done to determine market potential for a prepackaged asparagus product in the Northwest and Midwest United States. Spear diameter, length and segment used, price and brand name were the four attributes of asparagus investigated in the conjoint portion of this survey. Two spear diameters were investigated, small and large. Three lengths were studied; spear tips, tips and cuts, and long spears. Three price points were \$1.49/lb, \$2.25/lb and \$2.99/lb. The brand names studied were Green Giant, Tender Tips, Sweet Tips and generic. Other questions pertaining to purchasing, preparation, and consumption were also asked. Participants preferred a small diameter to the large diameter, long spears to the other lengths and

segments used and the lowest price point of \$1.49/lb. Consumers preferred the names 'Green Giant' and 'Tender Tips' to generic or 'Sweet Tips'. The most preferred combination was the small-diameter; long spears priced at \$1.49/lb with the brand name 'Green Giant'. In this study participants had few attitudinal differences and a uniform marketing plan was suggested to be useful (Behe, 2006).

Several other studies were able to employ conjoint analysis to determine consumer preferences. Preference for several characteristics of outdoor ornamental plants including plant health, shape, bushiness, final height, price, suitability for growing conditions, leaf color and flower color were determined. Health of the plants was the most important factor, followed by suitability for the garden, shape, bushiness, final height, price, and leaf color (Townesley-Brascamp et al., 1995). Preference for residential landscape's plant size, increased perceived home value, design sophistication, and plant material were also determined, with plant size the most important factor, followed by design sophistication and plant material. The largest size plant increased perceived home value by 5.0%, design sophistication increased the value by 4.5% and plant material was half of that of plant size and 40% less than design sophistication (Hardy et al., 2000). Behe et al. (2005) evaluated consumer preference for table-top Christmas trees including tree species, decoration themes and price. This study found that tree species was the most important factor, followed by decoration themes and finally price. Each of these studies was able to employ conjoint analysis to determine what consumers are looking for in these products. Perceptions and acceptability of edible flower species found that the probability of using them in a meal and buying them were

favorable. These positive responses led to more research exploring this opportunity for small-scale growers (Kelley et al., 2004).

### **Delighted Consumers**

A Web-based study determined that future consumption of horticulture products is negatively affected when customers experience regret with their purchase. This effect on repurchase intentions could be detrimental to the industry. This same study also suggested that understanding consumer needs and anticipating unexpected occurrences with garden plants and products may be one way to increase repeat patronage (Dennis et al., 2004a). Anticipating unexpected occurrences, like a plant dying, can prove to be challenging; however, retailers who make the effort may be able to build positive relationships with their customers (Dennis et al., 2004b). It has been shown that it is much easier to keep current customers than it is to prospect for a new one (Barton, 1999).

There is clear evidence that businesses need to aim to retain customers by not only satisfying them, but also going beyond satisfaction to delight them. In a study on consumer delight and satisfaction, participants were divided into low and high knowledge groups based on a series of questions where they rated their own plant knowledge level. It was hypothesized that satisfaction would have a greater effect on repurchase intention for consumers with a low level of knowledge compared to a high level of knowledge. However, in both the high and low knowledge groups, delight had a greater impact on repurchase intention, than satisfaction and satisfaction did not influence repurchase intention. In addition, delight was determined to not have a greater

effect on repurchase intention for consumers with a low level of knowledge compared to consumers with a high level of knowledge. Customer satisfaction is important in decisions for products and services, but to retain customers and create loyalty, horticulture businesses need to do more than just satisfy their customers (Hicks et al., 2005). Results from this study were consistent with those from Oliver et al. (1997) in which satisfaction and delight were separate entities.

### **Surveying**

Most industries today conduct market research using the Web. There are several advantages of using a Web-based survey compared to mail or fax. Web-based surveys are a fast method, high-quality images can be used, thousands of surveys can be transmitted at a time, they are automatically coded, and they are cost effective (Cobanoglu et al., 2001). The Internet offers an accessible study sample of interested gardeners, a method for participants to respond, and a potential source of large quantities of information (Waliczek et al., 2000). Advantages of Web-based surveys according to McCullough (1998) are that they are potentially faster to conduct than telephone or face-to-face interviews, generate more accurate information with less human error, and are cheaper by several magnitudes because less man-power is needed to create, deliver and analyze the survey. Because it is difficult to assess customer preferences accurately, it is important to show them alternatives. Whenever possible the surveyor should offer choices between alternatives visually to customers (Barton et al., 1998). Using a Web-based survey allows high quality photographs of both the product and the alternatives to be included and reduces the variation in what the participants see (Barton et al., 1998).

On the other hand, disadvantages of a Web-based survey include the initial time commitment and the lack of Internet access for some consumers (Cobanoglu et al., 2001). However, Internet access by adults at home or work was estimated to be 210 million in the United States of a population estimated at 300 million, or 69.6% (Internet World Stats, 2006). The older method of using test markets invites the biases of the local participants and introduces variability due to the wear and tear on live plant material over time. Frank et al. (2001) utilized a face-to-face in-store survey on bell peppers, providing pepper samples for every combination, which was labor intensive and expensive (Simonne et al., 2006).

It has been determined that the inclusion of cash and non-cash incentives for participating in consumer surveys can increase response rates significantly (Cobanoglu et al., 2001). An Internet study used a \$5.00 e-coupon from Amazon.com in exchange for the consumer completing the survey. The researchers were able to collect 743 usable surveys with this method (Dennis et al., 2004a). Another study determined consumer preferences and marketability for six evergreen tree species using a Web-based survey in which 331 participants were compensated with a \$5.00 e-coupon for completing the survey (Behe et al., 2005). The inclusion of an incentive motivated the consumers to complete the surveys.

## CHAPTER III

### MATERIALS AND METHODS

#### Development of Container Gardens and Photography

The first objective of this research project was to design, grow, and photograph three almost identical, attractive container gardens in three color harmonies to use in the consumer preference survey. Twenty-milliliter rooted liners (84 rooted liners/tray) were received from Proven Winners® (EuroAmerican Propagators, Bonsall, CA) on 9 Mar. 2006 (Table 1). The liners were planted on 10 and 14 Mar. All liners were planted in soil-less media (Pro Mix BX, Premier Brands, Quakertown, PA) in 10.6 cm (480 mL) standard round plastic pots (Dillen Products, Middlefield, OH). From arrival of liners until 15 Mar. plants were hand watered with reverse osmosis (RO) water. Beginning on 17 Mar. plants were fertilized at each irrigation with 20N-3.4P-16.6K (Peter's Professional, Scotts-Sierra Horticultural Products Company, Marysville, OH) water-soluble fertilizer at  $200 \text{ mg}\cdot\text{L}^{-1}$  N. On 28 Mar., a fungicide drench (Banrot 40% WP, Scotts-Sierra Crop Protection Company, Marysville, OH) was applied to all plants at a rate of  $59.8 \text{ mg}\cdot\text{L}^{-1}$  to prevent root rot. All plants received a Soluble Trace Element Mixture (STEM, Peters Professional, Scotts-Sierra Horticultural Products Company, Marysville, OH) drench at  $30 \text{ mg}\cdot\text{L}^{-1}$  on 16 Mar. Insecticides for the treatment of aphids and thrips were used at the recommended rates as needed (Table A.1). 'Nagano'

heliotrope plants were drenched with 20% iron sulfate to correct symptoms of iron deficiency i.e., chlorosis of the new foliage, on 11 Jul.

A container garden planting design was created (Figure 1). On 3 Apr. plants grown in individual pots were planted together in 36.2 cm (12.7 L) plastic pots (Dillen Products, Middlefield, OH) using this design. The planting design was according to plant forms, heights and textures. The cultivars of ipomoea, calibrachoa and coleus were changed in the design to create three color harmonies (Table 1). All other plants used in the design were the same throughout all containers. The three color harmonies created were monochromatic, analogous and complementary (Figure 2). Until photographs were taken, individual plants in the containers were pruned as needed to increase branching, maintain proportion, and prevent shading between the different species. Pruning of plants in the containers was performed on a 10-15 day schedule.

