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Invasive Plant Species: Results of a Consumer Awareness, Knowledge, and Expectations Survey Conducted in Pennsylvania[1]

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Abstract

Consumers were surveyed at the 2004 Philadelphia Flower Show in Philadelphia, PA, from March 8–10, to quantify their attitudes and behaviors towards invasive plant species and potential problems associated with purchasing and planting them. A majority of the 341 participants (81.5%) was aware that non-native plants were used in the landscape and that these plants may be invasive in natural areas. Less than half (40.1%) acknowledged owning plants considered invasive while one third (33.5%) did not know if these plants were growing in their landscapes. Less than half (41.3%) believed that laws should be passed to prevent the sale of non-native plants while 27.8% believed that laws should be passed to allow sale of only native plants in their area. Three distinct consumer segments were identified using Cluster Analysis: 'Invasive savvy,' participants knowledgeable about invasives and interested in alternative species; 'Invasive neutral,' participants neutral in their decision to purchase alternatives to invasive plants and price sensitive about paying more for plants tested for invasiveness; and 'Invasive inactive,' participants were not price sensitive to paying more for plants tested for invasiveness, however, they appeared to oppose the purchase of plants previously listed as invasive which would be available as seedless through breeding and natural selection or other forms of genetic modification. Survey results indicated that media sources (e.g., television and print media) would be effective for educating consumers about potential problems associated with invasive species in the landscape.

Index words: cluster analysis, segmentation, survey, non-native, exotic, genetically engineered plant, genetically modified plant.

Significance to the Nursery Industry

Lists of invasive plant species have been developed by several organizations, conservation groups, and associations throughout the United States. This can become a concern for growers who need to plan plant production cycles years in advance of selling these goods to retailers, which can result in plants newly labeled as invasive being offered for sale after the invasive list is published. Because of this offset timing of production cycles and rapidly changing invasive plant lists, growers and retailers lose money and time invested in preparing products for sale. As potential problems associated with invasive species becomes more prevalent, the practice of producing, promoting and selling invasive species has become more regulated and under greater scrutiny. Therefore, the dilemma for both growers and retailers relates to their ability to forecast the future of public concern and scientific data on invasive plants in conjunction with their investment of resources in propagating, producing, and promoting plants for the marketplace. This dilemma directly impacts a grower's ability to produce and sell product and ultimately their financial survival. Understanding consumer perceptions, attitudes, and potential purchasing behaviors will help industry professionals in developing consumer education programs and marketing strategies, as well as assist growers and retailers in making informed decisions about their plant product mix to meet the needs and interest of consumers.

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Introduction

Invasive plants pose the second highest threat to biodiversity in the United States, surpassed only by habitat destruction (1, 14, 20). An estimated $35 billion is spent annually by the government to control these weedy pests and to account for agricultural losses (15). On February 3, 1999, President Clinton signed Executive Order 13112 allotting $28 million to create an Interagency Invasive Species Council and policies regarding invasive plants (9, 14, 15, 17).

Invasives spread at a rate of 14% each year and cover approximately 100 million acres (21). They are responsible for the displacement of native species (4, 12), threaten approximately 2/3 of endangered species (14), and cause reductions in wildlife habitat quality (12). Invasives rapidly establish in disturbed locations (9, 12). Many invasives share similar biological traits including rapid vegetative spread, production of large quantities of seed requiring no pretreatment for germination, short juvenile period, and a history of invasiveness elsewhere (8, 16). In response to invasion, changes in trophic levels, resource supplies, and disturbance levels may occur in natural plant communities (4). Changes in trophic levels refers to the alteration of levels in the food web may ultimately result in ecosystem shifts. Ecological impacts may result in changes in hydrological cycles, nutrient cycling, erosion, or fire disturbance (12).

To date, the nursery industry both nationally and locally has taken steps to address concerns regarding invasive plants, including voluntary withdrawal of potential invasive plants (17), establishment of a code of conduct (9), investing research dollars in developing non-invasive ornamentals (6), and collaboration with state agencies and local environmental groups (17). In order to prevent the spread of invasive plants, it is crucial that consumers are educated on these species' potential problems (9, 17). Many consumers are uninformed about the negative economic and ecological impacts

of invasives (3), and may therefore be unintentionally responsible for their spread. Recent studies have indicated that if informed, most consumers do not wish to compound this problem. It is therefore important to educate the public about invasives and alternatives (17).

