HRI's Mission:

To direct, fund, promote and communicate horticultural research, which increases the quality and value of ornamental plants, improves the productivity and profitability of the nursery and landscape industry, and protects and enhances the environment.

The use of any trade name in this article does not imply an endorsement of the equipment, product or process named, nor any criticism of any similar products that are not mentioned.

Consumer Preferences for Native Plants in Montana Residential Landscapes and Perceptions for Naturalistic Designs[1]

Yousef R. Zadegan[2], Bridget K. Behe[3], and Robert Gough[4]
Department of Plant Sciences & Plant Pathology
Montana State University, Bozeman, MT 59717

Abstract

In a preliminary study, consumer perceptions of native plants in traditional and naturalistic settings was investigated. In Montana, 361 participants in an internet study reported their familiarity with both woody and herbaceous native plant species. Additional data were collected to determine their perceptions of native plants used in naturalistic designs through a conjoint study. Nearly half of the study participants recognized or had purchased most of the native plants shown in photographs. Results of the conjoint study showed that participants placed the greatest relative importance (62%) on landscape style as the most important factor in landscape design. They also preferred a naturalistic style over a more traditional style and mixed plant species to single species. Across all comparisons, the high relative importance of landscape style remained constant and was consistent with prior studies. Plant material (21.9%) and species diversity (16.2%) were half the relative importance of design style and remained relatively consistent through most comparisons. Even among those participants not familiar with native plants and those who had not purchased native plants, native plants were preferred in the landscapes. The demand for native plants may be reaching a critical stage for both commercial growers and the landscape profession. Although this study was limited to one state, results show that consumer interest is present and further investigation is warranted.

Index words: landscape design, plant preference, survey.

Species used in this study: arrowleaf balsamroot (*Balsamorhiza sagittata* (Pursh) Nutt.); buffaloberry (*Shepherdia argentia* (Pursh) Nutt.); butterfly bush (*Buddleia davidii* Franch.); dwarf Korean lilac (*Syringa meyeri* C. K. Schneid.); fuzzy-tongued penstemon (*Penstemon eriantherus* Pursh); harebell (*Campanula rotundifolia* L.); hawthorn (*Crataegus douglasii* Lindl.); heartleaf arnica (*Arnica cordifolia* Hook); honey locust (*Gleditsia triacanthos* L.); Indian paintbrush (*Castilleja pulchella* Rydb.); Japanese tree lilac (*Syringa reticulate* (Blume) H. Hara); limber pine (*Pinus flexilis* James); lupine (*Lupinus* sp. Pursh); pinks (*Dianthus* sp. L.); primrose (*Primula* sp. L.); red mountain-heather (*Phyllodoce empetriformis* (Sm.) D. Don); rocky mountain iris (*Iris missouriensis* Nutt.); serviceberry (*Amelanchier alnifolia* (Nutt.) Nutt. Ex Roem.); silver sagebush (*Artemisia cana* Pursh); spirea (*Spiraea* spp. L.); water birch (*Betula occidentalis* Hook); white fir (*Abies concolor* (Gord. & Glend.) Lindl. ex Hildebr.); wood's rose (*Rosa woodsii* Lindl.); and yellow columbine (*Aquilegia flavescens* S. Watson).

Significance to the Nursery Industry

Increasingly, consumers are exposed to information about native plants and their use in the landscape. While the definition of a native plant is often hotly debated, consumer perceptions about native plants are a topic of interest to many horticultural businesses. Some consumers may readily adopt and install native plants in a traditional landscape while others may use them in a more naturalistic landscape style. Yet, current consumer perceptions about native plants and naturalistic landscape styles are unclear. In Montana, 361 participants in a study reported their familiarity with both woody and herbaceous native plant species depicted in photographs. Additional data were collected to determine their perceptions of native plants used in naturalistic designs through a conjoint study. Nearly half of the study participants recognized or had purchased most of the native plants shown in photographs. Results of the conjoint study showed that participants placed the greatest relative importance (62%) on landscape style as the most important factor in landscape design, consistent with other studies. Plant material (21.9%) and species diversity (16.2%) were half the relative importance of design style. In general, native plants were preferred over non-native plants in built landscapes. Surprisingly, among those participants who were not familiar with the native plants in photographs and those who had not purchased native plants before, a preference for some plants considered to be native was clearly evident in this survey. Consumer awareness of native plants and their interest in using them in the landscape is likely at a critical stage. Plant professionals, both growers and landscapers, are uniquely poised to respond to what should be increasing consumer interest if not demand.