Table 1. Genus, specific epithet, authority, cultivar and common name of plants used in the container garden survey.

Genus	Specific epithet	Authority	Cultivar	Common name
<u>Common to all containers</u>				
<i>Angelonia</i>	<i>angustifolia</i>	G. Bentham	AF® Blue	Summer Snapdragon
<i>Heliotropium</i>	<i>arborescens</i>	(L.)	Nagano	Heliotrope
<i>Heuchera</i>	hybrid	G. Engelmann	Velvet Night	Heuchera
<u>Monochromatic containers</u>				
<i>Calibrachoa</i>	hybrid	Lave Lex	SB® Tr. Blue	Calibrachoa
<i>Ipomoea</i>	<i>batatas</i>	(L.)J.de Lamarck	Black Heart	Sweet Potato Vine
<i>Solenostemon</i>	<i>scutellarioides</i>	(L.)L.E.W. Codd	Merlot	Coleus
<u>Analogous containers</u>				
<i>Calibrachoa</i>	hybrid	Lave Lex	SB® Red	Calibrachoa
<i>Ipomoea</i>	<i>batatas</i>	(L.)J.de Lamarck	Black Heart	Sweet Potato Vine
<i>Solenostemon</i>	<i>scutellarioides</i>	(L.)L.E.W. Codd	Religious Radish	Coleus

Table 1 Continued.

Genus	Specific epithet	Authority	Cultivar	Common name
<u>Complementary containers</u>				
<i>Calibrachoa</i>	hybrid	Lave Lex	MB® Crackling Fire	Calibrachoa
<i>Ipomoea</i>	<i>batatas</i>	(L.)J.de Lamarck	Margarita	Sweet Potato Vine
<i>Solenostemon</i>	<i>scutellarioides</i>	(L.)L.E.W. Codd	Rustic Orange	Coleus

AF® = Angelface, SB® = Superbells, MB® = MillionBells

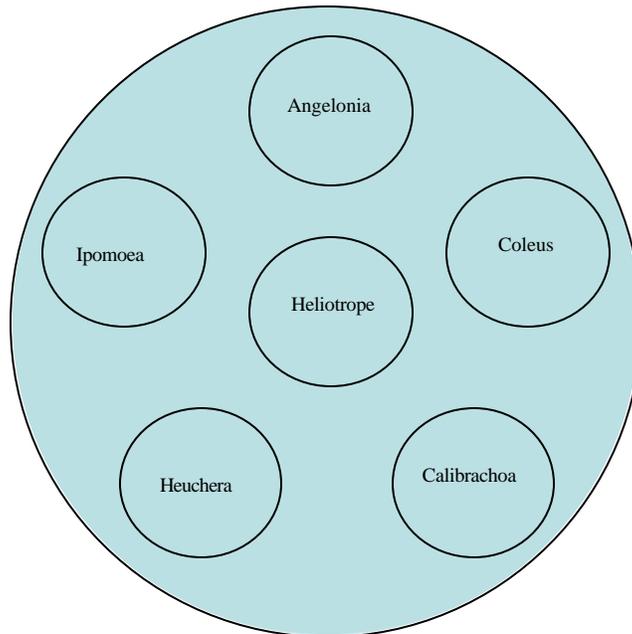


Figure 1. Diagram of container garden planting design.

Digital photographs were taken weekly beginning on 17 Apr. 2006 until 27 Jul. of each container garden with a Sony Mavica (MVC-CD1000, Park Ridge, N.J.). Photographs taken on 21 Apr. 2006 were used in the conjoint analysis section of the survey. All photographs taken after this date were used to create progressions of plant growth and to demonstrate results of pruning. Photographs were taken against a black felt background at three different exposures to insure that a quality photo was taken each week. These photographs were scrutinized and compared to each other to find one container garden from each color harmony that was nearly identical to the other color harmonies. Care was taken to choose photographs where the number of flowers on angelonia, heliotrope and calibrachoa were similar and the vigor of the other plants was indistinguishable.

(A)

(B)

(C)



Figure 2. Monochromatic (A), analogous (B) and complementary (C) container gardens photographed on 21 April 2006 and used in the container garden survey.

## **Development and Administration of Survey**

The second objective of this research project was to create and administer a statistically sound Internet survey to investigate consumer preferences of container gardens, for color harmony, price, and level of care information provided with the purchase.

Macromedia Dreamweaver (Version 8, San Jose, CA.) Web page creation software was used to create the Internet survey. A database was created using FileMaker Pro (Version 6, Santa Clara, CA.) to accurately record participant's survey responses. Some photographs and photograph progressions were refined with Adobe Photoshop (Version 6.0, San Jose, CA.). All research conducted with human subjects must be approved by Texas A&M University's Institutional Review Board. Approval was granted before this survey was administered in Fall 2006. A copy of the participant consent form can be found in Table B.1.

The survey database was hosted online by <http://floriculture.tamu.edu:7998> (no longer open) on 18 Oct. An independent garden center assisted in sending out an email invitation to complete the online survey to their customer email list consisting of approximately 7,000 customers. The same invitation was sent to the Texas Master Gardeners email list, courtesy of Dr. Doug Welsh. Dr. Welsh serves as coordinator of the Texas Master Gardener program with 5,000 Master Gardener volunteers. When participants received the invitation, they could click on a link and begin the survey. The independent garden center provided an incentive to both their customers and the master gardeners for participating. If they answered all of the required questions, both groups

were eligible to receive the \$5.00 coupon for their next purchase at the independent garden center. The survey remained open until the supply of 1,000 incentives was exhausted, which occurred in approximately 36 hours. After the survey was closed, these coupons were mailed to the participants. In future studies, assessing consumer preferences for a population that is representative of the United States, including gardeners and non-gardeners, would be encouraged so that marketing plans could be implemented nationwide.

The survey was divided into four sections: (1) conjoint analysis; (2) gardening experience; (3) container gardening experience; and (4) demographics.

#### (1) Conjoint Analysis

The conjoint analysis section of the container garden survey was developed to determine consumer preference for three factors that may influence purchase decisions for container gardens. These factors were color harmony, price, and level of care information provided with the container garden. For each of these factors, we identified a hierarchical set of levels to investigate. The color harmonies were monochromatic, analogous and complementary (Figure 2). Price was identified at three points including \$24.99, \$49.99, and \$74.99, consistent with a range of prices Texas consumers might expect to pay for a container this size and style. Care information was identified as no information, little information or extensive information (Figure 3). Thus, the design was a 3 x 3 x 3 factorial.

(A)

CARE TAG
<b>No Information Provided.</b>

(B)

CARE TAG
<b>Exposure</b> : Full sun to partial shade
<b>Fertilizing</b> : Apply slow-release fertilizer once a season.
<b>Water</b> : Water as needed to keep moist.

Figure 3. Care tag information levels used in the container garden survey: (A) no information; (B) little information; and (C) extensive information.

(C)

<b>CARE TAG</b>	
<b>Exposure:</b> Full sun to partial shade	
<b>Fertilizing :</b> Apply a slow-release fertilizer once a season or water-soluble fertilizer twice a month.	
<b>Water:</b> Water as needed to keep moist. Water thoroughly with each watering until water comes through the drainage hole.	
<b>If you would like to know more about the individual plants in your container read on.</b>	
	1. Heuchera 'Velvet Night'– Grown for its dark foliage but will flower once per year; comes back each year i.e. perennial. Likes shade and good drainage.
	2. Heliotrope 'Nagano'- Intense dark violet-blue, vanilla scented blossoms all summer. Dark green, large leaves give a coarse texture in the garden. May come back each year in Southern gardens. Remove spent blooms to encourage new ones.

Figure 3 Continued.