A survey was conducted to describe consumer attitudes and behaviors towards the availability of invasive plant species and the potential problems associated with planting them in the landscape. The main objectives of the survey were to determine: 1) consumer awareness of issues involving invasive species and how they first learned about potential problems these species cause; 2) if they could accurately identify selected invasive species and if any of those species were planted in their yard; 3) their knowledge about and ability to identify characteristics of invasive plant species; and 4) interest in alternatives to invasive species, such as genetically modified plants, those bred to be seedless, and native options. In addition, survey participants were asked their opinion on what agencies or organizations should be involved in regulating or preventing further sales of invasive species. Survey results and consumer feedback can assist growers, retailers and extension educators in educating consumers about invasive species as well as non-invasive alternatives.

Materials and Methods

An intercept survey was conducted at the Philadelphia Flower Show in Philadelphia, PA, from March 8–10, 2004. This annual event attracts gardening enthusiasts from mid-Atlantic states to view the newest trends in garden and floral design. The survey was administered adjacent to the Penn State Cooperative Extension 'Ask the Expert' Booth, where attendees could ask extension educators gardening, landscape, and plant-related questions.

Participants were self-selected and answered 26 questions that focused on awareness and knowledge of invasive plant species; concern about invasive plants in their community and home garden; interest in obtaining information on how to select non-invasive species for their home garden; and what agencies and organizations they believe should be responsible for investigating potential invasiveness of plant material. Additionally, participants answered demographic questions (e.g., gender, education level, and household income) to determine if differences in responses were associated with demographic status. The average amount of time it took participants to complete the survey was 10 minutes. Respondents were given a Yankee® votive candle as an incentive to participate and complete the survey. The study was approved by the Office for Research Protections, the Pennsylvania State University, which oversees research involving human participants.

Screener question. The question '*Do you have a yard planted with groundcovers, herbaceous perennials, shrubs and/or trees?*' was used to screen participants for survey analysis. Surveys collected from participants who responded with a 'no' to the screener question were not included in the analysis. These 49 surveys were excluded because the focus of this study was to analyze responses from gardeners who could answer questions pertaining to invasive species already planted in their home gardens and intent to purchase non-invasive species in the future.

Data analysis. Cluster analysis (SPSS Inc., Chicago, IL) was used to determine whether meaningful consumer segmentations could be created, based on 341 valid participant responses. Cluster analysis is used by marketers to find similarities between survey participants, based on responses to select survey questions, and then 'enables these subjects to be placed in clusters' (11). The resulting clusters are then used for market segmentation. Cluster analysis has been used by researchers to define consumer segments related to their preference for horticultural products, such as edamame (edible *Glycine max*) (10), and professional landscapers' and nursery operators' general perceptions and implementation of IPM principles and practices (18, 19). Variables used for clustering were participants' knowledge, interest, and concern about invasive plant species in their environment. Using K-Means, clusters of size 2, 3, and 4 were examined. After examination of each cluster size, the three-cluster solution was selected to develop consumer segments because it provided the most detail among respondents based on questions selected for clustering.

Results and Discussion

Participant demographics. Slightly over half (57.1%) of the participants lived in Pennsylvania, while an additional 38.8% lived in other mid-Atlantic states; 2.4% were from New England; and 1.8% from other regions in the United States. Most participants were female (84.0%), lived with one other adult (61.2%), in a household without children (80.9%). In addition, participants had obtained at least a bachelor's degree (59.9%), had a 2003 household income of $60,000 or greater (60.3%), and lived in a single family home (93.0%). The mean age for participants was 54 years, with many (48.1%) qualifying as 'Baby Boomers' as defined by the year of their birth (1946 to 1964) (13).

Participant awareness and knowledge of invasive plant species. The first set of survey questions was designed to assess consumer awareness and knowledge about invasive plant species. Of the 341 participants, 81.5% responded that they were aware that non-native plants (plants imported from other countries or regions within the U.S.) were used in the landscape and that these plants may be invasive in natural areas. Participants reported that they first learned about invasive plants from television (27.4%), newspapers/magazines/books (19.8%), friends/neighbors/family members (9.4%), garden clubs (7.5%), and garden centers or nurseries (7.1%). Only 4.7% of those who cited a source acknowledged Cooperative Extension. For general gardening information, participants used newspapers/magazines/books (72.5%), friends/neighbors/family members (62.4%), garden centers or nurseries (50.3%) and gardening programs on cable television (37.0%) and public television (36.1%). Cooperative Extension and university websites were utilized by 24.0 and 13.3%, respectively.