Introduction

Montana's population has been growing tremendously since the 1980s. An economic study conducted by Adair (1) indicated that new home construction in nine Montana counties has expanded local economies and will continue to increase as new industries are established and out-of-state individuals immigrate to the state. From 2001 to 2002, 814 new homes were built in Gallatin County. An increasing number of homebuyers are purchasing or building homes > 4000 sq ft and large acreages of undeveloped or natural landscapes are being transformed for human use (Zadegan, personal observations). A result of new home construction will be an increased demand for landscape installation and

[1]Received for publication September August 16, 2007; in revised form January 23, 2008.

[2]Assistant Professor. To whom all correspondence should be directed. <YZadegan@montana.edu>.

[3]Professor, Department of Horticulture, Michigan State University, East Lansing MI 48824.

[4]Professor and Associate Dean, College of Agriculture, Montana State University, Bozeman, MT 59717.

maintenance services. The transformation of resident native plant communities to other kinds of landscapes will result from subdivision developments, resort planning, and urbanization. This transformation, along with an interest in non-native species in developed landscapes, is becoming a major concern for environmentalists, conservationists and restoration ecologists (3, 18, 21). One potential response to these concerns is to install more native plant species in either traditional or more naturalistic landscape designs providing the community with an ecology-based solution to help maintain or restore biological diversity (19). Ecology-based design is a relatively new concept in landscape architecture that incorporates the use of native plants in built landscapes (12).

In recent years, landscape architects and concerned citizens have responded to the need for incorporating and using native plants in designed landscapes (2). In doing so, opportunities and challenges for landscape architects and designers arise since the aesthetic qualities of native plants vary widely and are often quite different from more customary landscape plants. Many native plant species have the tendency to grow in groups or colonies rather than single species stands and often produce small flowers with short bloom periods. For best establishment, a special ecological niche needs to be provided. This clustering tendency of native plants can be recreated in the designed landscapes by carefully studying and imitating natural plant associations (24).

Several native species have experienced a noticeable increase in popularity in home landscapes. The intention of the authors is not to contribute to a definition of 'native plants,' and we recognize diversity if not controversy in this definition. However, the need to understand public perception of 'native plants' is the basis for the study. The public's perception of native plants in designed landscapes and whether these plants or landscapes will contribute to the added value of a home, however, is unclear. Therefore, a better understanding of consumers' preferences for native plants, their attitudes toward bringing a more naturalistic landscape design into a developing environment, and purchase behavior is needed to better characterize the market for producers of native plants and other horticultural professionals.

Consumer preferences for types of plant materials and design style in residential landscaping have been the subject of several investigations (5, 14, 16). Property value directly relates to residential landscaping (5, 15, 16). Behe et. al (5) demonstrated that an average 41% of the perceived home value added by the landscape to the base price of the home was due to the design sophistication of a landscape, 35.9 % to plant size, and 22.4% to plant material. Hardy et al. (14) found slightly different results in Michigan, where plant size was the most important landscape feature, accounting for 40.2% of the value added to a landscape (14). In warmer climates, plant size didn't appear to be as great of a concern to consumers (5). Furthermore, the smaller size of the plants at landscape installation stage has been a concern for many clients (9), as they expect an immediate functional and aesthetic effect from newly installed landscapes. For most markets, we would expect the style of the landscape design to be a predominant factor in consumer preferences.

Behe et al. (5) and Hardy et. al. (14) found that the type of plant material was relatively less important than landscape design style. The authors attributed this to the consumers' inability to differentiate among plant types or to their difficulty in judging plant type compared to plant size and design style. It is important to note that no native plants were used in these studies. Whether the lack of client's experience or knowledge to recognize plant types or that customers were indifferent to the type of plant material used in the landscape, contributed to the low evaluations, the use of native plants in landscapes deserves further investigation.