(C)

	<p>3. Calibrachoa hybrid 'Million Bells® Crackling Fire'- Abundant, small petunia like flowers. Flowers best in cool temperatures in spring and fall. Can be pruned back to produce sturdier growth.</p>
	<p>4. Angelonia hybrid 'Angelface® Blue'– Flowers all summer, loves the heat and sun; drought tolerant. Flowers look like small orchids. Foliage is grape scented.</p>
	<p>5. Ipomoea 'Margarita'– Commonly know as Sweet Potato Vine. Vigorous, trailing growth with vibrant color. Prune frequently to keep in proportion with the other plants in your container.</p>
	<p>6. Coleus 'Rustic Orange'– Heat tolerant variety. Vibrant orange tones appear on uniform leaves. Prune as much as you like to keep it in proportion to the other plants in your container.</p>

Figure 3 Continued.

The number of combinations required was reduced from 27 to 9 by using a partial factorial design. In reducing the number of combinations viewed, factor orthogonality (independence) was maintained and potential survey participant fatigue was decreased. The survey utilized combinations of these three factors that were determined using the Statistical Package for the Social Sciences (SPSS®) for Windows Release 13.0 (Chicago, IL.) conjoint analysis program. These nine combinations were used to create nine Web pages that pictured a container garden, a price point and a care tag (Figure 4). Participants were asked to rate “how likely are you to purchase” each container garden on a seven-point Likert scale (1=very unlikely, 7=very likely) based on the color harmony, the price and the amount of care information they were being provided.

## (2) Gardening Experience

Section 2 of the container garden survey was designed to determine a participant’s gardening experience and to analyze how much they enjoyed gardening (Table C.1) (B.K. Behe, personal communication). This section consisted of three questions that were presented on one Web page.

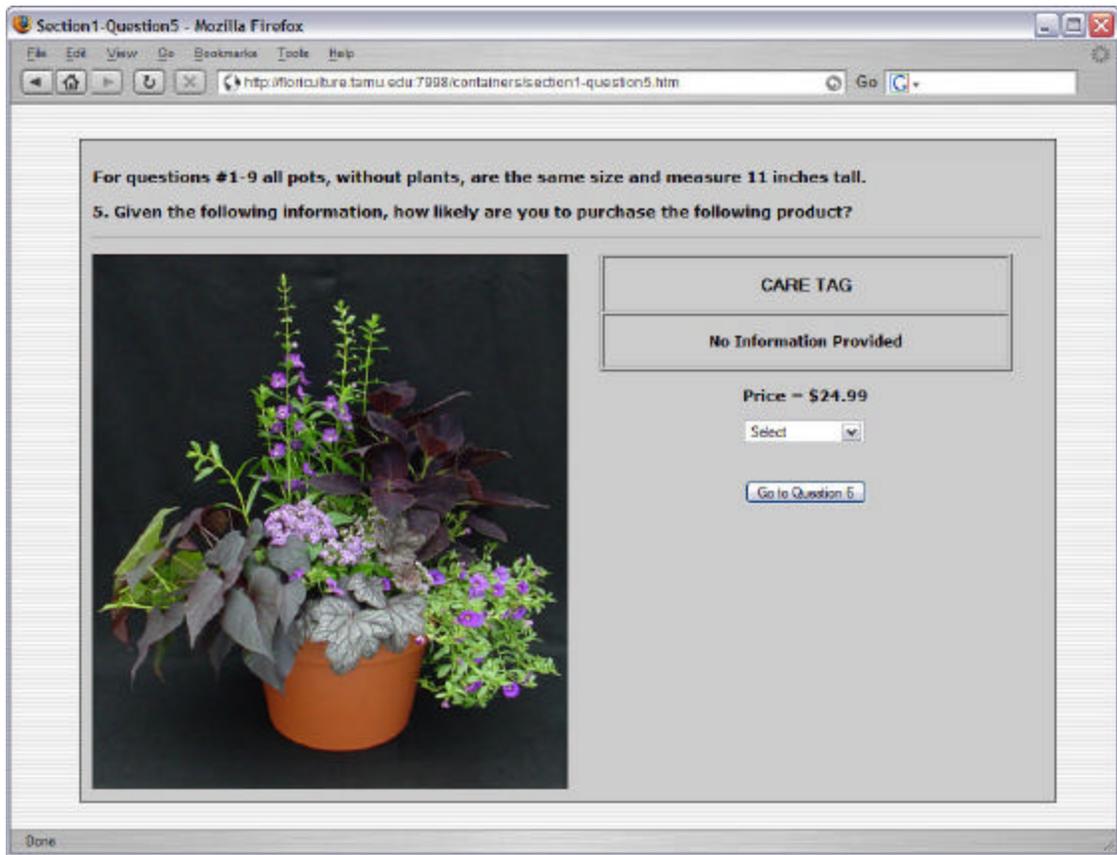


Figure 4. An example of a Web page as viewed by survey participants for conjoint analysis section of the container garden survey. Nine questions followed this same format, but the photograph, price and care tag varied according to the combination of preferences being displayed.

### (3) Container Gardening Experience

Section 3 consisted of nine Web pages that asked several questions about the participants and their container gardening experiences (Table D.1). At this point in the development of the survey we met with the managers of an independent garden center and developed questions they thought would be of importance to the improvement of their container garden program. We asked how many container gardens participants were buying or making, if they maintained the container gardens themselves, and if they would be interested in pruning directions or a replacement pack for senesced plants in their containers. It was also of interest to ask a series of questions on delight, regret and repurchase intentions. Three questions which measured delight and the two questions which measured repurchase intentions were taken from a study where Hicks et al. (2006) showed that customer delight, a stronger emotion than customer satisfaction, increased the likelihood that a customer would make a repeat purchase.

### (4) Demographics

The fourth section included demographic questions asked to collect biographical information from participants. It included questions about the participant's age, gender, income level, value of their residence, and education (Table E.1). Some demographic questions were adapted from a consumer survey administered in and around the Raleigh, NC area (Safley et al., 1997). These questions assisted in determining who buys container gardens.

## **Analysis of Data**

Data were analyzed to determine consumer preferences for three attributes of container gardens and to compare subgroups within the participant population.

Using conjoint analysis, consumer preferences were determined using an additive model in which utility scores, also defined as part-worths, for each factor (color harmony, price and extent of care tag information) were added to form the overall preference for a container garden.

A statistical test to compare conjoint analyses does not exist but numerical comparisons can be made. Consumer preference was determined for several groups within the participant population so that they could be compared numerically. These groups included the entire population of participants and the participants divided into groups based on their gender, age, income, and gardening experience. Pearson's R was used as the test statistic at a significance level = 0.05.

After completing the conjoint analysis, participants were placed into one of three groups: non-users, light-users and heavy-users based upon the number of containers that they either purchased or made. Non-users had not purchased or created a container garden, light-users had purchased or made one to nine containers and heavy-users had purchased or made = ten containers. Light and heavy users were compared using the SPSS® for Mac OS X Release 13.0 (Chicago, IL.) procedure "Crosstabs" which performs the Pearson's Chi Square test. The series of questions that measured delight and repurchase intentions were analyzed using structural equation modeling using LISREL 8.7 (Lincolnwood, IL).

The demographics section was analyzed using the SPSS® (Chicago, IL.) procedure “Frequencies” to determine the descriptive statistics of this data including frequencies and percentages.

## CHAPTER IV

### RESULTS

#### Conjoint Analysis

Only participants who completed the survey in its entirety were included in the conjoint analysis study (n = 985). The conjoint design was significant and accounted for 99.8% of the variance in preference. The relative importance of the three factors studied decreased from price (70.7%), to level of care information provided with purchase (22.9%), to color harmony (6.4%) (Table 2). The most preferred container was a complementary color harmony with extensive care information and a price point of \$24.99 (mean rating = 4.58). The least preferred container was an analogous color harmony with no care information and a price point of \$74.99.