Participants then answered a series of questions to identify respondents who could accurately identify more prominent invasive plant species and characteristics of invasive plants. A third or less of participants accurately identified purple loosestrife (*Lythrum salicaria*; 33.0%), Norway maple (*Acer platanoides*; 20.2%), Japanese barberry (*Berberis thunbergii*; 10.4%) and tree of heaven (*Ailanthus altissima*; 8.3%) as common invasive plants.

Plant characteristics that participants correctly identified as contributing to their invasiveness included plants with an aggressive growth habit (73.7%), and plants that produce

Table 1. Description of three consumer segments derived from cluster analysis based on participant's responses (%) to questions regarding their awareness, knowledge, and concern about invasive plant species.

Variable	Response by consumer segment			
	'Invasive savvy'	'Invasive neutral'	'Invasive inactive'	Significance[z]
No. in sample	149	121	71	
% of total	43.7	35.5	20.8	
Is aware that some non-native exotic plants, presently used in the landscape, may be invasive in natural areas	81.2	79.3	85.9	NS
Knowing that a plant is potentially invasive would prevent the participant from purchasing and using it in their landscape	91.9	78.8	89.9	1
Interest in purchasing plants that have been genetically engineered or bred to be seedless:				
Very interested	13.7	0	0	1, 2
Interested	26.0	0.9	0	1, 2
Somewhat interested	13.7	7.7	0	1, 2
Neutral	46.6	70.1	0	1, 2, 3
Somewhat uninterested	0	8.5	4.4	2, 3
Uninterested	0	3.4	26.5	1, 2
Very uninterested	0	9.4	69.1	1, 2
Has plant material in their yard that is presently considered invasive	45.6	31.1	44.1	NS
Willingness to pay more for a plant that has been tested to determine its invasiveness prior to allowing it into the market place:				
Very willing	17.7	0	18.8	1, 3
Willing	33.3	0	8.7	1, 2
Somewhat willing	37.4	0	13.0	1, 2
Neutral	11.6	66.9	52.2	1, 2, 3
Somewhat unwilling	0	5.9	4.3	1, 2, 3
Unwilling	0	10.2	2.9	1, 2, 3
Very unwilling	0	16.9	0	1, 3
Manages their own landscape	85.8	93.8	89.6	NS
Hires a professional to manage their own landscape	8.3	5.0	8.3	NS
Knows the common or scientific name of all of the plants in their yard	27.9	30.7	33.8	NS
Knows the proper cultural practices (pruning, deadheading, watering, andfertilizing) for the plants in their yard	62.1	48.2	55.9	1
Would like more information on potentially invasive plants and how to manage them	90.5	67.6	76.5	1, 2
Looks for native plants to purchase more often than non-native plants	75.9	57.0	77.9	1, 3
Investigates the potential for invasiveness of a plant that interests them before purchasing it	63.7	47.7	61.2	1
Would like more information on culture care and management of their landscape and garden plants	83.1	71.8	73.1	1
Examines their garden and landscape beds for germinating seeds and weeds:				
More than once a week	21.3	20.5	26.1	NS
About once a week	29.1	26.8	29.0	NS
Two to three times a month	22.0	15.2	23.2	NS
About once a month	10.6	9.8	7.2	NS
A few times a year	15.6	18.8	7.2	3
Don't examine	1.4	8.9	7.2	1, 2

[z]1 = Cluster 1 tested against Cluster 2; 2 = Cluster 1 tested against Cluster 3; 3 = Cluster 2 tested against Cluster 3

NS, *Nonsignificant or significantly (*) different at $P \leq 0.05$ as based on Pearson X^2 statistic.

viable seed and germinate rapidly (49.6%). Fewer participants identified other plant characteristics that may contribute to invasiveness, such as plant seeds heavily each year or every few years (33.8%), plant is not native to the U.S. (32.9%), or plant produces small seeds (7.1%).

