Extension Education Methods

Consumer Preferences and Perceptions of Gardening Information

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Additional index words. environmental horticulture, extension, education

Summary. **A survey of gardeners in Minnesota found they get their information from friends and garden centers. Older gardeners were less likely to use the Internet. The highest interest was indicated for annuals, perennials, and containers, followed by trees and shrubs. Most participants had not attended a gardening class in the past year and indicated they learn best from talking with friends. Publications are of interest to gardeners, and they highly value color photos and illustrations. The University of Minnesota and Minnesota Landscape Arboretum were perceived as significantly more credible and trustworthy than garden centers, and participants felt these institutions should provide educational programs, even if survey respondents were not participating in these programs. About half the participants were not able to comment on the level of bias of the university and arboretum, and other traits (credible, trustworthy, expert, and knowledgeable) were unknown to one-third to one-half of the participants. Participants knew more about these traits for garden centers and home stores. Participants in this survey indicated they look for convenient sources of gardening information and, although many felt the land-grant university and arboretum were highly credible and knowledgeable, they were still more likely to use other sources for their gardening information. This poses a challenge to universities and arboreta to use new ways to reach gardeners.**

Gardening is of great interest in the United States, with 91million households, or 83% of all U.S. households participating in one or more types of do-it-yourself indoor and outdoor lawn and garden activities, spending an annual average of $387/household in 2005 (National Gardening Association, 2006).

Although this is a decline in average household spending compared with the previous year (from $449/household in 2004), it represents an increase of nine million households, or 11% that are gardening (National Gardening Association, 2005). Concern has been raised about a maturing gardening industry, along with the age of people who are gardening (White and Beytes, 2006). Competition between mass merchants and independent garden centers has offered consumers a wider array of horticultural products and gardening information from which to choose (Brun, 2004).

United States land-grant universities, through cooperative extension, have provided gardening information for many years, through Master Gardeners and other consumer horticulture programs (Meyer, 2007). Despite the size of the lawn and garden market, and the availability of information, little is known about consumer preferences and needs for garden information. Additionally, consumer's perception about the reliability or quality of gardening information, the role of universities in supplying this information, and consumers' use of the university for gardening information is not well documented. To do a better job of supplying gardening information through the University of Minnesota Extension, we conducted a survey of Minnesota gardeners to answer these questions: 1) Where do gardeners currently get their information? 2) What topics are gardeners interested in learning? 3) What learning methods do they prefer? 4) Should the university play a role in supplying gardening information? and 5) Do gardeners perceive a difference in the quality of gardening information from universities, garden centers, and home stores?

Methods and materials

A mail survey was conducted by the University of Minnesota Center for Survey Research (MCSR), using a set of questions developed by cooperative extension consumer horticulturists at the University of Minnesota. After revisions by MCSR, a pretest was distributed on 9 May 2005 to 100 gardeners. A total of 34 pretests were completed and returned, and after several minor revisions, the final version of 31 questions was obtained. Questionnaires were sent to a random sample of 1000 Minnesota residents who had an interest in gardening. The sample was purchased from Survey Sampling International (Fairfield, CT), which maintains a database of information from returned response cards. The selection criteria for inclusion in this sample were 1) response cards that had been returned in the last 24 months and 2) people who checked a box corresponding to "interest in gardening."

Procedures used for this mail survey were based on Dillman's guidelines (2000). The first mailing was sent on 16 June and included the following: 1) a cover letter from the head of the Department of Horticultural Science at the University of

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Minnesota, inviting participation in the survey; 2) a survey instrument; and 3) a self-addressed, stamped return envelope.

The second mailing, consisting of a reminder postcard, was sent on 23 June. The postcard thanked individuals if they had already filled out the questionnaire, and asked them to take time to complete the survey if they had not already done so. On 7 July, a third mailing, procedurally identical to the first was sent to all individuals who had not yet returned their survey. A final postcard was sent on 22 July to all nonrespondents. This postcard asked individuals to respond either by completing the survey or by indicating they were not involved in gardening.

Returned surveys were counted to track sample status and response rate. Peak survey returns occurred within three days of each mailing. One hundred forty-three, 67, and 108 surveys respectively were returned for the each of the three mailings, showing the correlation of multiple mailings and response rate.

Surveys with unclear responses were discarded and not tabulated. The remaining surveys were tabulated and entered into SPSS (version 11; SPSS, Chicago) data files for statistical analysis. Responses to selected questions, based on age, were analyzed using Bonferroni's, Tukey's, and Sheffe's multiple range test of analysis of variance at $P \leq 0.05$ (SPSS). Significance was tested for the following categories: 1) whether consumers were using the Internet for gardening information and 2) sources from which consumers obtain their gardening information.