This study is the first effort undertaken in Montana to provide information to help evaluate production, marketing, availability, and use of native plants in residential landscapes. In a pilot study conducted in spring 2003, a small number of consumers expressed interest in purchasing native herbaceous plants. However, the majority of plant buyers preferred more traditional species. The initial study indicated that the lack of interest in purchasing native plants was due to lack of knowledge about the plants rather than price differences or other factors. The present study was conducted with a larger number of consumers and included a wide range of woody ornamentals and herbaceous plants, and design aesthetics.

Materials and Methods

A survey was developed to determine consumer preferences for native plants as well as their installation in naturalistic or traditional landscape styles. The survey was designed to solicit information on gardening habits, plant purchases, and demographic characteristics. The survey protocol and instrument were approved by the Local Government Center at Montana State University prior to implementation. In addition to plant awareness and preferences, a conjoint study was constructed to determine the relative importance of three landscape attributes: landscape setting or design style (traditional vs. naturalistic), plant material (native vs. non-native), and species (simple vs. mixed). These attributes were considered the most influential factors in consumer preference decisions in residential landscapes.

Conjoint studies (11, 13) are used to investigate a number of paradigms in psychology, economics and marketing that deal with the quantitative description of consumer value trade-offs. The use of conjoint analysis allowed us to simultaneously investigate a number of product attributes and determine the relative importance of each attribute in the consumer's preference. Others have used this method to determine consumer preferences for chrysanthemums (23), dogwood trees (17), geraniums (7), outdoor ornamental plants (25), residential landscapes (5, 14), rhododendrons (10), roses (22), and table-top Christmas trees (6). We used an additive model in which the preference for each factor was added to form the overall preference for a particular landscape. For each factor, we identified two levels to investigate: landscape style (naturalistic and traditional), plant material (native and non-native horticultural varieties), and plant species diversity (simple or mixed). Using this $2 \times 2 \times 2$ factorial, we generated 8 landscape combinations for which photographs were selected. Computer generated three-dimensional views of homes and landscapes were rendered in full color. Views were prepared from the street/access road to portray curb appeal. Design software, including Adobe Photoshop version 7, was used for design simulation. Participants were asked to rate how 'acceptable' each landscape in the photograph was on a five-point Likert scale (1 = like very little, 5 = like very much). Conjoint analysis defines the overall consumer preference for a particular product, in this case a residential landscape, as the sum of the part-worths (utilities) for each

factor level. Conjoint and other statistical analyses were completed using SPSS 10.0 (SPSS, Inc., Chicago, IL).

From 2004 to 2006, web-based surveys were administered at the Montana State University Web server and Montana Native Plant Society Web site. To recruit participants for the internet survey, e-mail requests were sent to Montana State University faculty and staff. The public was invited to participate through local media outlets including daily newspapers, weekly newspapers, radio and television news stations, and Master Gardener classes held throughout Montana. Additionally, over 400 flyers were distributed to the visitors of Home & Garden Show by displaying them on automobile windshields. The web-based survey was adopted for the purpose of targeting a broader sample of consumers, increasing response rates, facilitating the use of high-quality images, and minimizing errors involved in hand coding and researcher bias (20). In addition, on-site surveys were conducted at the Home & Garden Show sponsored by the Bozeman Area Chamber of Commerce and the Montana Nursery and Landscape Association Annual Meeting in 2004 and 2005, respectively. Data from both survey methods were combined for analysis.

The survey consisted of three parts. The first part assessed respondent's gardening involvement and recognition of native plant photographs. We provided no definition of a native plant; the photographs simply depicted a plant that could be characterized as native in Montana In the second part of the survey, participants were asked to examine high-resolution professional color photographs of homes landscaped using the factors identified above. Participants were told that homes were located in a hypothetical subdivision with similar new homes, the estimated value of the homes, located in Gallatin County. Participants were asked to view the photographs and, considering the price of the homes assigned by realtors and the quality of the landscape, comment on each design on a five-point Likert scale. The third part of the survey asked the respondents to provide demographic information about themselves, their home and landscape, and landscape service usage.

Results and Discussion

Median age of the 361 participants was 54 years. Forty two percent had completed 16 or more years of formal education. Over half of the participants had only two people living in the home at the time of the study, 10.1% had three people, 13.4% had four people, and 6.3% had five or more people in the home. When asked if they were a 'plant professional' as part of their occupation, nearly 27% said yes.