Utility values indicate how valuable each of the attribute levels (color harmony, price and level of care information) is compared to the other attribute levels and how sensitive consumer preferences are to changes in product features (Orme, 2001). An ideal price for the overall conjoint study was calculated to be \$43.42 based on utility values. This price was calculated by dividing the range of the three prices (\$24.99 to \$74.99), fifty dollars, by the range of the utility values for the price points (1.2738 to -.9780), 2.2518. This results in each unit of utility being worth \$22.20. The ideal price is found at a utility value of zero, which does not add or subtract value from the perceived value. The closest utility value to zero for the three price points is -.2957. This number was multiplied by \$22.20 to get -6.57 and subtracted from the closest price to zero

utility, \$49.99. This resulted in the ideal price of \$43.42. Converting utility values into monetary values is a common practice used for easier interpretation of data; however, it can also be misleading and can lead to poor advice for strategic planning (Orme, 2001). The utility to monetary value calculations in this study were done strictly for the purpose of interpretation.

Table 2. Relative importance and utility value for color harmony, price and level of care information in a conjoint study of consumer preferences for container gardens among 985 participants.

Factor	Level	Relative	
		Importance (%)	Utility
Color harmony	Monochromatic	6.4	-0.0022
	Analogous		-0.1014
	Complementary		0.1035
Price	\$24.99	70.7	1.2738
	\$49.99		-0.2957
	\$74.99		-0.9780
Information level	No information	22.9	-0.3637
	Little information		-0.0028
	Extensive information		0.3665

$R^2 = 0.998, P = 0.0000$

Women in this study placed a higher relative importance on price than men (Table 3). Men placed a higher relative importance on color harmony and valued the complementary color harmony more than women did. Men also placed a higher relative importance than women on care information provided. Participants of age 39 and under placed a higher relative importance on color harmony and price than those 40 years and older (Table 4). When the two age groups were compared, care information was the attribute with the largest difference in relative importance. Participants of age 40 years and over placed a higher value on the extensive information level (Table 4).

Table 3. Relative importance (%) by gender for color harmony, price and level of care information in a conjoint study of consumer preferences for container gardens among 985 participants.

Factor	Women, <sup>z</sup> n = 812	Men, <sup>y</sup> n = 173
Color Harmony	5.4	11.5
Price	72.3	62.2
Information Level	22.3	26.3

<sup>z</sup>  $R^2 = 0.998$ ,  $P = 0.0000$

<sup>y</sup>  $R^2 = 0.998$ ,  $P = 0.0000$

Table 4. Relative importance (%) by age group for color harmony, price and level of care information in a conjoint study of consumer preferences for container gardens among 985 participants.

Factor	Age (yr.)	
	= 39, <sup>z</sup> n = 210	= 40, <sup>y</sup> n = 775
Color Harmony	8.3	5.9
Price	72.0	70.3
Information Level	19.7	23.8

<sup>z</sup>  $R^2 = 1.000, P = 0.0000$   
<sup>y</sup>  $R^2 = 0.997, P = 0.0000$

Participants were also grouped by income and those with an income of \$44,999 or less placed a higher utility value on the lowest price point and a lower utility value on the highest price point than the participants with an income of \$45,000 or more (Table 5). A higher relative importance was placed on both color and level of care information by participants with an income of \$45,000 or more (Table 5).

Participants with 21 years or more gardening experience placed a higher relative importance on the level of care information than participants with 20 years or less gardening experience (Table 6). Participants with 20 years or less gardening experience placed a higher relative importance on price and both groups indicated about the same relative importance for color harmony (Table 6).

Table 5. Relative importance (%) by income for color harmony, price and level of care information in a conjoint study of consumer preferences for container gardens among 985 participants.

Factor	Income	
	= \$44, 999, <sup>z</sup> n = 135	> \$45,000, <sup>y</sup> n = 850
Color Harmony	4.2	6.8
Price	73.7	70.2
Information Level	22.2	23.0

<sup>z</sup>  $R^2 = 0.997, P = 0.0000$   
<sup>y</sup>  $R^2 = 0.998, P = 0.0000$

Table 6. Relative importance (%) by the number of years of gardening experience for color harmony, price and level of care information in a conjoint study of consumer preferences for container gardens among 985 participants.

Factor	Experience (yr.)	
	= 20, <sup>z</sup> n = 525	= 21, <sup>y</sup> n = 460
Color Harmony	6.6	6.2
Price	71.8	69.6
Information Level	21.6	24.3

<sup>z</sup>  $R^2 = 0.998, P = 0.0001$   
<sup>y</sup>  $R^2 = 0.995, P = 0.0002$

The survey participants were divided into three groups based on the number of container gardens that they had either purchased or made themselves: non-users, light users and heavy users. Non-users had not purchased or made any container gardens, light users had purchased or made one to nine container gardens, and heavy users had purchased or made ten or more containers in 2006. Using these definitions, there were 55 non-consumers (5.6%), 364 light consumers (36.9%) and 567 heavy consumers (57.5%). There was no significant difference in gender ( $\chi^2 = 2.293$ ,  $p = .130$ ) or income ( $\chi^2 = 1.84$ ,  $p = .175$ ) between heavy and light users. There was a significant difference in the age distribution ( $\chi^2 = 7.371$ ,  $p = .007$ ) between heavy and light users. More heavy users were 40 years or older than the light users. There was also a difference between heavy and light users in home value ( $\chi^2 = 12.12$ ,  $p = .007$ ). More heavy users had homes valued at \$300,000 or more than light users. No other demographic differences were found between heavy and light users. For the gardening experience and container gardening experience analyses, only heavy and light user responses were used.

### **Gardening Experience**

When comparing heavy and light user's gardening experiences, there were three variables that differed. More heavy users had 11-21+ years of gardening experience compared to light users, and more light users had 0-10 years of gardening experience (Table 7). Heavy users indicated that they spent more time in the garden in spring than light users (Table 8). More heavy users enjoyed gardening more than light users. More light users dreaded spending time in the garden than heavy users. More light users were neutral to spending time in the garden than heavy users (Table 9).

Table 7. Responses in percent from heavy users ( $\geq 10$ ) and light users ( $\leq 9$ ) of container gardens to years of gardening experience.

	Heavy (n=567)		Light (n=364)		P-value
	0-10	11-21+	0-10	11-21+	
How many years of gardening experience do you have?	26.8	73.2	36.5	63.5	.002 *

\* = significant Pearson  $\chi^2$  value at  $P = 0.05$ .

Table 8. Responses in percent from heavy users ( $\geq 10$ ) and light users ( $\leq 9$ ) of container gardens to hours spent in the garden in spring.

	Heavy (n=567)				Light (n=364)				P-value
	0-10	11-20	21-30	31-41+	0-10	11-20	21-30	31-41+	
How many hours do you spend in your garden in a week in a typical spring?	55.2	29.3	11.5	4.1	69.5	23.6	6.3	.5	.000 *

\* = significant Pearson  $\chi^2$  value at  $P = 0.05$ .

Table 9. Responses in percent from heavy users ( $\geq 10$ ) and light users ( $\leq 9$ ) of container gardens to enjoyment of spending time in the garden.

	Heavy (n=567)			Light (n=364)			P-value
	<b>Dread</b>	<b>Neutral</b>	<b>Enjoy</b>	<b>Dread</b>	<b>Neutral</b>	<b>Enjoy</b>	
How much do you enjoy spending time in your garden on a scale from 1 to 7?	1.1	4.1	94.9	3.3	8.2	88.5	.001 *

