

Production and Marketing Practices and Trade Flows in the United States Green Industry in 2013¹

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Abstract

A national survey of 32,000 U.S. ornamental plant grower and dealer-retail firms was conducted to collect information on business practices and operating results for calendar year 2013. A total of 2,657 valid respondent firms reported annual sales of \$3.957 billion, and employment of 38,657 fulltime, part-time, seasonal and foreign H2A workers. About 43 percent of sales were at retail to final consumers, and 57 percent through wholesale market channels, including landscape contractors, re-wholesalers, home centers, garden centers and mass merchandise stores. The top five specific plant categories reported were flowering annuals (bedding plants), deciduous shade and flowering trees, herbaceous perennials, deciduous shrubs, and vegetables/fruits/herbs. Container-grown plants were the predominant product form. Sales were reported for marketing practices such as advance contracting, brokerage, and transaction methods such as telephone or in-person sales. The internet was the largest advertising medium. International exports were a small share of total sales (<1%), while sales outside the production area for eight agroclimatic regions of the United States represented less than one percent to 36 percent of sales. Groundwater wells were the predominant source of irrigation water, and overhead sprinklers were the largest application method, followed by drip irrigation and hand watering. Factors perceived to be most important for the overall health of the green industry included market demand and weather uncertainty.

Index words: nursery, plant dealer, sales, employment, ornamental plants, wholesale, product forms, market channels, irrigation, integrated pest management, advertising.

Significance to the Horticulture Industry

As a result of the recent economic recession (2007 to 2009) and subsequent decline in consumers' discretionary expenditures, the green industry in the United States suffered significant economic losses leading to major structural changes in the industry. To be competitive in today's complex business landscape and effectively manage risk, nursery and greenhouse operators need reliable and up-to-date information about sales, transportation, marketing channels, product mix, irrigation, pest management and other relevant production practices. However, due to budgetary limitations, the availability of such data from federal government sources has become very limited in recent years. The current report summarizes the state of the industry, focusing on trends in production and marketing characteristics in 2013.

Introduction

The environmental horticulture or green industry encompasses a diverse array of businesses, including nursery and greenhouse producers, allied suppliers, wholesale and retail distributors, and landscape design, construction and

maintenance services. The green industry is characterized by rapid growth, innovation, and change over the last three decades, however, slowing growth in demand and tighter operating margins suggest that the industry is maturing. In recent years, there has been considerable consolidation in the industry, among both producers and retailers. Big box stores and mass merchants have captured over half of consumer spending on lawn and garden plants. The rise of large, nationwide plant retailers like home centers and mass merchandisers has created a marketing opportunity for large growers who can supply the large volumes these customers require. Some nursery firms have grown rapidly through acquisition during the past decade, largely to service these big customers. On the other hand, independent garden centers, retail nurseries, and smaller landscape firms have often been competitively displaced. Structural changes such as these indicate that the nature of competition in the industry is changing. In such highly competitive conditions, it is imperative that firms develop a system of intelligence upon which to formulate decisions regarding strategic positioning in the marketplace. However, the dearth of industry statistics greatly diminishes the ability of owner and managers to benchmark their performance relative to other firms. This national survey has been a vital resource for green industry firms, and these latest results will be important in the context of recovery from the Great Recession.

Materials and Methods

This study represents the sixth national survey conducted by the Green Industry Research Consortium, following previous surveys in 1989, 1994, 1999, 2004, and 2009 (Brooker et al 1990, 1995, 2000, 2005; Hodges et al. 2009; Hall et al. 2011). The content of the survey has remained very similar over time in order to provide consistency in time-series data, but has evolved in response to changes in the industry.

The 2014 National Green Industry Survey gathered information on business practices and operating results for calendar year 2013 or fiscal year 2013–14, depending on the firm. Information collected in this survey included annual sales, fulltime and part-time employment, plant types produced,

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native plants, product forms, market distribution channels, interstate and international trade flows of finished products and propagation materials, selling methods, advertising forms, irrigation water sources and application methods, integrated pest management (IPM) practices, year of business establishment, and factors affecting business growth and pricing. For the first time, the 2014 survey targeted 'plant dealer' firms, including retailers, rewholesalers, florists, and landscape contractors, as well as growers, with new questions added regarding retail marketing practices. Some questions in the survey required respondents to indicate the percentage share of the total activity for each specific item, with all items to sum to 100 percent, while other questions were posed as checklists, yes/no answers, fill-in open-ended blanks, or rating items on a 4 point scale. The questionnaire and survey protocol were approved by the University of Florida Institutional Review Board for compliance with ethical standards for human subjects research.

A list of over 110,000 grower and plant dealers firms in the United States was developed for the survey, containing information on company name, mailing address, and in some cases telephone numbers, email addresses, and type of business (grower or dealer). The listings for each state were obtained from members of the National Plant Health Board (nationalplantboard.org), an organization representing the plant health regulatory agencies in each state, typically the Department of Agriculture or its equivalent. All commercial growers and post farm-gate dealers of live plants (e.g. landscape service firms and retail firms) are required to be registered and annually certified for compliance with phytosanitary regulations, so these lists of firms can be considered exhaustive to the extent of law. Some states make their lists of firms available on a website, while others provide it upon request. Usable lists of certified nurseries and plant dealers were obtained from all states except Alaska, Montana, and New Mexico; for these states, lists of firms were obtained from the InfoSource USA database (Hoovers.com). After screening to eliminate duplicate entries and firms no longer in business, the population was about 104,000 firms (Table 1). A total of 32,000 firms were targeted for the survey, including 15,000 grower firms randomly selected to receive the questionnaire mailed via the U.S. Postal Service, and all 17,000 grower or dealer firms with email addresses that received the survey via email (internet). Firms to be surveyed via email were removed from the population considered for random sampling for the mail survey to avoid duplication.

The surveys were distributed during July to August, 2014. Following best practices for survey research, an introductory letter was first sent to selected firms to explain the purpose and benefits of the project, and all printed survey materials contained the logos of the sponsoring organizations to enhance the credibility and legitimacy of the survey (Dillman et al. 2008). Two mailings of the survey questionnaire were sent to firms selected for the mail survey, along with postage-paid return envelopes. Reminder postcards were mailed to respondents about one week after each survey mailing. Mailed questionnaires were imprinted with a code number matched to the mailing list, in order to identify respondents for quality control purposes. Completed surveys were returned to the University of Florida for data entry and analysis.

The online version of the survey was implemented at the same time as the mail survey and followed the same general approach. The SurveyMonkey web survey service

(SurveyMonkey.com) was used to send batch email invitations, record survey responses in security-encrypted form, and track respondents. Three invitations to participate in the survey were made in July and August 2014, with the second and third email invitations sent only to those firms that had not previously responded. Firms were invited to participate in the online survey by clicking a link in the email message directing them to the survey website. Respondents were then explicitly asked for consent to participate in the survey, and were given the option to decline or 'opt-out', as required by laws governing electronic communications. Consenting respondents were asked a qualifying question: 'Was your company actively involved in producing and marketing ornamental plants last year (2013)?' Respondents answering this question affirmatively were then directed to proceed with the survey, while those answering negatively were thanked and the survey was terminated. The online version of the questionnaire and emailed letters of invitation closely matched the content of the printed/mailed surveys, except for the initial qualifying question, and some additional questions on retail marketing practices, so the results are comparable.

The survey data were coded and entered into worksheets for tabulation and analysis. Valid responses were received from 2,657 firms, including 1,712 from the mail survey and 945 from the email survey (Table 1). A total of 299 or 2.0 percent of mailed surveys were returned as undeliverable, and 958 email addresses were considered undeliverable. In addition, 377 firms refused to participate ('opted-out') in the email survey. After deducting the undeliverable and non-compliant firms, the overall response rate for the survey was about 8 percent. Across firm types, 483 (18%) respondents were growers only, i.e. reported only wholesale sales, 721 (27%) were plant dealers reporting only retail sales, 817 (31%) were growers or dealers with a mix of wholesale and retail sales, and 636 (24%) were of unknown type because wholesale or retail sales were not reported. In some cases, survey results are reported separately for grower firms and plant dealer firms, as well as all responding firms, where there are meaningful differences between these groups.

