

# CRABAPPLES: SALES TRENDS AND CONSUMER PREFERENCES IN IOWA<sup>1</sup>

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**Abstract.** A survey questionnaire was sent to all 180 active members of the Iowa Nursery and Landscape Association to assess the importance of crabapples (*Malus* sp.) to the nursery and landscape industry in Iowa, identify crabapple taxa offered for sale, and characterize consumer preferences. Most of the respondents (83%) identified crabapples as their customers' preferred flowering tree, with cultivars 'Prairifire', 'Spring Snow', and 'Snowdrift' as the most popular taxa. Slightly less than two-thirds of all respondents indicated they had eliminated certain crabapple selections from their product line. The cultivars 'Radiant' and 'Royalty' were cited most frequently as discontinued taxa, primarily because of disease problems. Businesses must continually evaluate the appropriateness of the crabapple taxa they carry to insure they are offering only those selections with excellent ornamental utility and superior disease resistance.

## Introduction

Crabapples are the most widely cultivated small landscape tree in the northern United States and southern Canada (3). Defined as those taxa in the genus *Malus* that bear fruits 5 cm (2 inches) in diameter or smaller, crabapples offer spectacular spring flowers, attractive summer foliage, an autumnal display of vividly colored fruit, and an array of growth habits and sizes to complement any landscape situation (1,4,5).

An examination of nursery catalogs underscores the popularity of crabapples. Approximately 200 taxa are currently available from nursery sources, and dozens more become available each year (7,9). But with this abundance comes confusion and skepticism over the quality and uniqueness of each selection. In addition, many homeowners and nursery professionals have developed negative attitudes toward crabapples because of inferior performance by a few widely planted selections. For instance, the cultivars 'Almey', 'Eleyi', 'Hopa', and 'Radiant' became commonplace in residential and commercial landscapes because of their showy, 7 to 10-day floral display each spring. Unfortunately, little consideration was given to their aesthetic impact at other times of the year. Thus, many established landscapes contain these and

other disease-prone crabapples that defoliate prematurely, flower only in alternate years, and/or produce undesirable fruit litter.

Over the last several decades, crabapple introductions have been held to a higher standard where disease resistance, spring flowers and fall fruit display, and maintenance considerations are given equal weight (6,8). As a result, the majority of recently introduced taxa are excellent landscape plants. Still, a surprising number of undesirable selections can be found in nurseries and garden centers. Failure to purge these substandard selections from wholesale and retail inventories could further undermine the reputation of this useful plant group and erode consumer confidence in the nursery industry.

The objectives of this study were to: 1) assess the importance of crabapples to the nursery and landscape industry in Iowa and identify crabapple taxa offered for sale, and 2) characterize consumer preferences that influence crabapple inventories as perceived by nursery operators participating in this study.

## Materials and methods

Survey questionnaires were sent by first-class mail to all 180 active members of the Iowa Nursery and Landscape Association. Mailed questionnaires included a cover letter explaining the objectives of the research and instructions for returning the completed questionnaire. Association members surveyed were assured of the confidentiality of their responses. The initial mailing was sent on June 7, 1996, with follow-up mailings to nonrespondents on July 1.

Completed questionnaires were received from 105 firms (58.3% response rate), however, five businesses were eliminated from the study because they neither grew nor sold crabapples. Firms were grouped according to their primary business type: retail nursery/garden center, landscape design/installation, rewholesale

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**Table 1. Rating of flowering trees in order of popularity with respondents' customers.**

Tree species	Response (%)					
	Rating <sup>z</sup>					
	1	2	3	4	5	6
Callery pear ( <i>Pyrus calleryana</i> )	6.1 (n=6)	19.6 (n=19)	13.5 (n=13)	19.5 (n=17)	16.2 (n=13)	19.5 (n=16)
Crabapple ( <i>Malus</i> spp.)	82.7 (n=81)	11.4 (n=11)	3.1 (n=3)	2.3 (n=2)	0.0 (n=0)	1.2 (n=1)
Dogwood ( <i>Cornus</i> spp.)	7.1 (n=7)	20.6 (n=20)	13.5 (n=13)	11.5 (n=10)	15.0 (n=12)	29.3 (n=24)
Japanese tree lilac ( <i>Syringa reticulata</i> )	3.1 (n=3)	12.4 (n=12)	26.1 (n=25)	25.3 (n=22)	27.5 (n=22)	8.5 (n=7)
Magnolia ( <i>Magnolia</i> spp.)	0.0 (n=0)	8.2 (n=8)	16.7 (n=16)	24.1 (n=21)	26.3 (n=21)	28.1 (n=23)
Serviceberry ( <i>Amelanchier</i> spp.)	1.0 (n=1)	27.8 (n=27)	27.1 (n=26)	17.2 (n=15)	15.0 (n=12)	13.4 (n=11)
	<b>n=98</b>	<b>n=97</b>	<b>n=96</b>	<b>n=87</b>	<b>n=80</b>	<b>n=82</b>