Results

Questionnaires were completed and returned by 523 individuals, for an overall response rate of 57%. Ten individuals refused to participate, 385 surveys were not returned, and the remaining 82 were eliminated from the sample as undeliverable mail, addressee deceased, or the individuals receiving the surveys responded that they were not a gardener.

Where do gardeners get their information? Eighty-one percent of those surveyed reported that they had gardening questions on a frequent or occasional (sometimes) basis (data not shown). When asked, "How often do you obtain plant information from the following sources?" participants indicated friends and neighbors were sometimes or frequently used sources of gardening information by 78% of the respondents, followed by magazines (71%) and garden centers or nurseries (70%; Table 1). Books (55%) and television (57%) are used as gardening information sources by more than half of the respondents. Less than half of those surveyed (46%) used home stores or large chain retailers as sources of gardening information. The University of Minnesota Extension Service was frequently or sometimes used by 26% of the participants, 28% rarely used it, and 56% indicated they never used this source.

If gardeners had a problem that needed solving right away, this urgency did not result in a shift from their regular information sources (Table 2). Friends and neighbors, followed by garden product labels, garden centers, the Internet, then books, and magazines are where gardeners look for information. Only about one-quarter (22%) of the

Table 1. Minnesota gardener's survey responses to the question: How often do you obtain garden or plant related information from the following sources?

Information source	Frequently (%)	Sometimes (%)	Rarely (%)	Never (%)
Friends/neighbors	30	48	12	10
Magazines	29	42	15	14
Garden center or nursery	23	47	17	14
Home and garden television or other television programs about gardening	22	35	20	24
Books	18	37	25	20
Internet sites	14	27	19	40
Home store or large chain retailer	10	36	24	30
Radio	6	27	25	42
Plant societies or garden clubs	3	7	21	68
University of Minnesota Extension Service, through its programs for Yard and Garden Line, Master Gardener, Info-U, etc.	3	13	28	56
Minnesota Landscape Arboretum	1	6	22	70
U.S. Department of Agriculture	1	8	27	64
Minnesota State Horticultural Society	1	6	20	74

Table 2. Minnesota gardener's responses to the survey question: When you have a plant problem that you need solved right away, how likely are you to go to the following for an immediate answer?

Information source	Very likely (%)	Somewhat likely (%)	Not very likely (%)	Not at all likely (%)
Friends/neighbors	52	36	7	5
Label on a garden product	40	43	10	7
Garden center or nursery	36	4	12	9
Internet site	28	24	14	34
Books	26	37	20	16
Magazines	16	42	24	18
Home store or large chain retailer	9	32	31	28
University of Minnesota Extension Service, through its programs for Yard and Garden Line, Master Gardener, Info-U, etc.	7	15	30	47
Plant societies or garden clubs	4	7	29	6
U.S. Department of Agriculture	1	11	32	57
Minnesota Landscape Arboretum	1	7	32	61
Minnesota State Horticultural Society	1	7	29	63

respondents are very or somewhat likely to be using the University of Minnesota Extension and even fewer are very or somewhat likely to be using the Minnesota Landscape Arboretum (8%) or Minnesota State Horticultural Society (8%). These responses are similar to those reported in previous studies that indicate gardeners get their information from garden centers, friends/neighbors/relatives, and magazines or newspapers [Table 3 (Garden Writers Association, 2005)].

The Internet is a new option for gardening information. When asked if they use the Internet for gardening information, more than half of the participants in our survey, 275 (54%), said no, they do not. The average age of these non-Internet users was 61 years. Participants who indicated they use the Internet for gardening information had an average age of 51 years. Respondents 70 years and older reported using the Internet significantly less that all other ages. Although this may seem low for Internet use, the overall average age of survey participants was 58. Of the respondents who used the Internet, 72% indicated they frequently or sometimes use Google search for a specific topic. Only 5% frequently used the university or arboretum Internet gardening services, although 31% indicated they sometimes used these sites [Table 4 (Minnesota Landscape Arboretum, 2006; Minnesota Nursery and Landscape Association, 2006, Minnesota State Horticultural Society, 2006; University of Minnesota Extension, 2006)]. Gardeners appear more likely to use the Internet if they have an immediate problem to be solved (Table 2).