\* = significant Pearson  $\chi^2$  value at  $P = 0.05$

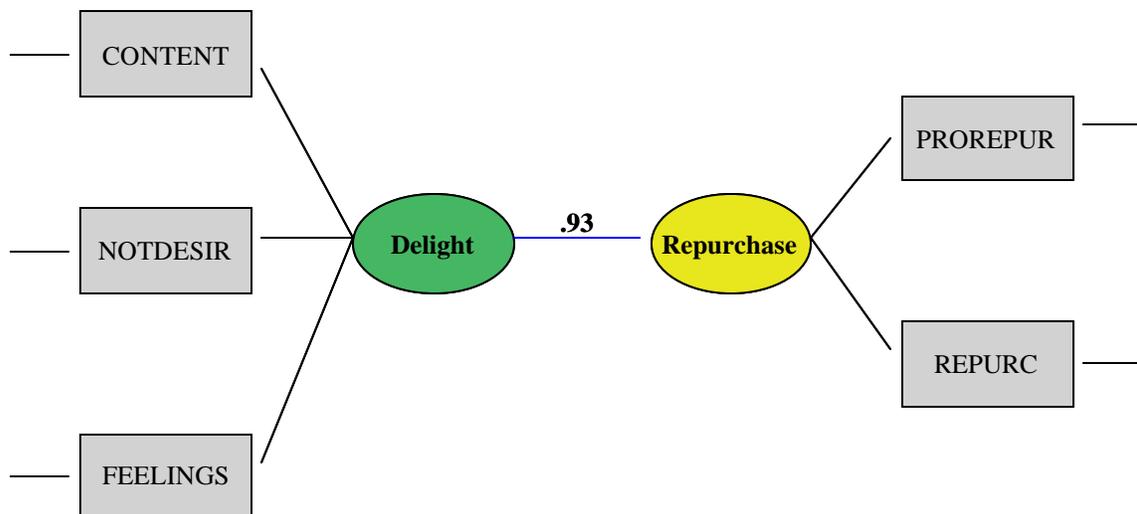
### **Container Gardening Experience**

There was no significant difference between heavy and light users when asked whether they used a professional service to maintain their container gardens, with 96.1% and 97%, respectively, reporting that they had never used a professional service for container maintenance (Table 10). There was no difference between the two groups as to whether they would be more likely to purchase a container garden if extensive care information was provided (Table 10). Approximately 85% of both heavy and light users said they were willing to visit a Website that would provide care information (Table 10). There was a significant difference ( $\chi^2 = 16.12$ ,  $p = .000$ ) between heavy and light users when asked whether they preferred to purchase a container garden preassembled or construct it on their own. Eighty three percent of the heavy users said they preferred to make the container garden, while only 72% of the light users preferred this choice (Table 10).

Participants were asked to rate color harmony sample swatches of non-plant material (Table 11). There was a significant difference between heavy and light users for preference of the complementary color scheme. More heavy users reported that they really loved it and more light users reported that they really hated it. Monochromatic and analogous color harmonies were not significant between the user groups. There was a significant difference in preference for a several species mixed in one container or several monoculture pots grouped together on a patio. More heavy users liked the mixed container and monoculture pots equally than light users. Light users, on the other hand, liked the monoculture pots grouped together more than heavy users. Approximately 70%

of both groups preferred a decorative pot to a utility pot with no difference between heavy and light users.

When customer satisfaction, delight and intentions to repurchase were measured, customers were, overall, delighted with their purchases of container gardens with a mean rating of 5.06/7.0 for the question “I am content with the purchase of my container” and a mean rating of 5.08 for the question “the outcome of my purchase was desirable.” The path (Figure 5) from customer delight (0.93) strongly and positively influenced the customer’s repurchase intentions ( $\chi^2 = 8.29$ ,  $df = 4$ ,  $P$ -value = 0.082, RMSEA = 0.033). In other words, delighted customers gave a strong indication to make subsequent purchases.



$$\chi^2 = 8.29, df = 4, P = 0.082, RMSEA = 0.033$$

Figure 5. Structural equation model for the effect of delight on repurchase intentions.

Table 10. Responses in percent from heavy users ( $\geq 10$ ) and light users ( $\leq 9$ ) of container gardens to container garden care information questions.

Questions	Heavy Users (n = 567)		Light Users (n = 364)		P-value
	A/U/S	N	A/U/S	N	
Do you pay a professional service to care for your container garden(s)?	3.9	96.1	3.0	97	.490
Would you be more likely to buy a container garden if extensive care information was provided to you?	<b>Yes</b> 78.1	<b>No</b> 21.9	<b>Yes</b> 76.1	<b>No</b> 23.9	.470
Would you be willing to visit a that would provide more care information for your container garden?	<b>Yes</b> 85.0	<b>No</b> 15.0	<b>Yes</b> 85.2	<b>No</b> 14.8	.948
Would you prefer to purchase your container garden assembled for you or would you prefer to construct the container on your own?	<b>Premade</b> 16.8	<b>Construct</b> 83.2	<b>Premade</b> 27.7	<b>Construct</b> 72.3	.000 *

A/U/S = always, usually or sometimes and N = never.

\* = significant Pearson  $\chi^2$  value at  $P = 0.05$ .

Table 11. Responses in percent from heavy users ( $\geq 10$ ) and light users ( $\leq 9$ ) of container gardens to color harmony and container questions.

	Heavy (n = 567)			Light (n = 364)			P-value
Rate the following color combinations from							
1 (really hate) to 7 (really love.)	<b>RH</b>	<b>N</b>	<b>RL</b>	<b>RH</b>	<b>N</b>	<b>RL</b>	
• Complementary	24.9	27.9	47.3	32.4	28.8	38.7	.016 *
• Analogous	10.1	21.5	68.4	15.1	19.5	65.4	.066
• Monochromatic	12.5	19.6	67.9	11.5	15.7	72.8	.244
If size and price were the same, which would you prefer on your patio? Mixed Container or Monoculture Pots grouped together.	<b>Mixed</b>	<b>Equal</b>	<b>Mono</b>	<b>Mixed</b>	<b>Equal</b>	<b>Mono</b>	
	33.5	36.5	30.0	33.2	26.4	40.4	.001 *
If size and price were the same, which would you prefer on your patio? Utility pot or Decorative pot.	<b>Utility</b>	<b>Equal</b>	<b>Decorative</b>	<b>Utility</b>	<b>Equal</b>	<b>Decorative</b>	
	11.3	19.9	68.8	12.4	18.1	69.5	.738

RH= really hate (1), N= neutral (4) and RL= really love (7) on a seven-point Likert scale.

\* = significant Pearson  $\chi^2$  value at  $P = 0.05$ .

There were no significant differences in any questions participants were asked regarding pruning of container gardens (Table 12). Eighty four percent of heavy users and 82% of light users reported that they would very likely keep a container garden for an entire season. Only 42% and 37% of heavy and light users, respectively, said they would replace a container garden if it were to get overgrown during the season. Over 70% of heavy and light users indicated that they would purchase a plant pack that had material to replace overgrown or senesced plants in their container garden. More than 85% of both groups reported that they would be willing to prune plants in their containers if they knew the outcome would be favorable and indicated that they would use pruning directions if they were included in the care information.

### **Demographics**

The heavy and light user population (n=931) was compared to the overall participant population (n=985) and no differences in demographics were found. Therefore all demographics reported are for the overall participant population. Participant age ranged from 19 to 80 years with 79% of participants being 40 or more years of age and 21% less than 39 years of age. Mean age was 50.4 years. Eighty two percent of participants were female and 18% were male (Table 13). Ninety four percent of participants resided in a single-family dwelling and 6% lived in a condo, duplex, triplex or apartment (Table 13). Ninety four percent of the participants owned their home (Table 13). Median household income fell in the category of \$75,000 or more. Sixty three percent of participants had completed a Bachelor's degree or more, while 99.5% had

received at least a high school diploma or the equivalent (Table 13). Ninety four percent of participants considered themselves at least sometimes time-stressed (Table 13).

Table 12. Responses in percent from heavy users ( $\geq 10$ ) and light users ( $\leq 9$ ) of container gardens to container garden pruning questions.

	Heavy (n=567)			Light (n=364)			P-value
	VU	NS	VL	VU	NS	VL	
How likely are you to keep this one container for the entire season?	9.0	7.1	84.0	9.6	8.5	81.9	.661
How likely are you to replace this container if it gets overgrown this season?	44.6	13.4	42.0	45.3	17.6	37.1	.141
How likely are you to purchase a plant pack, to refresh your container?	15.2	8.5	76.4	16.5	12.4	71.2	.109
How likely are you to prune your container garden when it gets overgrown?	6.9	6.3	86.8	6.6	6.0	87.4	.966
How likely are you to use pruning directions if they were included in the care information?	8.3	7.1	84.7	7.1	6.0	86.8	.660

VU= very unlikely (1), NS= not sure (4) and VL= very likely (7) on a seven-point Likert scale.