It is interesting to note that when participants considered purchasing a plant for their landscape, they were interested in several characteristics that may contribute to invasiveness: 'the plant is well adapted to where I live' (78.4%); 'the plant has a long flowering and fruiting period' (62.4%); 'the plant produces fruit that is attractive to birds and animals' (47.6%); and 'the plant produces attractive and long lasting fruit' (38.8%). These characteristics may actually be appropriate descriptors for both invasive and noninvasive species. Because of this, distinctions need to be made between invasive and noninvasive species that possess these qualities. For example, of those plants that produce long-lasting and attractive fruit (a desirable feature amongst these survey participants), which species are noninvasive and could be marketed to consumers? Since survey participants were able to identify characteristics that contribute to invasiveness, indicating that they are knowledgeable about this topic, many still preferred landscape plants that possessed invasive features. Therefore, more consumer education is needed to inform this clientele group about how to properly identify trees and shrubs that possess attributes that do not pose a threat of becoming invasive. Less than half of participants (40.1%) reported that they presently had plants in their landscape which were considered invasive, 33.5% responded that they 'don't know', while the remaining 26.3% choose 'no' as a response. Of the species listed in the survey, only 1.8% and 12.6% of participants responded that tree of heaven and multiflora rose (*Rosa*

multiflora), respectively, were growing in their yard, species widely recognized as being invasive.

Consumer interest in regulation of sales of invasive plant species. Most participants (79.6%) were interested in obtaining information on potentially invasive plants and how to manage them, while approximately half (57.6%) actually investigated the potential invasiveness of plants prior to purchase for their landscape or garden. A quarter of participants believed that only plants native to their locale or region should be available for purchase (25.3%) and that if a species was considered invasive, then all cultivars of that species were also invasive (21.6%).

In response to questions regarding legislation banning invasive plants or testing and reporting of the invasiveness of plants, half (52.5%) believed that any plant that seeds heavily should be considered invasive until proven otherwise. Less than half believed that local, state, or federal laws should be passed to prevent the sale of non-native plants in their area (41.3%) and only 27.8% believed that laws should be passed to allow the sale of only native plants in their area. If testing and reporting the invasiveness of plants were conducted, participants believed that the following agencies and organizations should be responsible for the procedure, universities (67.3%), nurseries and greenhouses (65.1%), nursery associations (59.3%), government agencies (46.9%), plant propagators (41.7%), non-profit organizations (30.9%), commercial firms (28.4%), and private individuals (14.5%).

Survey results indicate that participants were generally aware that certain non-native plant species could become invasive in natural areas. Only a third or more of participants could accurately identify more prominent plant characteristics that were considered as contributing to invasiveness, while a third or less were able to identify species that were more commonly recognized as being invasive, such as multiflora rose or tree of heaven (2, 5). Overall, participants were in favor of taking measures to limit the impact of invasive plant species and expressed interest in learning how to manage them. To educate consumers about invasive plant issues, universities, green industry associations and businesses should develop coherent, research-based guideline and recommendations for distribution through major media channels.

Cluster analysis. Cluster analysis was used to identify three segments among survey participants (Table 1). Each segment resulted in a group of participants with different attitudes and behaviors regarding invasive plant species, and interest in procedures which could be used to control distribution and sales of these plants.

Segment 1 (Invasive savvy). The largest segment, 'Invasive savvy,' consisted of almost half (43.7%) of all participants (Table 1). 'Invasive savvy' tended to have the greatest knowledge about and interest in excluding invasive species from their yard and were the most willing to consider options, such as genetically modified species and those bred to be seedless, and the most willing to pay more for plants that had been tested for invasive properties.

A higher proportion of these participants responded that knowing that a plant is potentially invasive would prevent them from purchasing and using it in the landscape (91.9%) than found among the 'Invasive neutral' segment. Interest in purchasing alternative plants that have been genetically engineered or bred to be seedless was greatest among the 'Invasive savvy' where participants were 'Very interested' (13.7%), 'Interested' (26.0%), or 'Somewhat interested' (13.7%), with none showing the disinterest found among the other two segments (Table 1).

A majority of the 'Invasive savvy' segment was also willing to pay more for a plant that had been tested to determine its invasiveness before allowing it into the marketplace, more so than the other two segments. Similarly a majority of this segment was willing to pay more for these plants, specifically, 17.7% 'Very willing,' 33.3% 'Willing,' and 37.4% 'Somewhat willing,' with none 'Unwilling' in contrast to the other two segments (Table 1).