Individual states with the highest number of respondents were Florida (440), Pennsylvania (231), New York (187), Georgia (141), North Carolina (134), California (121), and Texas (116), as shown in Table 1. In nine states with less than 10 respondents (ND, MT, NV, UT, NH, AK, HI, AR, OK), the results may be considered less reliable. The survey data were analyzed for individual states and aggregated across eight broad physiographic regions of the U.S., including the Southeast (709 respondents), Northeast (602), Midwest (461), Appalachian (297), Pacific (246), Southcentral (176), Great Plains (85) and Mountain (81).

Overall, 81 percent of respondents reported the key information on annual sales, and 79 percent reported employment. Annual sales were reported either as a specific value, or as one of 14 separate ranges of values, and the midpoint of the range indicated was taken as an estimate of annual sales. For firms reporting annual sales in the category 'over \$50 million', a value of \$50 million was used in the analysis. Data reported on the percentage distribution of sales by category of plant type, product form, market channel, wholesale/retail level, selling practice, and state destination were multiplied against the total annual sales to estimate sales category values for each firm. Similarly, data on percentage breakdowns for advertising expenditures by media type were combined with

Table 1. Number of U.S. green industry firms and number of survey respondents, by region, state, survey group and firm type in 2013.

Region, state	Population of firms			Total respondents	Respondents by survey group		Respondents by firm type			
	Growers	Dealers ^z	Total		Internet	Mail	Grower only	Dealer only	Grower and dealer	Type NA
Appalachian	3,141	4,718	7,859	297	67	230	75	54	125	43
KY	392	538	930	42	22	20	7	7	19	9
NC	1,401	2,610	4,011	134	2	132	36	23	64	11
TN	912	1,273	2,185	78	40	38	18	13	27	20
VA	288	14	302	28	2	26	13	4	9	2
WV	147	284	431	15	1	14	1	7	6	1
Great Plains	1,052	2,554	3,605	85	40	45	2	33	24	26
KS	430	1,325	1,755	25	1	24	2	12	8	3
ND	64	121	185	3	3			2		1
NE	441	820	1,261	48	35	13		16	12	20
SD	116	288	404	9	1	8		3	4	2
Midwest	5,649	10,256	15,906	461	144	317	60	162	134	105
IA	453	1,006	1,459	24		24		11	11	2
IL	661	566	1,227	55	2	53	13	14	21	7
IN	422	1,686	2,108	89	89		2	29	12	46
MI	1,279	3,832	5,111	89		89	12	34	31	12
MN	836	802	1,638	48		48	7	18	16	7
MO	836	1,736	2,572	31	1	30	5	10	10	6
OH	717	41	758	74	1	73	20	26	22	6
WI	445	587	1,033	51	51		1	20	11	19
Mountain	3,661	8,798	12,458	81	12	69	16	21	27	17
AZ	92	8	100	6		6	3		3	
CO	412	1,792	2,204	22	1	21	5	5	10	2
ID	359	1,386	1,745	23	1	22	6	7	5	5
MT	31	3	34	4		4		2	2	
NV	2,559	5,107	7,666	6		6	1	1	2	2
UT	206	502	708	19	10	9	1	5	5	8
WY	1	0	1	1		1		1		
Northeast	5,892	9,338	15,230	602	126	476	85	178	232	107
CT	244	55	299	16		16	4	3	6	3
DE	163	166	329	16	1	15	2	5	6	3
MA	250	629	879	18	2	16	1	6	8	3
MD	370	1,249	1,619	24		24	6	7	11	
ME	678	135	813	27	1	26	1	10	13	3
NH	6	26	32	1		1			1	
NJ	759	700	1,459	61	2	59	22	10	22	7
NY	116	52	168	187	99	88	9	70	56	52
PA	2,904	5,791	8,695	231		231	36	61	103	31
RI	110	278	388	8	8		3	2	2	1
VT	291	257	549	13	13		1	4	4	4
Pacific	3,200	10,844	14,044	246	126	120	36	66	65	79
AK	46	7	53	1	1				1	
CA	2,467	8,331	10,798	121	1	120	31	28	46	16
HI	157	2	159	5	5		2		2	1
OR	196	1,832	2,028	54	54		1	17	8	28
WA	334	673	1,007	65	65		2	21	8	34
Southcentral	2,681	14,533	17,214	176	6	170	43	45	65	23
AR	73	40	113	4		4		1	3	
LA	526	136	662	37		37	17	8	6	6
NM	119	696	815	10		10		4	6	
OK	135	280	416	9	5	4	1	1	2	5
TX	1,828	13,381	15,209	116	1	115	25	31	48	12
Southeast	10,471	7,460	17,931	709	424	285	166	162	145	236
AL	601	46	647	31		31	11	3	8	9
FL	7,277	2,383	9,660	440	206	234	131	88	96	125
GA	1,538	3,306	4,844	141	140	1	12	46	16	67
MS	439	1,033	1,471	28	9	19	7	7	6	8
SC	617	692	1,309	69	69		5	18	19	27
Grand total	35,745	68,502	104,247	2,657	945	1,712	483	721	817	636

^zPlant dealer firms include retailers, rewholesalers, florists and landscape contractors.

data on total advertising expenditures as a share of sales to estimate actual expenditures. Data on the percentages of irrigation water used by source and application method were weighted by firm sales to provide estimates of overall

water use. Further details on the study background, survey methodology, a copy of the survey questionnaire, and complete state and region level results are given in a report by Hodges et al. (2015).

Results and Discussion

Period established. Nearly one quarter (24%) of surveyed firms were established during 2000 to 2010, while nearly 20 percent were established during the 1990s, 18 percent during the 1980s and 12 percent during the 1970s, with smaller shares in prior decades (data not shown). This pattern reflects the turnover of firms in the industry, with progressively fewer firms surviving from earlier periods. Cumulatively, about 14 percent of firms have been in existence since the 1960s, including about one percent since the 1800s. Although the percentage of firms established during the recent period of 2010 to 2014 (13%) is about half of that for the previous decade, it reflects less than half of the length of time, suggesting that the rate of new business formation has remained fairly constant. Based on other sources, it is well accepted that a substantial number of firms exited the industry during the recession of 2008–2009 and for a period several years after.

Annual sales. Annual sales for 2013 reported by 2,163 survey respondents totaled \$3.957 billion (B), and averaged \$1.83 million (M) per firm (Table 2). Sales through wholesale market channels totaled \$2.136 B, and averaged \$1.64 M per firm, while sales at retail totaled \$1.592 B, averaging \$1.04 M per firm. Total annual sales reported were highest in the Southeast region (\$1.065 B), followed by the Midwest (\$877 M), Pacific (\$525 M), Appalachian (\$494 M), Northeast (\$486 M), Southcentral (\$202 M), Great Plains (\$196 M), and Mountain (\$112 M). Average sales per firm were highest in the Great Plains (\$2.97 M) and Pacific regions (\$2.85 M), and lowest in the Northeast (\$0.93 M). Among individual states, average annual sales per firm were highest in Hawaii (\$7.19 M), Wisconsin (\$6.62 M), Montana (\$4.91 M), Missouri (\$4.79 M), and Nebraska (\$4.00 M). Retail sales represented 40 percent of overall annual sales reported, and ranged from 27 percent to 97 percent across regions.