\* = significant Pearson  $\chi^2$  value at  $P = 0.05$ .

Table 13. Demographic responses in percent from 985 participants in a conjoint study of consumer preferences for container gardens.

<b>Factor</b>	<b>Response (%)</b>
<b>Age</b>	
= 39 years	21.3
= 40 years	78.7
<b>Gender</b>	
Male	17.6
Female	82.4
<b>Current residence</b>	
Single family dwelling	94.3
Condo/Duplex/Triplex/Apt.	5.7
<b>Residence</b>	
Owned	93.5
Rented	6.5
<b>Years lived at current residence</b>	
0 to 10 years	67.6
11 to 20 years	19.0
21 to 25 + years	13.4
<b>Market value of current residence</b>	
= \$199,000	51.7
\$200,000 to \$299,000	24.7
\$300,000 to up	23.6
<b>Income</b>	
= \$44,999	13.7
= \$45,000	86.3
<b>Years of formal education</b>	
Less than high school diploma	.5
High school diploma / GED	12.4
Some college	5.8
Associate's degree	18.8
Bachelor's degree	38.2
Advanced degree	24.3
<b>Time-Stressed</b>	
Always	10.9
Usually	28.3
Sometimes	54.6
Never	6.2
<b>Master Gardener</b>	
Yes	19.8
No	80.2

## **CHAPTER V**

### **DISCUSSION**

Participants in this study reported that price was the most important attribute of a container garden. A tabletop Christmas tree study found that relative importance of price decreased as participant age increased, until about age 60 where price becomes an important component again (Behe et al., 2005). Somewhat of the same effect was observed in this study where consumers of age 39 or under placed a higher relative importance on price than participants age 40 or over. It was expected that if we divided the group of 40 years of age and over into two groups, 60 years and over and 40 years to 59 years, the age group of 60 and over would consider price more important than the group of 40 to 59 years. However when this was done, the age group of 40-59 valued price more than the age group of 60 and over. This same price trend was seen in a tomato study where price sensitivity was lowest in people < 38 years and > 58 years but was significantly greater for participants 39 to 57 years (Simonne et al., 2006).

Results from this study were not consistent with the tabletop Christmas tree study regarding the magnitude of the relative importance of price. The extremely high relative importance that our participants placed on price may have been due to the fact that the range of prices in this study (\$24.99 to \$74.99) was much broader than the Christmas tree study (\$14.95 to \$24.95). The high relative importance in this study was likely exaggerated due to fact that the perceivable range of prices investigated was much broader than the perceivable range of colors and level of care information. In future

studies where color harmonies are being investigated the use of an obnoxious, clashing color harmony may prove useful to increase the perceivable range that participants can identify. To a somewhat lesser extent the same concept for the level of care information used in future studies may also apply.

Conversely to this study, consumers in other conjoint studies, including edible flowers (Kelley et al., 2004), geraniums (Behe et al., 1999), and tabletop Christmas trees (Behe et al., 2005) indicated attributes other than price as the most important. It was predicted that price would not be the most important factor in choosing a container garden but this was not the case, perhaps because the range for price was very broad and the perceived range for color was not.

Flower color was an important factor in consumer decision-making in a geranium study (Behe et al., 1999) and in an edible flower study (Kelley et al., 2004). In both studies consumers indicated that flower color was the most important attribute that influenced their purchase decisions. Participants in our study preferred the complementary color harmony most, followed by the monochromatic and analogous harmonies, respectively. This was similar to the edible flower study where consumers preferred a combination of all three colors studied (blue, yellow and orange) over a monochromatic container of any one of these colors (Kelley et al., 2002). In a geranium study consumers preferred a lavender (hypothetical blue) cultivar the most, followed by a dark red cultivar (Behe et al., 1999). The lowest utility value range occurred in the color harmony attribute, which reveals that consumers perceived the difference in color harmonies shown in this study as the relatively least important attribute. Hardy et al.

suggested that a small difference in utility value ranges may be due to lack of knowledge to distinguish between factors, indifference or difficulty in judging between them (2000). In this study, participants were likely indifferent to the three-color harmonies and therefore the relative importance of color was lower than care information or price. All of the container gardens that participants viewed for this study were very attractive and it may have proved difficult for participants to judge differences among them because anecdotal evidence shows color is very important to horticultural purchases. Most consumer preference studies reviewed investigated single color preferences, except the edible flower study (Kelley et al., 2002) where color harmony preferences were studied. It is possible that participants in our study were not apt on color harmonies and therefore did not prefer one to the others.

Interestingly, participants in this study ranked the non-plant material color harmonies completely opposite from the container garden color harmonies. In the non-plant material both heavy and light users preferred the monochromatic color sample swatch most, followed by analogous and finally complementary. When judging the container gardens, participants chose the complementary color harmony first, followed by monochromatic and analogous, respectively. This difference is probably due to the fact that the container garden included textures and forms in the design that were not present in the non-plant material color sample swatches. The textures in the container garden add interest and eye-appeal (Starman, 2005). In addition to texture and line, the container gardens also possessed additional shades and tints of green from the foliage. This served to create depth and line and therefore rhythm between the colors of interest.

Any or all of these factors may have caused a change in participant's preference for color harmony from the container gardens to the color sample swatches.

The perceived value that color harmony adds or subtracts from the container garden was calculated. A monochromatic color harmony using these plants subtracts only five cents, while the analogous harmony subtracts \$2.25 from the overall package. The most preferred color harmony, complementary, adds only \$2.30 to the overall package. Again, because these containers were similarly well constructed, it may have been challenging for consumers to distinguish the color differences.

The monetary value of a container garden with no information subtracts from the value of the container considerably, \$8.07, or approximately 20% of its value. A container garden that comes with little care information subtracts six cents from its price. However, the container with the extensive care information adds \$8.14, or approximately 20% of the value of the container garden. By providing simple, but thorough care instructions retailers could potentially add \$8.14 in perceived value to the price of the container garden. Hicks et al. (2005) found that consumers with both low and high levels of plant knowledge need to be delighted to increase their intentions to buy again. This may translate to a situation where all consumers of container gardens could be delighted with extensive care information provided with their purchase. Extensive care information may be a method for retailers to go beyond customer satisfaction to customer delight that Hicks et al. suggested (2005). As an industry, we want our consumers to be successful with plants. Consumers of a container garden that

comes with extensive care information, unlike any care information they had ever received, would have a reference guide to lead them through the season successfully.

A cost analysis was performed taking into account all indirect and direct costs incurred in growing these container gardens in a commercial greenhouse situation. It was determined that a profit could be earned if the container gardens were sold for the lowest price point in this study of \$24.99. All costs were estimated using published catalog prices (Hummert International, Earth City, Mo.). Behe et al. (2005) used prices for inputs in a cost analysis from a published national wholesale grower-supply catalog to determine that the production of tabletop Christmas trees was profitable. In this analysis it was suggested that most any grower would negotiate lower prices than the listed catalog prices and the negotiated price would depend on the economies of scale and others factors at the time of the negotiation. Thus, the researchers suggested that a profit estimated from published catalog prices is ultra-conservative and if a profit can be demonstrated using a published catalog price for costs of production, the likelihood of generating a profit using the lower negotiated price would be extremely high (Behe et al., 2005). Therefore the likelihood of a profit from this type of container garden is extremely high. Although an initial investment would have to be made to develop and implement a method of delivery for the extensive care information that customers want, it could potentially increase profits.