When responses to questions regarding plant knowledge and actions taken to prevent purchasing invasive plant species were analyzed, 'Invasive savvy' respondents were more knowledgeable and active in excluding these plants from their yard. 'Invasive savvy' were more likely to: a) know the proper cultural practices for the plants in their yard (62.1%); b) look for native plants to purchase more often than non-native plants (75.9%); c) investigate the potential for invasiveness of a plant that interests them before purchasing it (63.7%); and d) desire more information on cultural care and management of their landscape and garden plants (83.1%) than the 'Invasive neutral' segment (48.2, 57.0, 47.7, and 71.8%, respectively) (Table 1). 'Invasive savvy' respondents were also more likely to want information on potentially invasive plants and how to manage them (90.5%) than were the other two segments. This segment was least likely to respond that they 'don't examine' their garden and landscape beds for germinating seeds and weeds (1.4%).

Cluster demographics. Certain demographic characters were significantly different between 'Invasive savvy' and the other two segments (Table 2). Based on the year participants were born, the 'Invasive savvy' group consisted of more 'Swing' generation (consumer born between 1933 and 1945; 12) participants (25.0%) than found among the 'Invasive inactive' (35.8%), but fewer 'WWII' generation (those born between 1921 and 1932) participants (3.5%) than found among either the 'Invasive neutral' or the 'Invasive inactive' (11.9 and 10.4%, respectively) (Table 2). 'Invasive savvy' consisted of fewer participants with a high school diploma or less (12.2%) than found among the 'Invasive neutral' (24.8%); however, more 'Invasive savvy' had a Bachelor's Degree (43.2%) than did the 'Invasive neutral' or 'Invasive inactive' segments (28.1 and 27.1%, respectively). Based on 2003 gross household income, fewer 'Invasive savvy' reported that they had an income equal to or less than $39,999 (11.8%) compared to the other two segments.

Segment 2 (Invasive neutral). The second largest segment (35.5% of participants), 'Invasive neutral,' included individuals who reported more or less neutral responses about purchasing alternatives to invasive plants (70.1%), as well as being less interested in obtaining information about invasive plants and management options (67.6%), coupled with the observation that they were the most price sensitive of the three groups in purchasing plants tested for invasiveness ('Neutral,' 66.9%; 'Somewhat unwilling,' 5.9%; 'Unwilling,' 10.2%; and 'Very unwilling,' 16.9%: Table 1).

Compared to the other two segments, 'Invasive neutral' respondents were the least likely to look for native plants to

Table 2. Demographic status for three consumer segments derived from cluster analysis based on participant's responses (%) to questions regarding their awareness, knowledge, and concern about invasive plant species.

Variable	Response by consumer segment			
	'Invasive savvy'	'Invasive neutral'	'Invasive inactive'	Significance[z]
No. in sample	149	121	71	
% of total	43.7	35.5	20.8	
Lives in a single family home	92.5	93.2	93.8	NS
Female	81.9	84.7	87.1	NS
Year born (generation):				
1977–1983 (Generation Y)	5.6	3.7	6.0	NS
1965–1976 (Generation X)	11.1	8.3	9.0	NS
1946–1964 (Baby Boomer)	54.9	45.0	38.8	NS
1933–1945 (Swing)	25.0	31.2	35.8	2
1921–1932 (WWII)	3.5	11.9	10.4	1, 2
Education level:				
≤ High School	12.2	24.8	14.3	1
Some college/Associates Degree	20.9	24.8	24.3	NS
Bachelor's Degree	43.2	28.1	27.1	1, 2
Professional/Medical Degree	23.6	22.3	34.3	NS
Single adult households	12.9	10.8	21.0	NS
One or more children in the household	22.4	15.4	18.8	NS
2003 gross household income:				
≤ $39,999	11.8	25.0	26.7	1, 2
$40,000 to $79,999	38.6	33.0	26.7	NS
$80,000 to $99,999	18.9	17.0	15.0	NS
≥ $100,000	30.7	25.0	31.7	NS

[z]1 = Cluster 1 tested against Cluster 2; 2 = Cluster 1tested against Cluster 3; 3 = Cluster 2 tested against Cluster 3.