Employment. A total of 38,657 employees were reported for all U.S. green industry survey respondents in 2013, including 20,946 (54.2%) permanent employees, 16,514 (42.7%) temporary, part-time or seasonal employees, and 1,197 (3.1%) foreign national employees authorized to work in the U.S. under the H2A visa program (Table 3). The Southeast and Midwest regions had the highest employment reported, with 9,065 and 8,815 employees, respectively, followed by the Pacific (5,542), Northeast (6,107), Appalachian (4,147), Southcentral (2,192), Mountain (1,454), and Great Plains (1,335). The national average number of employees per firm was 18.4 (Table 3). The states with the highest percentage of permanent employees were Hawaii (98%), Arizona (98%), Arkansas (91%), Texas (77%), Massachusetts (77%), New Mexico (75%), and New York (75%). The states with the highest percentage of temporary employees, which can be taken as an indication of seasonality in business, were New Hampshire (100%), Wyoming (100%), Kansas (88%), Montana (77%), Rhode Island (72%), Idaho (71%) and Nevada (70%). States with the largest percentage of H2A employees, which may represent tight labor market conditions, were Maryland (18.1%), Mississippi (17.3%), Louisiana (14.5%), Ohio (11.2%), and Alabama (10.8%). Roughly two-thirds (66%) of firms reported that their number of fulltime/permanent employees had remained the same over the past five years, while 19 percent had decreased employment and 15

percent had increased employment. For part-time/temporary/seasonal employees, a similar share of firms kept the same number of employees (61%), and decreased (22%) or increased (17%) employment.

Firm size distribution. Annual sales were reported in the survey either as a specific amount or as a range, from less than \$250,000 to more than \$50 million (M). Over half (55%) of 2,163 respondents were firms with less than \$250,000 in annual sales, while 13 percent of firms had sales of \$250,000 to \$999,000, 8.5 percent had sales of \$1 to \$4.9 M, 1.1 percent had sales of \$5 to 9.9 M, and 3.8 percent of firms had annual sales of \$10 M or greater, including 0.3 percent with sales \$50 M or more (Fig. 1). Approximately 19 percent of firms did not report annual sales. States with the highest percentage of firms reporting \$10 M or greater in annual sales were Hawaii (25.0%), Montana (25.0%), and Wisconsin (19%), while states with all surveyed firms reporting less than \$250,000 in annual sales were North Dakota, Nevada, Wyoming, New Hampshire and Alaska.

Ornamental plant types. Across eighteen major ornamental plant types, the largest specific plant type sold was bedding plant-flowering annuals, representing 17.6 percent of total sales reported, followed by miscellaneous other plants (10.5%), e.g. cut flowers, bamboo, palm trees, orchids, cactus (Fig. 2). A second tier of plant types were deciduous shade and flowering trees (9.0%), herbaceous perennials (8.6%), deciduous shrubs (excluding roses, 7.3%), bedding plants-vegetables/fruits/herbs (5.8%), and broad-leaved evergreen shrubs (5.4%). A third tier of plant types included fruit trees (4.8%), evergreen trees (4.8%), potted flowering plants — e.g. Easter lily, poinsettia (4.5%), Christmas trees (4.1%), and sod (3.1%). Plant types that represented 3 percent or less of sales were roses (3.0%), tropical foliage (2.7%), propagated plants-liners/cuttings/plugs (2.4%), vines and ground covers (2.3%), narrow-leaved evergreen shrubs (2.4%), and azaleas—separate from broadleaf evergreens (1.5%). Plant types that increased as a share of sales since the previous survey for 2008 were flowering annual bedding plants, herbaceous perennials, and fruit trees.

The mix of plant products differed across U.S. regions. Flowering annual bedding plants represented over 30 percent of total sales in the Appalachian and Great Plain regions. Plant types that represented above-average percentages of total sales were fruit trees in the Southcentral (29%), deciduous shade/flowering trees in the Midwest and Southcentral (16%, 15%), deciduous shrubs in the Midwest (18%), evergreen trees in the Northeast (9%), herbaceous perennials in the Midwest and Northeast (13%), vegetables/fruits/herbs bedding plants in the Pacific and Great Plains (14%), flowering potted plants in the Pacific (10%), Christmas trees in the Great Plains (23%), fruit trees in the Southcentral (29%), turfgrass sod in the southeast (8%), propagated material in the Mountain region (21%), and miscellaneous other plant types in the Southeast (22%) (data not shown).

Native plants. In recent years, there has been increasing emphasis on using native plants for landscaping because they may be well adapted to prevailing environmental conditions, require less maintenance, and are less likely to become invasive. For the U.S. overall, native plants represented 17.1 percent of total sales reported by survey respondents for

Table 2. Annual sales reported by surveyed U.S. green industry firms (growers and plant dealers) in 2013, by region and state.

Region, State	Number firms reporting sales	Total annual sales (M\$) ^a	Average sales per firm (M\$)	Wholesale sales (M\$)	Average wholesale sales per firm (M\$)	Retail sales (M\$)	Average retail sales per firm (M\$)	Percentage of sales at retail
Appalachian	268	493.6	1.842	355.2	1.776	133.0	0.743	26.9%
KY	34	58.1	1.710	19.2	0.737	39.0	1.499	67.0%
NC	128	304.0	2.375	250.7	2.507	50.2	0.577	16.5%
TN	64	72.7	1.137	32.3	0.718	39.0	0.976	53.7%
VA	27	51.5	1.909	48.8	2.218	2.6	0.202	5.1%
WV	15	7.2	0.480	4.2	0.607	2.2	0.169	30.5%
Great Plains	66	196.3	2.974	4.3	0.165	191.2	3.355	97.4%
KS	22	55.5	2.524	2.2	0.221	53.3	2.665	96.0%
ND	2	0.1	0.063	0.0	0.000	0.1	0.063	100.0%
NE	34	136.3	4.008	1.7	0.142	133.9	4.783	98.3%
SD	8	4.3	0.543	0.4	0.091	3.9	0.551	88.8%
Midwest	386	877.4	2.273	480.7	2.478	336.2	1.136	38.3%
IA	23	8.5	0.369	3.1	0.281	5.4	0.245	63.5%
IL	50	78.7	1.573	63.6	1.871	14.8	0.423	18.8%
IN	59	140.5	2.381	49.5	3.538	61.2	1.492	43.6%
MI	81	141.5	1.746	104.6	2.434	32.1	0.493	22.7%
MN	43	100.4	2.335	86.9	3.779	13.2	0.389	13.2%
MO	25	119.7	4.788	111.4	7.428	8.3	0.415	6.9%
OH	69	50.0	0.725	36.5	0.870	13.4	0.278	26.7%
WI	36	238.2	6.617	25.0	2.081	187.8	6.059	78.9%
Mountain	68	112.1	1.649	36.9	0.857	29.9	0.624	26.7%
AZ	6	16.8	2.796	16.1	2.688	0.6	0.216	3.9%
CO	21	63.2	3.010	13.0	0.867	5.2	0.346	8.2%
ID	20	5.9	0.295	4.2	0.385	1.4	0.116	23.5%
MT	4	19.7	4.913	1.9	0.953	17.7	4.436	90.3%
NV	5	0.4	0.088	0.2	0.050	0.2	0.076	51.6%
UT	11	6.2	0.561	1.4	0.240	4.7	0.474	76.7%
WY	1	0.0	0.005	0.0	0.000	0.0	0.005	100.0%
Northeast	522	485.7	0.930	241.8	0.763	241.4	0.589	49.7%
CT	14	28.0	2.001	17.4	1.743	10.3	1.142	36.7%
DE	13	48.3	3.714	45.4	5.672	2.9	0.264	6.0%
MA	15	15.4	1.024	2.2	0.245	13.2	0.939	85.6%
MD	24	33.8	1.410	18.3	1.078	15.5	0.862	45.8%
ME	25	3.3	0.132	1.0	0.070	2.3	0.101	70.3%
NH	1	0.1	0.125	0.1	0.075	0.1	0.050	40.0%
NJ	57	67.6	1.187	60.6	1.378	6.9	0.215	10.2%
NY	145	168.3	1.161	24.4	0.375	143.2	1.136	85.1%
PA	211	91.1	0.432	68.7	0.494	21.2	0.130	23.3%
RI	7	3.7	0.523	3.4	0.685	0.2	0.058	6.4%
VT	10	26.0	2.604	0.3	0.059	25.6	3.203	98.4%
Pacific	184	524.6	2.851	297.7	2.947	212.6	1.623	40.5%
AK	1	0.1	0.125	0.1	0.083	0.0	0.042	33.3%
CA	112	316.5	2.826	233.3	3.029	69.9	0.944	22.1%
HI	4	28.8	7.188	28.6	7.148	0.2	0.079	0.5%
OR	32	59.1	1.847	6.7	0.744	51.8	2.073	87.6%
WA	35	120.1	3.432	29.0	2.905	90.7	3.129	75.5%
Southcentral	157	201.7	1.285	100.2	0.928	77.8	0.707	38.6%
AR	4	1.4	0.344	0.8	0.268	0.6	0.143	41.6%
LA	31	18.4	0.592	17.5	0.760	0.9	0.062	4.7%
NM	10	0.8	0.084	0.3	0.053	0.5	0.052	61.8%
OK	5	1.1	0.210	0.4	0.140	0.3	0.110	31.5%
TX	107	180.1	1.683	81.1	1.112	75.5	0.956	41.9%
Southeast	512	1,065.3	2.081	618.7	1.990	370.3	1.206	34.8%
AL	23	9.6	0.416	8.5	0.449	1.0	0.091	10.4%
FL	341	622.7	1.826	346.2	1.525	207.5	1.128	33.3%
GA	83	245.9	2.963	134.0	4.786	104.8	1.691	42.6%
MS	21	11.3	0.540	4.3	0.332	7.0	0.541	61.9%
SC	44	175.8	3.995	125.7	5.236	50.0	1.350	28.4%
Grand total	2,163	3,956.7	1.829	2,135.5	1.643	1,592.4	1.035	40.2%