According to the zip code provided by each respondent, 91% had a Montana zip code. The most frequent zip code provided was 59715 (22%), followed by 59714 (5.7%). All other zip codes each were provided by 3% or fewer of the respondents. Over 40% of the participants lived in Montana >10 years with only 12% having lived there one year or less. Eighty-nine percent owned their home and 11 percent rented their home. This was consistent with national home-ownership percentages (4). Thirty-one percent had lived in the home ≥10 years while nearly 24% lived in their home ≤2 years.

Over 80% reported their present home was landscaped. Nearly 42% said it was done by a 'professional'. The National Gardening Association (8) reported that 6.8% of American households used a landscape maintenance service in 2006 while 2.6% used a landscape design service and 2.6% used a landscape installation service. Results here are higher than the NGA study reported. Ninety-five percent of the study participants maintained their own yard. In the five years prior to the survey, 58% had visited a garden center in the Gallatin Valley while 42% had not. Only 34% had purchased a Montana native plant while 68% had purchased a non-native species. Sixty-five percent responded they were 'very likely' to incorporate native plants from Montana if they were to remodel their home landscape.

Table 1. Percent of respondents who were familiar with the six plant species.

Species	Percent familiar with plant in photograph
Arnica cordifolia	51.6%
Balsamorhiza sagittata	79.8%
Campanula rotundifolia	85.5%
Iris missouriensis	85.0%
Penstemon eriantherus	49.2%
Rosa woodsii	85.8%

Approximately 33% spent ≥5 hours in the garden on average each week, 14.8% spent 4 hours, 16.9% spent 3 hours, 16.1% spent 2 hours, and 7.4% spent only one hour, (11.7% no response). Eighty-eight percent reported their family enjoys gardening and 91% said they have favorite plants. Several species mentioned more than once included balsamroot, chokecherry, lupines, columbine, Indian paintbrush, and roses.

We showed participants photographs of six native plant species. Nearly half of the participants were familiar with the six native plant species shown as photographs (Table 1). So, there was relatively high recognition or familiarity with plants that can be considered native in the Montana landscape.

Next, we showed participants another series of plant photographs and asked them to rate their 'willingness to buy' on a five-point Likert scale, with 1 = very willing to buy and 5 = not very willing to buy (Table 2). Among the woody plants, consumers rated *Abies concolor* highest, a native species with drought and fire resistance. Among shrubs, *Phyllodoce empetriformis* was rated highest, a native plant which also has drought resistance. Among herbaceous perennial plants, they rated *Aquilegia flavescens* highest; it is also a native plant. Fifteen of 18 plants listed received >3.0 rating (median value). The three that received a value lower than median were *Gleditsia triacanthos, Syringa reticulata,* and *Crataegus douglasii*, all three non-native species. Most native plants were rated relatively high by consumers, again indicating some preference for those species.

We compared purchases of native plants with familiarity of six herbaceous native plant species. In four of the six plants, a higher percentage of participants who were aware of the native species did make more native plant purchases (Table 3). Our hypothesis was that if the participant was familiar with the plant, s/he was more likely to have purchased the native plant. This was, indeed, the case. The only plant for which there was no significant difference in the percentage of participants who were familiar with the plant but had not purchased it was *Campanula rotundifolia*. Chi-square analyses of age group, income group, and education group showed no statistical differences among purchasers of native plants (data not shown).

Table 2. Percent of respondents who would be very willing to buy (= 1) or not very willing to buy (= 5) the plants shown in photographs.

Plant species	Mean	s.d.
Woody trees		
Abies concolor (native, drought& fire resistant, $35/5 g)	2.40	1.433
Betula occidentalis (native, very cold hardy, $40/5 g)	2.72	1.297
Crataegus douglasii (non-native, attractive to birds, $35/5 g)	3.03	1.346
Gleditsia triacanthos (non-native, open canopy, $30/5 g)	3.23	1.322
Pinus flexilis (native, semi-arid sites, open canopy$35/5 g)	2.72	1.360
Syringa reticulata (non-native, slow-growing, $35/5 g)	3.27	1.489
Shrubs		
Amelanchier alnifolia (native, drought tolerant, $5/1 g)	1.95	1.194
Buddleia davidii (non-native, drought tolerant, $3.50/1 g)	2.85	1.421
Phyllodoce empetriformis (native, drought tolerant, $10/1 g)	1.88	1.116
Shepherdia argentia (native, attractive berries, $4,70/1 g)	2.09	1.269
Spiarea sp. (non-native, drought tolerant, $5/1 g)	2.68	1.401
Syringa meyeri (non-native, drought tolerant, $5/1 g)	2.86	1.455
Herbaceous perennials		
Aquilegia flavescens (native, summer flowering, $3.70/1 g)	1.70	1.192
Artemisia cana (native, winter wildlife food, $4.70/1 g)	2.58	1.534
Castilleja pulchella (native, attracts hummingbirds, $4.70/1 g)	1.64	1.075
Dianthus sp. (non-native, good drainage, full sun, $3.70/1 g)	2.99	1.478
Lupinus sp. (non-native, average to rich soil, $4.70/1 g)	2.28	1.393
Primula sp. (non-native, moist & rich soil, $3.70/1 g)	3.19	1.460