NS, *Nonsignificant or significantly (*) different at $P \leq 0.05$ as based on Pearson X^2 statistic.

purchase rather than non-native plants (57.0%). Members in this segment were less likely to: a) know the proper cultural practices for the plants in their yard (48.2%); b) to request more information on potentially invasive plants and how to manage them (67.6%); c) investigate the potential for invasiveness of a plant that interests them before purchasing it (47.7%); and d) request more information on culture care and management of their landscape and garden plants (71.8%) than were the 'Invasive savvy' (Table 1).

Segment 3 (Invasive inactive). 'Invasive inactive' consisted of 20.8% of participants. This segment expressed no interest in purchasing plants that were genetically engineered or bred to be seedless, therefore, this segment may not be a viable market for non-invasive plants produced or developed in different or new fashions.

Resembling the 'Invasive neutral' segment, the 'Invasive inactive' group was mostly disinterested in purchasing genetically engineered plants or plants that have been bred to be seedless ('Somewhat uninterested', 4.4%; 'Uninterested', 26.5%; or 'Very uninterested', 69.1%; Table 1). Although the 'Invasive inactive' respondents were not as price sensitive in purchasing a plant tested for invasive properties as were the 'Invasive neutral,' this segment included responses distributed through the response range from 'Very willing' to 'Unwilling' (Table 1).

Trends among segments. Although differences existed among the three segments based on: a) interest in purchasing plants that have been either genetically engineered or bred to be seedless and b) price sensitivity to paying more for a plant that has been tested to determine its invasiveness, there were some similarities in responses amongst each group. Overall, participants were aware that some non-native plants, presently used in the landscape, may be invasive in natural areas (79.3 to 85.9%) and between 31.3 and 45.6% of participants in each segment acknowledged that they did have plant material planted in their yard that is considered invasive (Table 1). When responses to questions regarding future plant purchasing and interest in excluding additional invasive plants from their gardens were analyzed, at least 78.8% of each segment responded that knowing that a plant is potentially invasive would prevent them from purchasing it for their landscape.

A majority in each segment lived in a single-family home (92.5 to 98.3%). Participants in each segment were responsible for the care and management of their landscapes (nearly 85.8% per segment) with slightly less than a quarter of each segment claiming to examine their garden and landscape beds for germinating seeds and weeds more than once a week (20.5 to 26.1%), about once a week (26.8 to 29.1%) or two to three times a month (15.2 to 23.2%; Table 1). Similar proportions in each segment responded that they knew the common or scientific name of all of the plants in their yard (27.9 to 33.8%).

Clustering participant responses clearly demonstrate that each segment has unique perspectives on issues regarding invasive plants. The 'Invasive savvy' segment was identified as the most accepting of genetically engineered plants or plants bred to be seedless, as well as the most willing to pay more for plants that undergo possible testing. Clearly, these participants would be the most likely target for any plant material to result from breeding programs designed to introduce non-invasive options where a premium would need to be charged to cover costs associated with such an endeavor. Additional research should be conducted to investigate consumer response to retail prices adjusted to include any additional costs.

The other two segments, 'Invasive neutral' and 'Invasive inactive,' could be considered a less viable market for culti-

vars resulting from non-invasive breeding and genetic engineering programs. Few, if any, participants in either segment were 'Very' to 'Somewhat interested' in purchasing genetically engineered plants or those specifically bred to be seedless with a majority of the 'Invasive neutral' actually 'Neutral' in their viewpoint. The lack of interest toward purchasing seedless varieties of common invasive plants may be the result of several overlying factors including; the lack of presently available seedless forms, a limited understanding of the biology involved in creating seedless forms, and the potential negativity associated with the present public debate on the acceptability of genetically engineered or modified plants in the environment (7). To clarify whether participants in these segments are truly opposed to purchasing seedless varieties, other survey methods, including oral interviews and focus group sessions, could determine more accurate behaviors and attitudes. An option that may appeal to these participants is the choice to purchase native plants as an alternative to invasive plant species. Based on result, at least 57.0% of all three segments would look for native plants as an alternative for their landscapes.

Although the 'Invasive neutral' segment appeared to be price sensitive to paying more for a tested plant, the 'Invasive inactive' segment was more accepting of the idea. Slightly less than half (40.5%) of these participants were within the 'Very' to 'Somewhat willing' categories and should be included in any marketing strategies designed to alert consumers about the availability of products which have passed rigorous testing.

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