^aValues are given in millions dollars.

2013, while in the previous national survey for 2008, native plants represented 13.4 percent of total sales (data not shown). Across regions, native plant sales ranged from 26 percent in the Appalachians to 8 percent in the Mountain region. The states with the highest share of sales in native plants were

Illinois (63%), Arkansas (51%), Tennessee (44%), Kentucky (33%) and New Jersey (33%). State and regional differences in native plant sales may represent the prevailing palette of plants traditionally used as well as native plant promotional programs.

Table 3. Employment reported by surveyed U.S. green industry firms (growers and plant dealers) in 2013, by region and state.

Region, State	Firms reporting employment	Total employees	Fulltime, permanent employees	Part-time, temporary, seasonal, employees	H2A employees	Average number of employees per firm	Percent permanent employees	Percent part-time, temporary, seasonal employees	Percent H2A employees
Appalachian	243	4,147	2,443	1,593	111	17.1	59	38	2.7
KY	32	266	144	122	0	8.3	54	46	0.0
NC	112	2,451	1,457	889	105	21.9	59	36	4.3
TN	65	503	315	184	4	7.7	63	37	0.8
VA	24	785	481	302	2	32.7	61	38	0.3
WV	10	142	46	96	0	14.2	32	68	0.0
Great Plains	68	1,335	368	959	8	19.6	28	72	0.6
KS	19	761	93	668	0	40.1	12	88	0.0
ND	2	5	3	2	0	2.5	60	40	0.0
NE	39	440	232	204	4	11.3	53	46	0.9
SD	8	129	40	85	4	16.1	31	66	3.1
Midwest	381	8,815	3,111	5,393	311	23.1	35	61	3.5
IA	21	180	65	115	0	8.6	36	64	0.0
IL	47	668	206	462	0	14.2	31	69	0.0
IN	75	826	422	404	0	11.0	51	49	0.0
MI	68	1,781	561	1,209	11	26.2	31	68	0.6
MN	42	1,655	543	973	139	39.4	33	59	8.4
MO	26	1,843	657	1,186	0	70.9	36	64	0.0
OH	60	1,443	469	813	161	24.1	33	56	11.2
WI	42	419	188	231	0	10.0	45	55	0.0
Mountain	69	1,454	744	697	13	21.1	51	48	0.9
AZ	6	230	225	5	0	38.3	98	2	0.0
CO	19	723	369	354	0	38.1	51	49	0.0
ID	20	110	32	78	0	5.5	29	71	0.0
MT	3	48	11	37	0	16.0	23	77	0.0
NV	5	10	3	7	0	2.0	30	70	0.0
UT	15	331	104	214	13	22.1	31	65	3.9
WY	1	2		2		2.0	0	100	0.0
Northeast	421	6,107	3,411	2,510	186	14.5	56	41	3.0
CT	13	236	101	135	0	18.2	43	57	0.0
DE	8	142	58	84	0	17.8	41	59	0.0
MA	15	527	405	122	0	35.1	77	23	0.0
MD	20	667	237	309	121	33.4	36	46	18.1
ME	20	107	40	67	0	5.4	37	63	0.0
NH	1	4		4		4.0	0	100	0.0
NJ	48	641	275	366	0	13.4	43	57	0.0
NY	139	2,412	1,801	557	54	17.4	75	23	2.2
PA	138	1,095	414	676	5	7.9	38	62	0.5
RI	7	154	37	111	6	22.0	24	72	3.9
VT	12	122	43	79	0	10.2	35	65	0.0
Pacific	203	5,542	3,737	1,770	35	27.3	67	32	0.6
AK	1	7	4	3		7.0	57	43	0.0
CA	105	3,710	2,503	1,207	0	35.3	67	33	0.0
HI	5	53	52	1	0	10.6	98	2	0.0
OR	42	823	535	286	2	19.6	65	35	0.2
WA	50	949	643	273	33	19.0	68	29	3.5
Southcentral	144	2,192	1,622	494	76	15.2	74	23	3.5
AR	4	21	19	2		5.3	90	10	0.0
LA	29	276	173	63	40	9.5	63	23	14.5
NM	8	65	49	16	0	8.1	75	25	0.0
OK	8	61	27	34	0	7.6	44	56	0.0
TX	95	1,769	1,354	379	36	18.6	77	21	2.0
Southeast	572	9,065	5,510	3,098	457	15.8	61	34	5.0
AL	26	195	90	84	21	7.5	46	43	10.8
FL	364	4,907	3,316	1,509	82	13.5	68	31	1.7
GA	108	1,647	643	873	131	15.3	39	53	8.0
MS	25	271	128	96	47	10.8	47	35	17.3
SC	49	2,045	1,333	536	176	41.7	65	26	8.6
Grand Total	2,101	38,657	20,946	16,514	1,197	18.4	54	43	3.1

Nursery product forms. Container-grown plants were the dominant product form reported in the survey, representing 73 percent of overall sales (Fig. 3). A second tier of product forms were balled and burlapped (8.1% of sales), bare root (7.0%), and miscellaneous other forms (8.6%). In-ground

container/pot-in-pot systems, balled/potted plants (field dug plants containerized) and field grow bags each had less than 2 percent market share. The share for container-grown product increased from 65 percent in the previous national survey for 2008, while the market share decreased for all

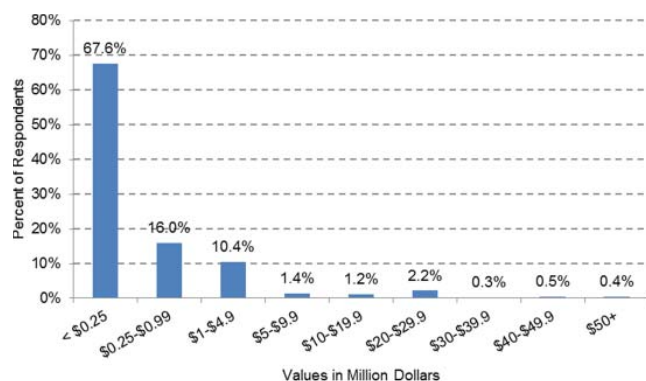


Fig. 1. Distribution of annual sales reported by U.S. green industry firms (growers and plant dealers) in 2013.

other specific product forms, except miscellaneous, such as cell trays. Container-grown products are increasingly popular due to their convenience in handling for production and marketing. Container-grown products constituted over 90 percent of sales in Missouri, Arizona, Montana, Wyoming, New Hampshire, New York, Vermont, Hawaii, Louisiana, and Georgia (data not shown). In general, container-grown products are more prevalent in southern areas where the risk of freeze damage to roots is lowest. Balled/burlapped products represented over half of sales in Missouri (83%), Illinois (66%), South Carolina (57%), Michigan (52%), New Jersey (60%), Arkansas (57%), and Rhode Island (76%). Bare root products were significant in Delaware (52%) and South Carolina (42%). In-ground containers were most popular in Texas (16%). Miscellaneous other product forms were an

important share of sales in Colorado (74%), Nevada (48%), Pennsylvania (44%), and New Mexico (36%).