Conjoint analyses. The conjoint model was significant ($p = 0.002$) and showed that the factors accounted for 96.3% of the variance in participant's ratings (Table 4). The style of landscaping (naturalistic or traditional) accounted for 62% of the participant's positive rating and was the most important factor. The plant material (native or non-native plants) was second most important with 21.9% of the relative importance attributed to this factor. Least important was the plant diversity (simple or mixed), which accounted for 16.2% of the participant's rating. These findings were consistent with Hardy et al. (14) in that plant material was relatively lower in importance than the style of combining plants into a landscape. Naturalistic landscape design styles were preferred over more traditional landscape designs (negative utility), native plants were preferred over non-native plants, and mixed species designs were preferred over simple species designs. The most preferred landscape combination was the naturalistic, native plant, mixed landscape with a mean rating of 2.14 ± 1.206. The least preferred combination was a traditional landscape with non-native plants in a simple landscape, rated at 4.70 ± 0.705.

We contrasted landscape preferences among two age groups: 25 to 49 years, and ≥50 years of age (Table 5). Respondents in the younger age group placed a higher relative importance on the landscape style and a lower relative importance on the plant material than did the older respondents. Both groups preferred naturalistic styles over more traditional styles and both preferred mixed species in the designs. Since native plant material was slightly more important to older participants, that attribute might be highlighted in landscape design marketed to potential consumers ≥age 50 years.

We examined the landscape preferences within three income groups: less than $50,000, $50,000 to $75,000, and ≥$75,000 (Table 6). The middle income group placed a higher relative importance on landscape style than the other income groups, but all preferred the naturalistic style over the traditional style. The lowest income group placed a substantially lower relative importance on plant material (14.3%) than the other groups, but a higher relative importance (29.7%) on the species of plants (simple or mixed). All groups preferred native species over non-native species. In all three groups, plant material and species were numerically lower in relative importance compared to the landscape style. Landscape style should be highlighted when marketing to middle-range income households while species diversity might be more accented in marketing landscapes to lower-income households.

There were small differences in the relative importance of the three landscape factors for respondents who had

Table 3. Comparison of survey respondents who were familiar with the six plant species shown and whether they made a purchase of any native plant species.

	Familiar		
Species	Purchased?	Not purchased?	Chi-square (p)
Arnica cordifolia	55.3%	42.1%	4.174 (p = 0.028)
Balsamorhiza sagittata	83.3%	70.9%	11.383 (p = 0.010)
Campanula rotundifolia	87.7%	79.7%	6.280 (p = 0.099) ns
Iris missouriensis	90.1%	70.5%	19.478 (p = 0.000)
Penstemon eriantherus	53.2%	37.2%	6.258 (p = 0.009)
Rosa woodsii	89.4%	76.9%	8.331 (p = 0.005)

Table 4. Relative importance of landscape factors from conjoint analysis using 273 survey responses.

	Relative importance	Utility value
Landscape	62.0%	
Traditional		–0.5989
Naturalistic		0.5989
Plant material	21.9%	
Native		0.2111
Non-native		–0.2111
Species	16.2%	
Simple		–0.1563
Mixed		0.1563

$R^2 = 0.963$, $p = 0.000$

Table 5. Relative importance (and utility value) of landscape factors from conjoint analysis using survey responses from two age groups[z] (age 25 to 49, and age 50 and over).