As recently as 2001, only 9% of respondents in Connecticut indicated they were currently using the Internet to obtain horticultural product information; however, 43% indicated they expected to use this resource within the following 2 years (Brand and Leonard, 2001). Age appears to be a factor in Internet use, "websites created by home gardeners" was a significantly higher source for gardening information among those 18 to 25 years old (29%) compared with participants 70 to 84 years old (0%) (Kelley and Wehry, 2006).

What determines where gardeners get their information? Pittenger (1991) concluded the most important attribute when consumers were looking for gardening information was convenience. Varlamoff et al. (2002) classified gardening information into four types: free, convenient (friends, neighbors, television and radio) used by 82% of men and 78% of women; free requiring search (Master Gardener, library, county extension office, nursery, garden center) used by 84% men, 86% women; paid and convenient (gardening magazines, newspapers) used by 78% men, 84% women; and paid requiring search (botanical gardens and Internet) used by 27% men, 26% women. These results, from a relatively small (N = 124) survey of Georgia residents, were interpreted as free and convenient are overriding factors in homeowner's choice of gardening information (Varlamoff et al., 2002).

Many consumers (89%) prefer to get their gardening information at the point of purchase for garden supplies (Mugaas and Foord, 2001). Niemiera et al. (1993) found consumer preference for a garden center is related to providing good gardening information.

What do gardeners want to learn? When asked if they had participated in the care of or taken time to learn about four categories of plants, annuals and perennials, including containers, had the highest interest (91%) followed by trees and shrubs (70%), with vegetables or fruit, and lawns receiving equal, although lower, interest or care (63%).

When asked, "How interested are you in obtaining more information about the following topics?" growing flowers received the highest response, with 86% very or somewhat interested (Table 5). Other topics listed in the survey and their level of interest are also indicated (Table 5).

Resources are limited in Extension to develop and distribute horticultural information; therefore, understanding the topics in which gardeners are most interested can help in developing timely publications and information that is of value to consumers.

How do gardeners learn best? When asked, "How do you learn gardening information *best?*," participants in our Minnesota survey indicated by talking with friends or others (75%), followed by reading (67%),

Table 3. Literature review of consumer sources of gardening information, 1965–2006.

Reference	Garden centers (%)	Friends neighbors relatives (%)	Magazines, books (%)		Newspapers (%)	Television (%)	Cooperative extension, Master Gardeners, university (%)	Internet (%)
Kelley and Wehry (2006)[z]	51	53	34	48	na[y]	31 cable[x], 40 PBS	24[w]	38[v]
Garden Writers Association (2005)[u]	14	15	14	8	4	4	na	10
Brand and Leonard (2001)[u]	65	50	55	25	na	28	na	9
Pittenger (1991)	22	8	21	16	20	6	2	na
Baker (1965)	20	33	60[t]	na	60[u]	na	na	na

[z]Home improvement store staff was a survey option with a 24% response.
[y]Data not available; question not asked.
[x]Cable = television other than major networks. PBS = Public Broadcasting Service stations.
[w]County cooperative extension offices, 17%; Master Gardeners, 7%.
[v]Home gardeners, 16%; university, 12%; horticultural company websites, 10%.
[u]Garden catalogues was a survey option for Garden Writers Association (2005) with a 6% response, and Brand and Leonard (2001) with a 47% response.
[t]Magazines and newspapers were listed together as one option.

Table 4. Minnesota gardening survey responses to the question: How often have you visited the following websites?

Website	Frequently (%)	Sometimes (%)	Rarely (%)	Never (%)
Google[z] search for a specific garden topic	22	50	15	14
University of Minnesota Extension Service, through its programs for Yard and Garden Line, Master Gardener, Info-U, etc. (University of Minnesota Extension, 2006)[y]	3	18	18	61
Minnesota Landscape Arboretum (2006)[x]	2	13	15	70
Minnesota Nursery and Landscape Association (2006)[w]	0	7	9	83
Minnesota State Horticultural Society (2006)[v]	0	11	12	77

[z]Google, Inc., Mountain View, CA.
[y]<http://www.extension.umn.edu>.
[x]<http://www.arboretum.umn.edu>.
[w]<http://www.gardenminnesota.com>.
[v]<http://www.northerngardening.com>.

Table 5. Minnesota gardening survey participant responses to the question: How interested are you in obtaining more information about the following topics?