Market channels. The most important market outlet for grower wholesale sales was landscape contractor firms, representing 28 percent of sales nationally, followed by re-wholesalers and home centers (20% each), single location retail garden centers (17%), mass merchandisers (10%), and multiple location garden centers (5%) (Fig. 4). The share of wholesale sales to home centers more than doubled from 8 percent in 2008, and the share to mass merchandisers increased slightly, while other wholesale outlets declined, especially single location garden centers. Home centers and mass merchandise stores have gained market share by virtue of their broad plant offerings at extremely competitive prices, due to large volume purchasing arrangements with growers. Among individual states, wholesale sales to landscape contractors were highest in Nebraska (66%), South Dakota (66%), Iowa (70%), Illinois (66%), Wisconsin (84%), Colorado (76%), Maine (69%), New Hampshire (90%), New Jersey (61%), Oregon (86%), and Oklahoma (100%). Sales to re-wholesalers were highest in Delaware (90%), Hawaii (87%), Rhode Island (64%) and New Mexico (63%). Sales to home centers were highest in Missouri (93%) and North Carolina (55%). Sales to mass merchandisers were highest in West Virginia (50%) and New York (43%). Sales to single location garden centers were highest in Montana (73%), Pennsylvania (56%), Vermont (55%), and Washington (52%). Sales to multiple location garden centers were highest in West Virginia (16%), Ohio (14%) and Mississippi (14%). States retaining a significant share of sales through traditional garden centers likely have a more discriminating consumer base that is willing to pay more for high plant quality, unusual plant offerings, and customer service.

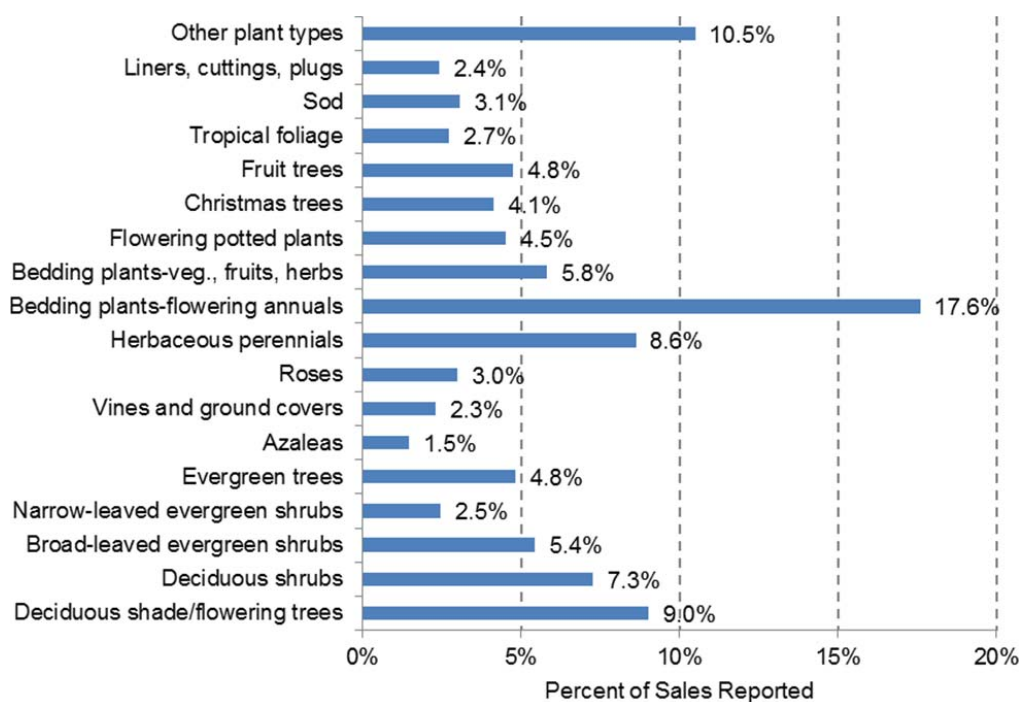


Fig. 2. Distribution of plant type sales by U.S. green industry firms (growers and plant dealers) in 2013.

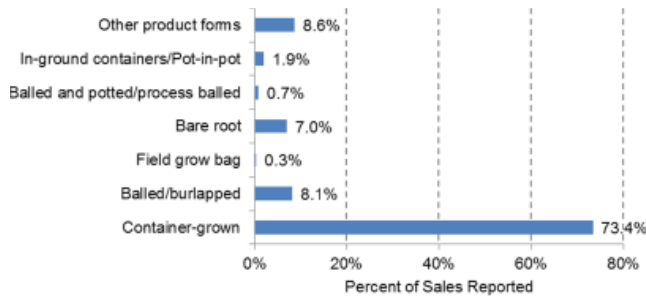


Fig. 3. Distribution of ornamental plant product forms sold by U.S. green industry firms (growers and plant dealers) in 2013.

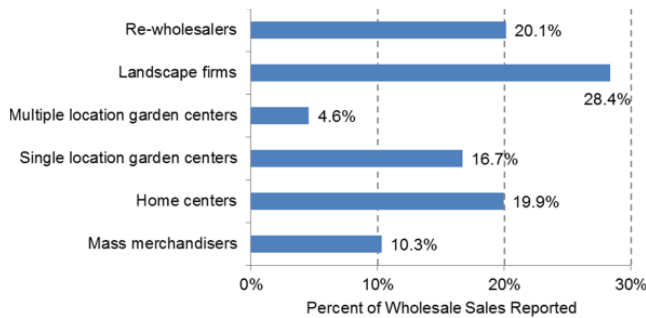


Fig. 4. Distribution of wholesale market channel sales by U.S. grower firms in 2013.

Marketing practices. Effective marketing of ornamental plant products is critical for survival and success in the green industry. About 78 percent of all green industry sales in 2013 were to repeat customers, and for grower firms it was over 90 percent, indicating a high level of customer loyalty (Fig. 5). Negotiated sales, defined as transactions where price and terms were discussed, represented 26 percent of total sales for all firms. Not surprisingly, negotiated sales were a much higher share (42%) for growers, but were lower for plant dealer or retailer firms (3%). Brokerage or resale of finished products represented 8 percent of overall green industry sales. Among individual states, repeat customer sales represented 90 percent or more of all sales in 6 states (CO, DE, HI, NH, MN, MO). Negotiated sales represented at least 30 percent of total sales in 12 states. Brokered sales represented 20 percent or more of sales in CT and MI.

Forward contracting is an important marketing practice that many producers use as a risk management tool. Forward contract sales accounted for 17 percent of overall sales, 30 percent for grower firms (data not shown). The most common specific type of buyer for forward contracting was producers, used by 14 percent of wholesaler respondents, followed by miscellaneous other types of buyers (15%), retail garden centers (8%), mass merchandisers (5%), and cooperatives (<1%). Forward contract sales accounted for at least 40 percent of sales in eight states (KY, NC, MI, MN, CO, DE, NH, PA).