As indicated by our study, customers may perceive an extensive care guide with their container garden as an entirely new product worth more money than an average container garden. A large percentage of both heavy and light users said they would be

more likely to purchase a container garden if extensive care information was provided with the purchase. Approximately 85% of both light and heavy users said that they would be willing to visit a Website that would provide detailed care instructions for container gardens. With 84% of heavy users and 82% of light users reporting that they planned on keeping their containers throughout the entire season, retailers providing pruning directions with their container gardens or on a could guide their customers to success, avoiding purchase regret. In addition, most of the heavy and light users reported that they would be willing to prune plants in their container gardens if they knew the outcome and they also reported that they would use pruning directions if they were provided with the purchase. The online version of the care instructions could potentially be very detailed with video footage of pruning plants and pictures of how they grow back. This research suggests retailers should provide an effective way to deliver detailed care information to their customers if they want repeat patronage for their container gardens.

Most participants in this study reported that they did not use a professional service for maintenance of their container gardens. In 2005, master gardeners and gardening enthusiast spent an average of \$54 on container gardening (National Gardening Assn., 2006b). Master gardeners and gardening enthusiast spent \$205 on lawn care, \$68 on vegetable gardening and \$84 on ornamental gardening on average (National Gardening Assn., 2006b). The casual gardener spent \$48 on container gardening while spending an average of \$188 on lawn care, \$40 on vegetable gardening and \$51 on ornamental gardening (National Gardening Assn., 2006b). Considering that

only fifty dollars is spent on containers, the fact that the consumer does not hire professional help to care for them is not surprising. On the other hand, there is great potential for this market segment to be opened and some companies have proved this service profitable.

Container gardening retail sales reached \$1.295 billion in 2005 (National Gardening Assn., 2006a). Sales of products used in container gardening have been one of the fastest growing lawn and garden categories in the past five years (National Gardening Assn., 2006a). The present goal should be for retailers to keep consumers interested in container gardening and to keep it creative (Calkins, 2006). Many participants, especially heavy users, reported that they would like to make container gardens on their own, instead of buying a pre-assembled container garden. This opens a market for an independent garden center to have a container garden station or display area equipped with all of the supplies needed including a variety of plants and companion products for customers to make their own container garden. The retailer could offer “mannequin” container gardens to demonstrate to customers how to use plants in combinations (Starman, 2005). Providing consumers with the opportunity to design and plant their container garden makes the experience at the garden center more personable and makes the container garden less of a commodity and more of a unique piece of living art.

Consumers expect products to last and if they die they are disappointed. The more regret a consumer experiences, the less likely they are to repurchase products (Dennis et al., 2004). Participants in our study had a positive response to purchasing a

plant pack to refresh senesced or overgrown plants in their container gardens. Offering an easy-to-carry, plant-pack of a variety of plant species that can replace senesced plant species in a container garden later in the season offers compensation to those who may be feeling disappointment in their container garden.

Container garden customers were, overall, delighted with purchases of container gardens in this study. Results were consistent with Hicks et al. (2005) that showed that customer delight increased the likelihood that a customer would make a repeat purchase. There was a strong positive relationship between delight and repurchase intention, where a customer's likelihood to buy again increased when they were delighted with their initial purchase. The ability for delight to influence repurchase intentions was very strong, indicating that delighted customers will make subsequent purchases. Although this indication was significant with a *P*-value of  $\leq 0.082$ , the strong relationship between delight and repurchase intention (0.93) is still an important finding.

As Baby Boomers, born between 1946 and 1964, move towards retirement the horticulture industry needs to consider the effect this will have on business. Container gardening was most popular with households age 55 or over, with 33 % participating in 2005 (National Gardening Assn., 2006a). This may change as this generation gets ready for retirement and their discretionary income becomes fixed or shrinks. The next generation that needs marketing attention focused on is the Generation Xers born between 1965 and 1976. They are a smaller population sandwiched between two very large generations, the Baby Boomers and the Millennials. The Xers have complained of being left out by the media, politicians and advertisers in the past and now are being left

behind again (Mitchell, 2000). Danziger (2005) said these Boomers and Millennials will impact the luxury market now and in the future while Xers are not expected to have much influence. This reiterates the fact that the Xers are looked over in marketing of luxury items, which may include container gardens. Generation Xers are well educated and are focused on experiences (Mitchell, 2000). Instead of providing DIFM container gardens to this generation, offering the experience of designing and planting themselves, with a DIY container garden may be more profitable. In addition, providing online care instructions to this generation could prove successful.

Since there were few significant differences between heavy and light users, in both demographics and attitudes about container gardens, a uniform marketing plan should be useful for container gardens. Any of the color harmonies used in this study can be marketed equally, and extensive care information should be included in the overall marketing plan.

## CHAPTER VI

### SUMMARY OF FINDINGS

#### Conjoint Analysis

- Price was the most important attribute (70.7%) in the purchasing decision of a container garden.
- The level of care information provided with the purchase was the second most important attribute (22.9%) of a container garden.
- Color harmony was the least important attribute (6.4%) of a container garden.
- The most preferred container garden was a complementary color harmony with extensive care information and a price point of \$24.99.
- An ideal price for the overall conjoint analysis study was calculated to be \$43.42.
- Women placed a higher relative importance on price than men. Men placed a higher relative importance on color harmony and care information than women.
- Participants of age 40 years and over placed a higher relative importance on the care information provided.

- Participants with an income of \$44,999 or less were more price sensitive than participants with an income of \$45,000 or more.
- Participants with 20 or less years of gardening experience valued color harmony and price more than participants with 21 or more years of gardening experience.
- Participants with 21 or more years of gardening experience valued care information more than participants with 20 or less years of experience.

#### **Gardening Experience: Heavy versus Light Users**

- Heavy users had more years of gardening experience compared to light users.
- Heavy user spent more time in their garden in a typical spring than light users.
- Heavy users also enjoyed gardening more than light users.
- Light users dreaded spending time in their gardens more than heavy users.

#### **Container Gardening Experience**

- Both heavy and light users indicated that they did not use a professional service to care for their container gardens.
- Heavy and light users would be more likely to buy container gardens if they were provided with extensive care information.
- Approximately 85% of both heavy and light users said they were willing to visit a Website that would provide more care information for their container gardens.

- Heavy users want to create and construct their own container gardens more than light users.
- Heavy users liked the complementary color harmony when rating the non-plant material color swatches.
- Heavy users liked the mixed container garden and the monoculture pots grouped together equally more than the light users.
- Light users preferred the monoculture pots grouped together more than heavy users.
- Both heavy and light users preferred the decorative pot to the utility pot.
- Customers were overall delighted with their purchases of container gardens.
- Delight strongly and positively influenced the customer's repurchase intentions.
- Delighted customers gave a strong indication that they will make subsequent purchases.
- Heavy and light users had intentions of keeping a container garden for the entire season.
- 42% of heavy users and 37% of light users said that they would be likely to replace their container garden if it was overgrown in the season.
- Heavy and light users gave a strong indication that they would purchase a plant pack for replacing overgrown or senesced plants in their container gardens.

- Both groups indicated that they would prune their container gardens if they were overgrown and that they would use pruning directions if they were included in the care information.

### **Demographics**

- Participants ranged from 19 to 80 years with 79% of them being 40 years or older. Mean age was 50.4 years.
- 82% were female and 18% were male.
- 63% of participants had at least a bachelor's degree.
- 94% of participants resided in a single-family dwelling.
- Median household income fell in the \$75,000 or more category.
- 94% of participants owned their home.
- More heavy users had homes valued at \$300,000 or more than light users.
- 94% of participants reported at least sometimes being time-stressed.

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**APPENDIX A**

**INSECTICIDE SPRAY LOG**

Table A.1. Insecticide trade name, common name, manufacturer name, application rate and date(s) of treatment to container gardens used in the container garden survey.

Trade Name	Common Name	Manufacturer	Rate (mg•L <sup>-1</sup> )	Date(s) (2006)
Azatin	Azadirachtin	OHP, Inc. Mainland, PA.	17	18 July
Conserve	Spinosad	Dow Agrosiences LLC Indianapolis, IN.	56	09 Jun.
Decathlon	Cyfluthrin	OHP, Inc. Mainland, PA.	29	18 July
Enstar II	S-kinopene	Wellmark International, Schaumburg, IL.	234	18 Apr.
Marathon	Imidacloprid	OHP, Inc. Mainland, PA.	31	10 Feb.
Marathon II	Imidacloprid	OHP, Inc. Mainland, PA.	31	26 May
Mavrik Aquaflow	Tau-fluvalinate	Wellmark International, Schaumburg, IL.	150	18 Apr.