Topic	Very or somewhat interested (%)
Growing flowers	86
Weed control	79
Landscape or garden design	73
Growing trees, shrubs, vines	73
Insects on plants	71
Lawn care	70
Diseases on plants	70
Garden maintenance	69
Pruning	68
Growing vegetables	66
Pesticide safety	65
Container gardening	64
Indoor plants	64
Soil and composting	59
Gardening and wildlife	56
Roses	54
Native plants	47
Invasive species	46
Growing fruit	43
Organic gardening	43
Water gardening	40
Children's gardens	29
Wine making	17
Genetically modified organisms	10

watching a video or gardening show on television (57%), and the Internet (28%). Only 13 people (2% of respondents) indicated a lecture by an expert would be their first choice for the best way to learn about gardening information.

When asked, "How likely are you to obtain information from the following sources?" Minnesota participants were very or somewhat likely to use short publications or pamphlets (75%), or a plant answer desk at a garden center (73%). Walking tours of gardens would be appealing for 50% of respondents, although 50% also indicated this was not of interest for them. Phone (44%) and e-mail (40%) answer lines, along with small hands-on workshops (42%) and community education classes (41%) were information sources likely to be used. Lectures would be used by 26% of the respondents, but 40% said they were not likely at all to use this method to obtain information. Online classes and large multispeaker events were not likely sources for 57% of respondents.

When asked, "In the past 12 months, how many educational programs or seminars about gardening have you attended?" 89% of the Minnesota participants indicated they had not attended one in the past year. When asked why they had not attended such a program, 159, (30%) cited no time or opportunity to go, 62 (12%) responded they were not informed of programs, and 64 (12%) indicated they were not interested. Educational programs on gardening are not a priority, with 87% indicating they would not travel more than 1 h to attend a half-day plant- or garden-related program that was of interest to them. The best day and time to attend gardening programs were Saturday (57%) and weekend mornings (40%). When asked, "How much would you be willing to pay for a 1-h class or learning experience, 55% indicated less than $10 whereas 34% said $10 to $19, 60% indicated they would pay less than $30 for a 1-d class or learning experience, and 24% would pay $30 to $49.

During the past 12 months, 49% of the gardeners had purchased a magazine about gardening topics, whereas 29% had purchased books, 21% had purchased pamphlets, and only 1% had purchased videos or DVDs.

Color photos, followed by illustrations and drawings, are very important features of gardening information, according to 46% and 44% of respondents respectively. Locally based information or research based was very important to 28% and 26% of respondents respectively. Source of information was very important to only 18% of the respondents, but somewhat important to 43%. "Lots of writing and text to read" is very important to only 6%, but somewhat important to 30%; "who wrote it" is very important to only 6% and somewhat important to 27%, and a brand name such as Ortho, Scotts, or Miracle Grow is very important to 18% and somewhat important to 39%.

How important is it that universities develop gardening information? Seventy-five percent of the Minnesota survey participants thought local garden centers were very or somewhat important in developing and presenting educational programs (Table 6). A lower number, 60%, thought it was very or somewhat important for the University of Minnesota Extension to develop and present educational programs on gardening and yet, as shown in earlier questions, the majority of participants are not using these institutions as gardening resources. Nearly one-half (49%) of respondents indicated the Minnesota Landscape Arboretum or Minnesota Nursery and Landscape Association should provide educational programs, as well as the U.S. Department of Agriculture (46%). Participants indicate that it is important for these institutions to provide the educational programming,

Table 6. Minnesota gardener's responses to the survey question: How important is it to you that the following organizations *develop and present* educational programs on gardening?

Organization	Very important (%)	Somewhat important (%)	Not very important (%)	Not at all important (%)
Local garden centers	32	43	14	10
University of Minnesota Extension Service, through its programs for Yard and Garden Line, Master Gardener, Info-U, etc.	26	34	20	20
Minnesota Nursery and Landscape Association	15	34	25	26
Minnesota Landscape Arboretum	15	34	24	26
U.S. Department of Agriculture	15	31	28	27

apparently even if they are not using these resources or services.

DO GARDENERS PERCEIVE A DIFFERENCE IN QUALITY OF INFORMATION? In our survey, when asked to rate gardening information sources, the University of Minnesota and the Minnesota Landscape Arboretum ranked significantly more credible, trustworthy, expert, knowledgeable, and less biased than garden centers and home stores (Table 7). Garden centers were significantly more credible, trustworthy, expert, knowledgeable, and less biased than home stores. However, a large number of participants, from 33% to 58%, indicated that they *did not know* how to rate the university and arboretum, indicating a lack of awareness about these institutions for these traits. A much smaller number, 11% to 18% indicated a lack of awareness for garden centers and home stores for four traits. When participants were asked to "rate the level of bias" of these informational sources, 30% were more unsure and 34% felt they could not answer about this trait for garden centers and home stores respectively. Fifty-eight percent and 49% were unable to answer about bias for the arboretum and university respectively. It is not surprising that the uncertainty drops when the question comes to garden centers and home stores, because many more people are more familiar with these businesses than extension or the arboretum.