The most common sales transaction method reported was traditional in-person orders, accounting for 63 percent of sales for all firms, 95 percent of sales for plant dealer firms, and 60 percent of grower firms (Fig. 6). Telephone orders

accounted for 31 percent of sales by all firms, but only 2 percent for dealer firms. Internet transactions represented 4.5 percent of sales for all firms, nearly the same as reported for the previous survey for 2008 (4.4%). Trade show orders and mail order sales each represented about 2% of all sales. Among individual states, in-person orders accounted for over 90 percent of sales in 11 states, and telephone orders accounted for over 50 percent of sales in 6 states. Internet transactions represented a significant percentage of sales in New Mexico (44%), Alabama (41%), Nevada (23%), Tennessee (22%), and Maryland (19%). Trade shows and mail order accounted for over 10 percent of sales in only 4 and 3 states, respectively.

Trade shows have traditionally been an important venue for marketing in the green industry. The average number of trade shows attended by all firms in 2013 was 0.8 with an exhibit, and 0.6 without an exhibit (data not shown). Trade show attendance has declined significantly since 2008, in which the average number of shows attended was 2.27 and 1.79, with and without exhibits, respectively. The states with the highest average number of trade shows attended with an exhibit were Mississippi (2.5), Maryland (2.5), Texas (2.0), Arizona (2.0), and Minnesota (1.8), while an average of at least 1.5 shows were attended without an exhibit by firms in Rhode Island, Hawaii and Illinois. Decreasing trade show attendance may be due to the proliferation of alternate media

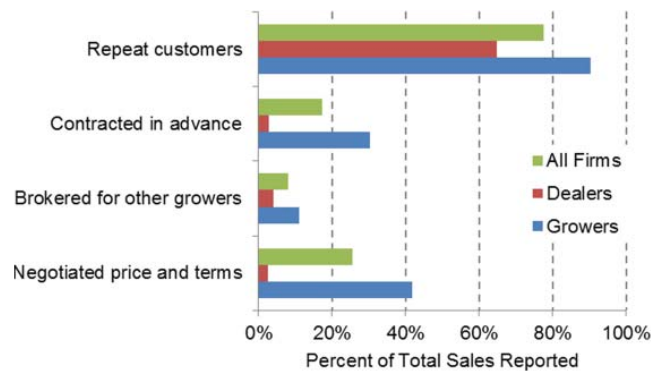


Fig. 5. Marketing practices used by U.S. growers, plant dealers and all firms combined in 2013.

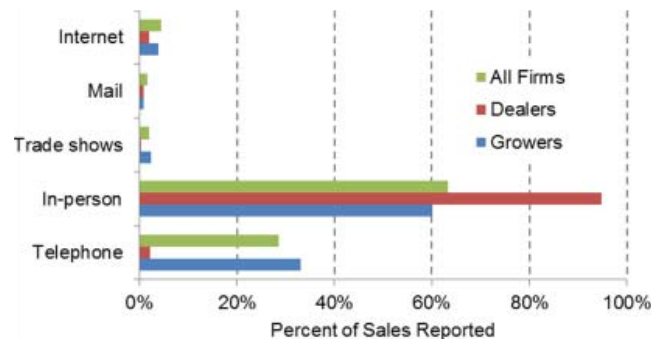


Fig. 6. Distribution of sales by transaction method used by growers, plant dealers and all firms combined in 2013.

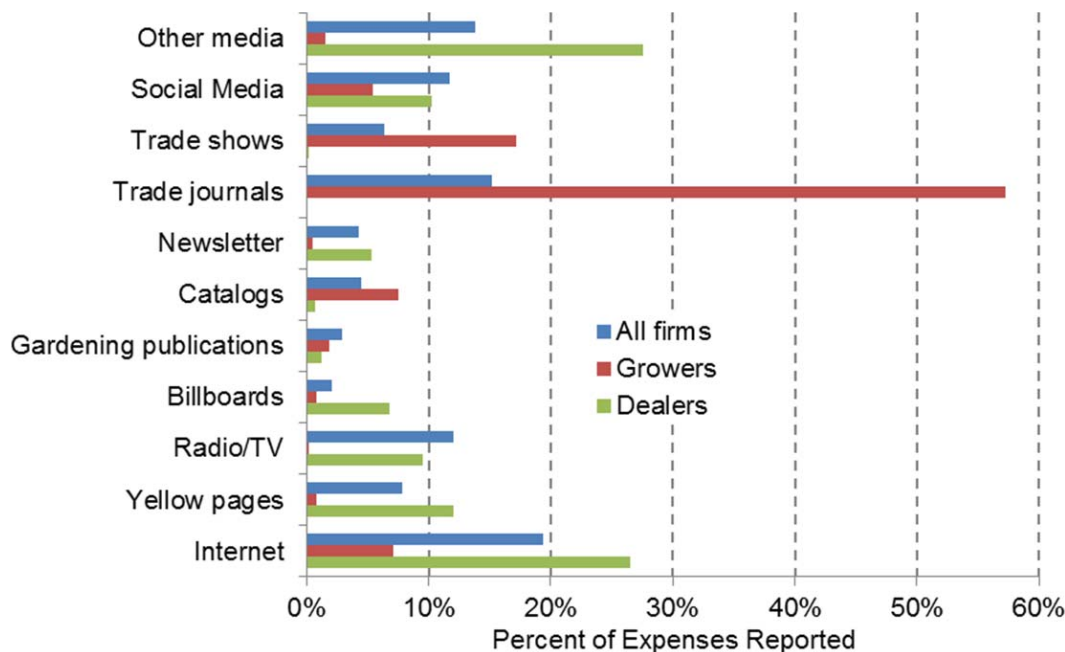


Fig. 7. Distribution of advertising expenditures by U.S. growers, plant dealers and all firms combined in 2013

channels and increased opportunity costs for management sales personnel to be away from their place of business.

Advertising expenditures. Advertising expenditures represented 4.0 percent of total sales for all green industry firms nationally. The most popular advertising media for all firms was the internet, accounting for 19 percent of the total advertising budget, followed by trade journals (15%), radio/TV (12%), social media, such as Facebook, Twitter, Tumbler and Instagram (12%), and miscellaneous other unspecified media (14%) (Fig. 7). For grower firms, 2.8 percent of annual sales were spent on advertising, and the most important media types as a share of the advertising budget were trade journals (57%), trade shows (17%), catalogs (8%), internet websites (7%), and social media (5%). For plant dealer firms, 4.5 percent of annual sales were spent on advertising, and the most important media types budgeted were miscellaneous other unspecified media (28%), internet websites (27%), yellow pages (12%), social media (10%), and radio/TV (10%). Interestingly, although the internet is important in terms of advertising expenditures, it still accounts for a relatively small share (< 5%) of sales transactions. Although it was not specifically listed in previous surveys, social media has certainly increased in importance in the industry. Advertising expenditures represented over 10 percent of annual sales in six states (KS, MO, CO, WY, CT, AK). The internet represented 80 percent of the advertising budget in Hawaii, and 40 percent or more in six states (IN, TN, NV, NM, GA, SC). Social media accounted for 20 percent or more of advertising in six states (TN, NE, CO, WY, DE, VT). Trade journals accounted for over 80 percent of advertising in Missouri and Alaska, while radio/TV accounted for over 70 percent of advertising in Kentucky and Utah.

Irrigation water sources and application methods used. Use of water resources for irrigation is becoming an increas-

ingly important issue in agriculture. Overall, 55 percent of respondents indicated that groundwater wells were a source of water for their irrigation, followed by city water supplies (27%), natural surface water (rivers, streams, lakes, ponds; 23%), recaptured water from on-site tailwater recovery ponds (10%), and reclaimed water from municipal primary treatment systems (4%) (data not shown). Note that the sum of these sources exceeds 100 percent because respondents were allowed to indicate multiple sources. Compared to all firms, a somewhat higher share of grower firms reported using groundwater wells (65%) and surface water (32%), while a lower share used city water (19%). On the other hand, a higher share of plant dealer firms reported using wells (53%) and city water (40%) than all firms. When the survey data on water sources were weighted by annual sales level to estimate the distribution of total water volumes used, groundwater wells represented 53 percent of total water used, followed by city water (21%), natural surface water (14%), recaptured (11%) and reclaimed (1%) (Fig. 8). Grower firms had a higher reliance on wells (56%), and recaptured (20%) sources, while plant dealer firms used a significantly greater volume of city water (49%). In a number of states, over 70 percent of firms reported using groundwater wells (MN, AZ, MT, WY, ME, NH, RI, AR, LA, NM, AL), while other states had less than 30 percent of respondents using wells (KY, ND, AK, OR). States in which over half of firms used city water for irrigation were KY, TN, KS, UT, CA, HI, WA. States with the highest percentage of firms using natural surface water were AK (100%), VA (50%) and CT (44%). States in which 20 percent or more of firms used either recaptured or reclaimed water were CT, VA, WA and NM.