**APPENDIX B**

**PARTICIPANT CONSENT FORM**

### **Tracking Consumer Preference for Container Gardens**

Thank you for participating in this study, Tracking Consumer Preference for Container Gardens. The purpose of this study is to determine which characteristics, if any, influence the purchase of container gardens. This study is being done for the industry and for a thesis project for a master's student at Texas A&M University. This study will involve over 500 Internet users, who are over eighteen years of age. The survey will take approximately 20 minutes to complete. At the end of the survey you will be asked to enter your name and mailing address in order to receive a \$5 gift certificate. You will also have the option to not enter your information; however, you will not receive the gift certificate. Your personal information will not be used for anything other than the mailing of your gift certificate and all of your personal information will be deleted once your gift certificate has been mailed.

By responding to this study you acknowledge that you understand the following:

- Your participation is voluntary;
- Your identity will remain anonymous;
- The IP address of your computer will not be recorded;
- You can elect to withdraw at anytime without penalty;
- There are no positive or negative benefits from responding to this survey;
- The survey will be used for research;
- The results will be printed and kept for 12 months in a locked file and then destroyed;
- The data obtained from the survey may be published;

If you have any questions, you can contact:

Terri Starman 2133 TAMU College Station, TX 77843

979-862-2910 tstarman@tamu.edu

OR

Shannon Huizar 2133 TAMU College Station, TX 77843

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This research study has been reviewed by the Institutional Review Board-Human Subjects in Research, Texas A&M University. For research-related problems or questions regarding subjects' rights, you can contact the Institutional Review Board through Ms. Angelia M. Raines, Director of Research Compliance, Office of the Vice President of Research at (979)458-4067, araines@vprmail.tamu.edu

If you understand and agree with the above Information Sheet, please access the link to indicate your consent to our using your survey results.

**APPENDIX C**

**GARDENING EXPERIENCE**

Table C.1. Gardening experience questions in the container garden survey.

Questions	Responses
10. How many years of gardening experience do you have?	0-21+
11. How many hours do you spend in your garden in a typical week in the spring?	0-41+
12. How much do you enjoy spending time in your garden on a scale from 1 (dread it) to 7(enjoy it very much)?	1-7

**APPENDIX D**

**CONTAINER GARDENING EXPERIENCE**

Table D.1. Container garden experiences questions in the container garden survey divided into three sub-sections.

Container garden purchase(s)	Responses
13. How many mixed container gardens did you purchase in 2006?	0-10+
14. How many container gardens did you construct on your own? (You bought all components and planted the container garden by yourself.)	0-10+
15. Would you prefer to buy your container garden assembled for you or would you prefer to construct the container on your own?	Buy pre-made Create myself
Delight, regret and repurchase intentions	Responses
16. Think about the largest and/or most expensive container garden you have. Choose a number that most closely reflects how you felt about the performance of this container garden.	1:Very Dissatisfied 2:Dissatisfied 3: Satisfied 4: Very Satisfied 5: Did Not Purchase: Skip to Q22.
Answer the following questions based on this same container garden:	
17. I am content with the purchase of this container garden.	1(Strongly Disagree) to 7 (Strongly Agree)
18. I would consider this container garden,	1 (Very Undesirable) to 7 (Very Desirable)
19. My feelings toward this container garden can be described as,	1: Anger 2: Frustration 3: Disappointment 4: Contentment 5: Delight
20. The probability of me repurchasing this kind of container garden is,	1 (Very Low) to 7 (Very High)
21. I will repurchase this kind of container garden the next time I want another one.	1 (Disagree) to 7 (Agree)

Table D.1 Continued.

Container gardening service and information	Responses
22. Do you pay a professional service to care for your container garden(s)?	1:Always 2:Usually 3: Sometimes 4: Never 5: I don't own one.
23. Did you have information on how to care for your container garden(s) provided at the time of purchase?	Yes No Don't Know Did not purchase one.
24. If extensive information was available to you on how to care for and maintain the beauty of your container garden(s) would you be more likely to purchase one?	Yes No
25. Would you be willing to visit a that would provide more information on how to care for and maintain your container garden(s)?	Yes No
26. Rate the following color combinations on a scale from 1(really hate it) to 7(really love it)?	1 (Really Hate) to 7 (Really Love)
	
	1 (Really Hate) to 7 (Really Love)
	1 (Really Hate) to 7 (Really Love)

27. If size and price were the same, which would you prefer on your patio?

Several plants grouped  
together in one container

Like them both equally

Several single plant  
containers grouped together



28. If size and price were the same, which would you prefer on your patio?

Utility pot

Like them both  
equally

Decorative pot



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Questions	Responses
29. How likely are you to keep this one container for the entire season?	1(Very Unlikely) to 7 (Very Likely)
30. How likely are you to replace this container if it gets overgrown this season?	1(Very Unlikely) to 7 (Very Likely)

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Photograph pictured with question 30 below.



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Question

Responses

31. How likely would you be to purchase a plant pack full of new, seasonal plants, as pictured below, when you need to refresh overgrown or dead plants in your container garden?

1 (Very Unlikely) to 7 (Very Likely)

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Photograph presented with question 31 below.



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Question	Responses
32. How likely would you be to cut back or prune your container when it looks like the one pictured in panel 2 if you knew you could get the results pictured in panel 4?	1(Not Likely) to 7 (Very Likely)

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Photograph presented with question 32 below.



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Question

33. How likely would you be to use pruning directions if they were included in the care information?

Responses

1(Very Unlikely) to 7 (Very Likely)

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Photograph presented with question 33 below.



**APPENDIX E**  
**DEMOGRAPHICS**

Table E.1. Demographic questions included in the container garden survey.

Questions	Responses
34. What year were you born?	1900 to 1990
35. Sex:	Male Female
36. What is your zipcode?	Open text
37. Is your current residence a:	Single Family Dwelling Condo/Apartment/Duplex/Triplex/etc...
38. Is your residence:	Owned Rented
39. How many years have you lived at your current residence?	Open text
40. What is the approximate market value of your current residence?	Less than \$100,000 \$100,000 to \$199,999 \$200,000 to \$299,999 \$300,000 or more
41. What was your approximate household income in 2005?	Less than \$15,000 \$15,000 to \$29,999 \$30,000 to \$44,999 \$45,000 to \$59,999 \$60,000 to \$74,999 \$75,000 or more.
42. How many years of formal education have you completed? (12 Years=High School Diploma)	Open text
43. Do you consider yourself time-stressed?	Always Usually Sometime Never
44. Are you a certified Master Gardener?	Yes No

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 M.S., Floriculture-2007  
 GPA: 4.0

**Texas A&M University**, College Station, TX  
 College of Science  
 B.A., Biology, Minor in Horticulture- 2003  
 Overall GPA: 3.16 (4.0 GPA in Horticulture)

### ORAL

**PRESENTATIONS** Mason, S., T.W. Starman, R.D. Lineberger, and B.K. Behe. 2007. Consumer Preferences for Price, Color and Care Information for Container Gardens. ASHS Annual Conference, Scottsdale, Arizona.

**PUBLICATIONS** Mason, S. T.W. Starman, R.D. Lineberger and B.K. Behe. 2007. Consumer preferences for price, color harmony and information level of container gardens. HortScience 42(4): 892.

### ACTIVITIES

#### **Horticulture Graduate Council**

- Organize social events for graduate students in the horticulture department.
- Represent the graduate students at faculty meetings in the horticulture department.

#### **Benz School of Floral Design**

- Completed the basic course that included instruction in floral design, color harmony, living jewelry, wedding design, sympathy tributes and shop management.

#### **Pi Alpha Xi – Collegiate Honor Society in Horticulture**

- Member since April 2006

#### **Gamma Sigma Delta – Honor Society of Agriculture**

- Member since April 2006