New Jersey survey respondents indicated that although more than 60% used newspapers and popular magazines for gardening information, only 16% felt these sources were the most reliable (Baker, 1965). Brand and Leonard (2001) found respondents rated the quality of advice from garden departments of large chain stores (4.7 points) as significantly lower than independent garden centers and nurseries (2.0 points), where 1 point is trustworthy and 7 points is not trustworthy. Hudson et al. (1997) found mass merchandisers fall short of meeting customer's needs for knowledge and assistance. A survey of Purdue Extension Master Gardeners gave the highest gardening information reliability to Purdue Cooperative Extension (92%), followed by fellow Master Gardeners (53%), garden books (50%), garden center or nurseries (26%), magazines (23)%, television (11%), newspaper (14%), radio (9%), and friends or neighbors (7%) (Dana et al., 1995).

DEMOGRAPHICS. Minnesota survey respondents were typically female (78%), 50 years or older (61%), employed full time (43%) or part time (18%), with some college (35%), or a bachelor's degree (21%). Kelley and Wehry (2006) found similar gardener demographics with an average age of 50 years, 87% female, and 54% were associate degree or technical school graduates.

In conclusion, Minnesota survey participants often had gardening questions, and 30% or more were *very* interested in learning more about growing flowers, weed control, garden maintenance, landscape design, and container gardening. Survey participants primarily obtain gardening information from friends or neighbors and garden centers, not institutions such as the land-grant university and arboretum. Most participants had not attended a gardening class in the past year and indicated they learn best from talking with friends. Publications are of interest to gardeners, and they highly value color photos and illustrations.

The University of Minnesota and Minnesota Landscape Arboretum were perceived as significantly more credible and trustworthy than garden centers, and participants felt these institutions should provide educational programs, even if they would not participate in these programs. About half the participants were not

Table 7. Minnesota survey of gardener's responses when asked to rate sources of gardening information.

Information source	Credibility[z]		Trustworthy		Expert		Knowledgeable		Biased	
University of Minnesota Extension Service, through its programs for Yard and Garden Line, Master Gardener, Info-U, etc.	6.4 a[y]	43 (%)[x]	6.4 a	34	6.4 a	39	6.6 a	33	6.2 a	49
Minnesota Landscape Arboretum	6.4 a	54	6.4 a	47	6.5 a	47	6.6 a	46	6.2 a	58
Garden centers or nurseries	5.3 b	14	5.3 b	11	5.2 b	12	5.3 b	11	4.7 b	30
Home store or large chain retailer, such as Home Depot[w], Menards[w], or Fleet Farm[w]	3.8 c	18	3.9 c	15	3.4 c	16	3.4 c	16	3.6 c	34

[z]Based on a scale of 1 to 7 points, where the lower number means the negative response: not credible, 1 point; credible, 7 points.
[y]Values within a column followed by a different letter are significantly different at $P < 0.005$.
[x]Percentage of participants who responded "did not know" to the question.
[w]The Home Depot USA, Inc. Atlanta, GA; Menards, Inc. Eau Claire, WI; Fleet Farm, Inc. St. Marys, Canada.

able to comment on the bias of the university and arboretum, and other traits (credible, trustworthy, expert, and knowledgeable) were unknown to one-third to one-half of the participants. Participants knew more about these traits for garden centers and home stores.

Based on this survey, making the highest quality information available at the most convenient place, such as garden centers, appears to be what consumers would like. Supplying information to the public where they look for it and want to find it appears to be a good strategy and should be developed by more universities and arboreta or botanical gardens. Information can and should be identified as coming from these institutions, even though it is found in a commercial garden center.

Because talking to others was cited as a preferred method of learning, information desks at garden centers staffed with Master Gardeners should be welcomed by gardeners seeking knowledge and information. University extension Master Gardeners have developed agreements to provide information in garden centers to supply information (Meyer, 2007), and the distribution of extension publications and newsletters in garden centers has been suggested (Kerrigan, 1993).

Participants in this survey indicated they look for convenient sources of gardening information and although many felt the land-grant university and arboretum were highly credible and knowledgeable, they were still more likely to use other sources for their gardening information. This poses a challenge to universities and arboreta to use new ways to reach gardeners.

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