In regards to irrigation water application methods used, a majority (53%) of respondents reported using overhead sprinkler irrigation, followed by drip irrigation (37%), sub-irrigation (5%), and other methods such as hand watering (20%) (data not shown). Among internet survey respondents,

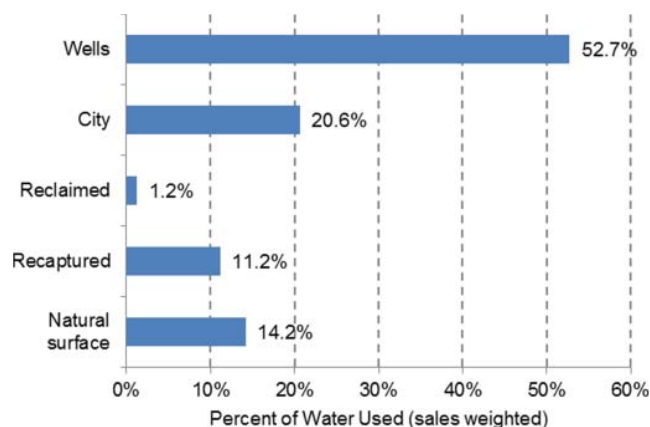


Fig. 8. Distribution of irrigation water volume used by source for U.S. green industry firms (growers and plant dealers) in 2013.

56 percent of firms also indicated using hand watering. Grower firms tended to use overhead (69%) and drip irrigation (49%) more than plant dealer firms (48 and 30%, respectively). The share of firms using water-conserving drip irrigation remained about the same as in the previous survey in 2009. In terms of volume of water used, based on sales-weighted data, overhead irrigation represented nearly half (49%) of total use, followed by drip irrigation (23%), hand watering (17%), sub-irrigation (4%), and other methods (7%) (Fig. 9). States with over 70 percent of firms using overhead water irrigation were NC, AZ, MT, UT, CT, NH, HI, LA and AL. States with 50 percent or more of firms using drip irrigation were SD, AZ, MT, NV, CT, MD, NH, AK, CA, AR, and OK. Sub-irrigation was used by an above-average percentage of firms in SD, IN, AZ and NM. Hand watering and other unspecified irrigation methods were used by a higher percentage of firms in MO, CO, MT, WY, DE, ME, AR and TX.

A new question in the 2014 survey asked about use of 'smart' irrigation, i.e. systems using soil moisture or weather sensors to control irrigation, and applying water only when actually needed by plants. Overall, about 18 percent of respondents reported using this technology (data not shown). At least half of respondents reported using smart irrigation systems in New Hampshire and Oklahoma.

Trends over time in water use for irrigation are important for measuring efforts toward resource conservation in the industry. Approximately 69 percent of all firms reported that their water use per acre has remained the same over the past five years, while 13 percent responded that it has increased, and 19 percent said it has decreased (data not shown). Among grower firms, a slightly larger share of respondents said that water use intensity has decreased (25%). On the other hand, a high share (75%) of plant dealer firms had water use remain the same. A third or more of firms decreased water use in Arizona and Maryland, while half or more firms increased water use in Alaska, Hawaii, Arkansas and Oklahoma.

Integrated pest management practices. Integrated Pest Management (IPM) is commonly hailed as a component of best management practices for agriculture that recognizes its ecological context, seeks to reduce application of toxic pesticides, and reduce impacts on non-pest organisms. Among

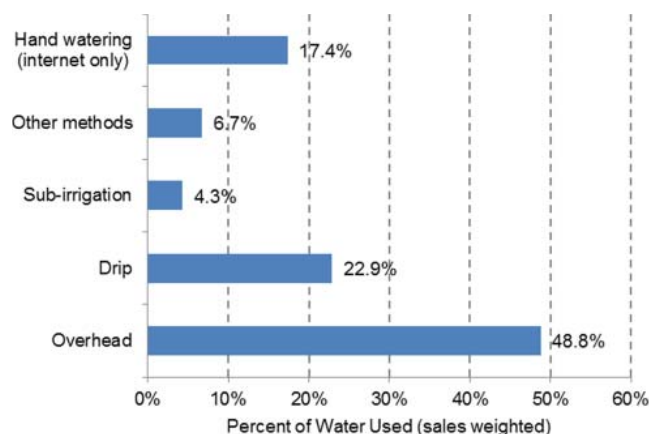


Fig. 9. Distribution of irrigation water use by application method for U.S. green industry firms (growers and plant dealers) in 2013.

22 different IPM practices, the most commonly used in 2013 were removal of pest-infested plants (72% of firms), cultivation/hand weeding (62%), spot treatment with pesticides (53%), elevating or spacing plants for air circulation (47%), inspecting incoming stock (46%), and alternating pesticides to avoid chemical resistance (42%) (Fig. 10). A second tier of practices followed by at least 20 percent of firms were using mulches to suppress weeds (36%), ventilating greenhouses (34%), managing irrigation to reduce pests (31%), adjusting fertilization rates (27%), disinfecting benches or ground covers (26%), using pest-resistant plant varieties (25%), adjusting pesticide application to protect beneficial organisms (23%), and identification of beneficial insects (23%). A third group of practices used by at least 10 percent of firms were monitoring pest populations with tarp or sticky traps (19%), using bio-pesticides or lower toxicity materials (15%), using beneficial insects (15%), and keeping pest activity records (14%). The least commonly used IPM practices were using screening or barriers to exclude pests (8%), soil solarization or sterilization (6%), treating retention pond water (3%), and using sanitized water foot baths (2%). IPM Practices that were used more frequently by growers compared to plant dealers or all firms included spot treatment with pesticides, managing irrigation to reduce pests, adjusting fertilization rates, alternative pesticides to avoid chemical resistance, disinfecting benches or ground covers, and keeping pest activity records. Differences in the prevalence of these practices across states presumably reflects pest density, agroclimatic factors, pesticide regulations, crop mix, and management knowledge and experience. Adoption of all or nearly all IPM practices by 100 percent of respondents were reported for Indiana, Wisconsin, Rhode Island, Vermont, Alaska, Hawaii, Oregon, Washington, Georgia, and South Carolina.