	Age group (years)	
	25–49 (n = 87)	≥50 (n = 154)
Landscape	68.4%	57.2%
Traditional	(–0.650)	(–0.600)
Naturalistic	(0.650)	(0.600)
Plant material	14.3%	23.0%
Native	(0.135)	(0.242)
Non-native	(–0.135)	(–0.242)
Species	17.3%	19.8%
Simple	(–0.165)	(–0.208)
Mixed	(0.165)	(0.208)
	$R^2 = 0.981$, $p = 0.000$	$R^2 = 0.983$, $p = 0.000$

Table 6. Relative importance (and utility value) of landscape factors from conjoint analysis using survey responses from three income groups (<$25,000, $25,000 to $75,000, and >$75,000).

	Income group		
	<$25k (n = 16)	$25k–$75k (n = 128)	>$75k (n = 90)
Landscape	56.0%	64.8%	55.5%
Traditional	(–0.455)	(–0.660)	(–0.511)
Naturalistic	(0.455)	(0.660)	(0.511)
Plant material	14.3%	20.1%	21.0%
Native	(0.116)	(0.205)	(0.193)
Non-native	(–0.116)	(–0.205)	(–0.193)
Species	29.7%	15.1%	23.6%
Simple	(–0.241)	(–0.154)	(–0.217)
Mixed	(0.241)	(0.154)	(0.217)
	$R^2 = 0.942$, $p = 0.001$	$R^2 = 0.981$, $p = 0.000$	$R^2 = 0.971$, $p = 0.000$

purchased a native plant and those who had not (Table 7). Both placed the highest relative importance on landscape style and preferred a naturalistic style. Respondents who had purchased native plant material placed a slightly higher relative importance on plant material than did those who had not purchased a native plant. Conversely, those who had not purchased a native plant placed a slightly higher relative importance on species compared to those who had made a native plant purchased. Both preferred native plants over non-native plants and both preferred mixed over simple species. So, even if they had not purchased a native-plant, they preferred them in the landscape over non-native types.

The participants of this study expressed an interest in native plant species in naturalistic landscape styles. Many owned their home, and maintained the landscape themselves. Most enjoyed gardening and many spent a considerable number of hours in their own garden.

While almost exclusively from Montana, many of these participants recognized native plants and had purchased them. Across all of the conjoint analyses conducted here, consumers consistently placed the greatest importance on style as the most important factor in landscape design. This finding was consistent with the reports of Behe et al. (4) and Hardy et al. (14). Plant material (native or non-native) and species diversity (simple or mixed) consistently were half the relative importance of design style. The relative importance of plant material and species were similar through most comparisons. Even among those not familiar with native plants and those who had not purchased native plants, native plants were preferred in the landscape photographs.

The responses from one state could be an indication of consumer perceptions in other states. This was a convenience sample, and thus is not generalizable to the U.S. population on average. However, the preference for and demand of non-native species in many U.S. markets is one that is expected to increase. Montana is a more rural state and perhaps native species in naturalistic settings are aesthetically pleasing, when they might not be considered so in a more urban setting. Consumer perceptions expressed in this study showed a preference for native species in more naturalistic settings. The results presented here show positive signs for landscape

Table 7. Relative importance (and utility value) of landscape factors from conjoint analysis using survey responses from two native plant purchase groups (purchased native plants, did not purchase native plants).

	Purchased native plant (n = 174)	Did not purchase native plant (n = 99)
Landscape	62.5%	60.3%
Traditional	(–0.597)	(–0.603)
Naturalistic	(0.597)	(0.603)
Plant material	20.1%	17.7%
Native	(0.192)	(0.177)
Non-native	(–0.192)	(–0.177)
Species	17.4%	22.0%
Simple	(–0.166)	(–0.220)
Mixed	(0.166)	(0.220)
	$R^2 = 0.985$, $p = 0.000$	$R^2 = 0.972$, $p = 0.000$

professionals and plant producers that they should expect the market for native plants to grow in the short term in some markets, if not more pervasively throughout the U.S. A study of this type should be conducted on a broader scale to include more diverse markets and plants.

Literature Cited

1. Adair, Ann. 2002. Costs versus benefits of new residential development. Montana State University, Billings College of Business.

2. American Society of Landscape Architects-Land Online. 2007. http://www.asla.org/land/2007/0116/trens.html. Accessed February 23, 2007.

3. Baschak, L.A. and R.D. Brown 1995. An ecological framework for the planning, design, and management of urban river greenways. Landscape and Urban Planning 33:211–225.

4. Behe, B.K. 2006. Comparison of gardening activities and purchases of homeowners and renters. J. Environ. Hort. 24:217–220.

5. Behe, B.K, 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. 2005a. Landscape plant material, size, and design sophistication increase perceived home value. J. Environ. Hort. 23:127–133.

6. Behe, B.K., R.M. Walden, M. Duck, B. Cregg, K. Kelley, and R.D. Lineberger. 2005b. Consumer preferences for and cost of production of tabletop Christmas trees. HortScience 40:409–412.

7. Behe, B.K., R. Nelson, S. Barton, C. Hall, C.D. Safley, and S. Turner. 1999. Consumer preferences for geranium flower color, leaf variegation, and price. HortScience 34:740–742.

8. Butterfield, B. 2007. National Gardening Survey 2006. The National Gardening Association, Burlington, VT.

9. Garber, M. and K. Bondari. 1992. Opportunities for cooperation between landscape contractors and landscape architects. J. Environ. Hort. 10:202–204.

10. Gineo, W.M. 1990. A conjoint/logit analysis of nursery stock purchases. Northeastern J. Agr. Res. Econ.19:49–58.

11. Green, P.E. and V. Srinivasan. 1978. Conjoint analysis in consumer research: Issues and outlook. J. Consumer Res. 5:103–152.

12. Hagstrom, J. 2006. A sustainable approach to residential landscape design. ASLA Annual Meeting, 43rd International Federation of Landscape Architects World Congress. October 6–10, 2006. Minneapolis, MN.

13. Hair, J., R. Anderson, R. Tatham, and W. Black. 1998. Conjoint Analysis, 387–439. *In*: Multivariate Data Analysis. Fifth edition, Prentice Hall, Upper Saddle River, NJ.

14. Hardy, J., B.K. Behe, S.S. Barton, T.J. Page, R.E. Schutzki, K. Muzii, R.T. Fernandez, M.T. Haque, J. Brooker, C.R. Hall, R. Hinson, P. Knight, R. McNiel, D. Rowe, and C. Safley. 2000. Consumers preferences for plant size, type of plant material and design sophistication in residential landscaping. J. Environ. Hort. 18:224–230.

15. Henry, M. 1999. Landscape quality and the price of single family houses: Further evidence from home sales in Greenville, South Carolina. J. Environ. Hort. 17:25–30.

16. Henry, M. 1994. The contribution of landscaping to the price of single family homes: A study of home sales in Greenville, South Carolina. J. Environ. Hort. 12:65–70.

17. Klingeman, W.E., J.R. Brooker, D.B. Eastwood, J.B. Riley, B.K. Behe, and P. Knight. 2001. Consumer perceptions of landscape characteristics, disease and pest problems, and the value of powdery mildew resistant dogwood. Research Series 07-01. Institute of Agriculture. Department of Agricultural Economics. The University of Tennessee, Knoxville.

18. Lowe, George D., T.K. Pinhey, and M.D. Grimes. 1980. Public support for environmental protection: New evidence from national surveys. Pacific Sociological Review 23:423–445.

19. McHarg, I.L. 1969. Design with Nature. John Wiley Press, New York.

20. McCullough, R. 1998. Web-based market research: Dawning of a new age. Direct Mkt. 61:36–38.

21. McKinney, M.L. 2006. Urbanization as a major cause of biotic homogenization. Biological Conservation 127:247–260.

22. Price, T.L., J.L. Robertson, and L.H. Chatfield. 1980. Factors affecting the marketability of roses. J. Amer. Soc. Hort. Sci. 105:388–393.

23. Shafer, B.S. and J.W. Kelly. 1986. The influence of cultivar, price, longevity on consumer preferences for potted chrysanthemum. HortScience 21:1412–1413.

24. Thompson, G.F. and F.R. Steiner (eds.). 1997. Ecological Design and Planning. John Wiley Press, New York.

25. Townsley-Brasscamp, W., N.E. Marr, E. Matsuo, and P.D. Relf. 1995. Evaluation and analysis of consumer preferences for outdoor ornamental plants. Acta Hort. 391:199–206.