Interregional and international trade. Information was collected in the survey on sales of plants products by destination state or country. The home state of the nursery was listed as the first option for a destination state since this was the dominant practice of all states in previous surveys. In most cases, the weighted percentage of sales to buyers within the nursery's home state was by far the largest. Regions with the largest share of product sales to other regions were the Appalachian (36%), Mountain (25%), and Southeast (19%),

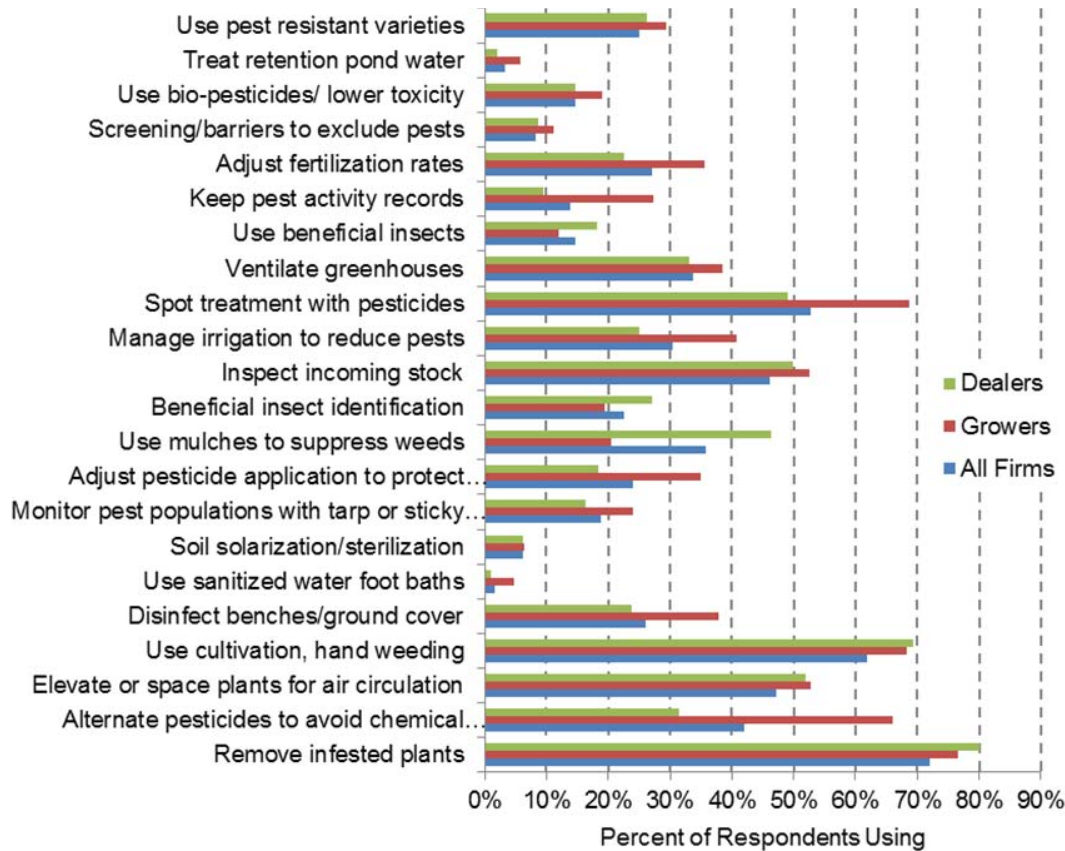


Fig. 10. Integrated pest management (IPM) practices used by U.S. growers, plant dealers and all firms combined in 2013.

followed by the Southcentral (12%), Pacific (11%), and Northeast (10%), while the Midwest and Great Plains regions had very low amounts (Fig. 11). Individual states with the largest share of products sold to other regions were Alaska (94%), Delaware (56%), Arkansas (48%), Virginia (46%), North Carolina (42%), Tennessee (40%), New Mexico (40%), Missouri (37%), and Colorado (37%).

International exports represented only 0.3 percent of total sales reported by all respondents, and 0.7 percent of total grower sales, down from 3.7 percent in the 2008 survey (data not shown). The state of New Mexico had the highest share of international sales (39%), followed by Alaska (13%), Florida (5%), and Delaware (5%). Trading partner countries reported included Thailand, Japan, Taiwan, Russia, Canada, Costa Rica, Turks & Caicos, St. Vincent, China, Bahamas, Singapore, Holland, St. Maarten, Anguilla, and Korea.

Factors impacting the industry. To gain insight into the attitudes and motivations of green industry managers, survey respondents were asked to rate the importance of various factors or issues potentially affecting the industry in terms of 'very important', 'important', 'minor importance', or 'not important'. The eight factors considered as potentially affecting product prices were cost of production, inflation, other grower prices, grade of plants, market demand, product uniqueness, inventory levels, and last year's prices. Cost of production was the factor with the highest average rating score (3.41 on a scale of 1–4), followed by grade of plants (3.20), market demand (3.11), product uniqueness (3.09), other

grower's prices (2.81), last year's prices (2.58), inventory levels (2.54), miscellaneous other unspecified factors (2.40), and inflation (2.28) (Fig. 12). The percentage of respondents that indicated a factor is either 'important' or 'very important' for product pricing was highest for cost of production (87%), grade of plants (83%) and market demand (79%). In general, the results for states were consistent with those for the U.S. as a whole, with minor exceptions.

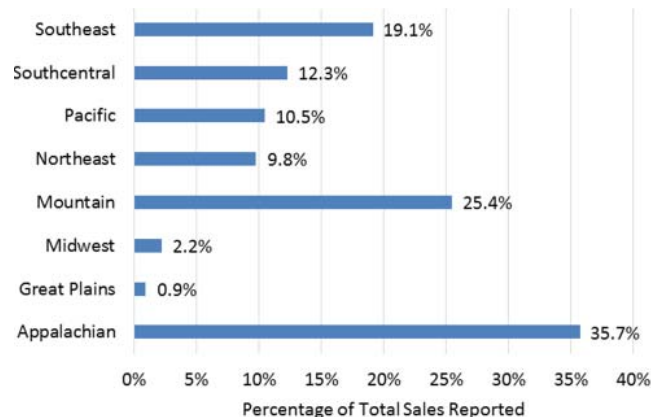


Fig. 11. Sales of plant products outside of home region by U.S. green industry firms (growers and plant dealers) in 2013.

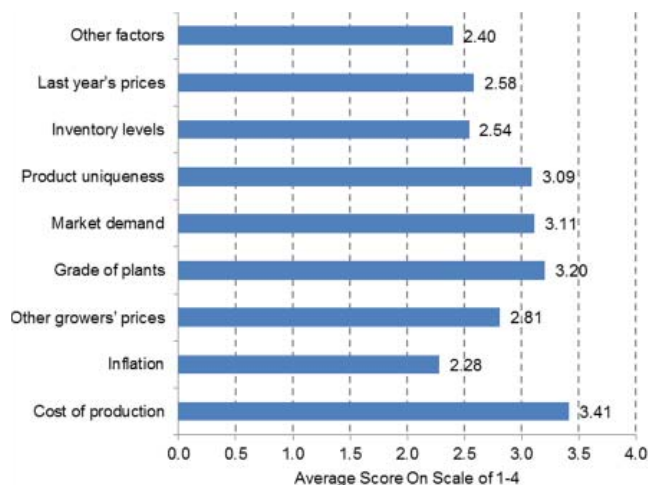


Fig. 12. Factors affecting product pricing for U.S. green industry firms (growers and plant dealers) in 2013.

Among factors considered that potentially limit the geographic range or trading area for green industry businesses, the highest average rating was for transportation (2.94), followed by plant offerings (2.92), production (2.76), marketing (2.43), equity capital (1.91), and debt capital (1.90) (data not shown). Over two-thirds (66%) of respondents indicated that plant offerings, transportation and production issues were important or very important.

Among factors that may potentially affect the overall business environment in the green industry, the highest average rating score was for market demand (3.31), followed by weather uncertainty (3.16), own managerial expertise (2.82), labor (2.64), competition/price undercutting (2.57), ability to



Fig. 13. Factors impacting the general business environment for U.S. green industry firms (growers and plant dealers) in 2013.

hire competent hourly employees (2.49), water supply (2.39), other (non-environmental) government regulations (2.39), environmental regulations (2.35), land availability (2.24), ability to hire competent management (2.08), equity capital availability (1.99), and debt capital availability (1.98) (Fig. 13). Nearly 87 percent of respondents rated market demand as important/very important, followed by weather uncertainty (78%), and own managerial expertise (67%).

The current report provides an overview of current green industry production practices, marketing, trade flows, and factors affecting businesses based on a national survey conducted in 2014. Access to up-to-date information such as this lies at the heart of solving many of the issues facing the environmental horticulture industry. This information should be of interest to the stakeholders, including nursery producers, plant distributors, and retailers. The environmental horticulture industry continues to be an important sector of the agricultural economy, providing economic value to local communities and the country as well as aesthetic beauty that is conducive to human psychological well-being and productivity. Understanding the key factors that influence the horticulture industry will help managers control production and market risk, and more effectively position their businesses in the competitive marketplace.

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