<sup>z</sup>Rating where 1 = most popular and 6 = least popular.

nursery, and production nursery. Because of the low number of responses, data from rewholesale nurseries, production nurseries, and one lawn care business, were grouped and analyzed together. Incomplete data for questions unanswered were not adjusted, and percentage results presented in tables are based upon actual reported totals. The frequency distribution of respondents was tabulated for each question with PROC FREQ of SAS (SAS Institute, Cary, N.C.).

The questionnaire contained 16 numbered questions in both closed-end and open-end form, and addressed the following areas: a) the relative popularity of crabapples compared to other flowering trees, b) the number of crabapple taxa offered for sale and identification of best-selling selections, c) the number of crabapple taxa eliminated from inventories since 1990, and why, d) crabapple traits that most influence customers' decisions to purchase, e) identification of fruitless

selections sold in Iowa, and f) the outlook for future crabapple sales.

## Results and Discussion

Most of the questionnaires were completed by owners and/or managers (96%). Respondents grouped themselves into five business categories, with retail nurseries and landscape design/installation firms comprising 90% of all respondents. Specifically, the participant profile was distributed in the following manner: Landscape design/installation (51%), retail nursery/garden center (39%), production nursery (5%), rewholesale nursery (4%), and lawn care (1%).

To gauge the relative importance of crabapples, respondents were asked to rate six species of flowering trees (rated on a scale of 1 to 6, where 1 = most and 6 = least) in order of their popularity with customers. Most believed crabapples were the preferred flowering tree as 83% gave them a

rating of 1 (Table 1). Serviceberry was the most frequent second choice.

Most nurseries feel obliged to carry crabapple selections that provide a range of flower and fruit colors, and growth habits (weeping, spreading, upright, columnar, etc.). In Iowa, retail nurseries offer the widest assortment of crabapples, averaging 13.9 selections per business (SEM = 2.05). Landscape design/installation firms averaged 10.3 selections (SEM = 1.15), while the combination of all other respondents averaged 11.3 selections per business (SEM = 5.99).

When respondents were asked how they offer crabapples for sale, most retail nurseries (85%) and a majority of landscaping firms (55%) said they sell crabapples as container-grown trees. Over one-third (39%) of landscaping firms reported selling balled-and-burlapped crabapples, but only two offered large specimens transplanted with a tree spade.

The cultivars 'Prairifire', 'Spring Snow', and 'Snowdrift' were cited most frequently as the best-selling crabapple selections (Table 2). In 1996, the Iowa Nursery and Landscape Association designated 'Prairifire' as the "Tree of the Year." Because of its disease-resistant history and bright red-purple flowers (2), the popularity of 'Prairifire' is not surprising, however, the "Tree of the Year" designation undoubtedly contributed to its prominent standing in Iowa. Almost one-third of retail (30%) and landscape design (29%) respondents also chose 'Prairifire' as their personal favorite.

The demand for fruitless flowering trees is great. The selection 'Spring Snow', which is essentially sterile, satisfies this need and explains its popularity with customers of Iowa nurseries and landscaping firms. Finally, white-flowering 'Snowdrift', despite its susceptibility to the diseases apple scab (*Venturia inaequalis*) and fire blight (*Erwinia amylovora*), remains a favorite long after its introduction in 1965. Unfortunately, several respondents listed the cultivars 'Pink Perfection', 'Radiant', 'Royalty', and 'Sparkler' among their best-selling selections. These cultivars have serious disease problems and should not be offered as viable choices (4).

A majority of all respondents (61%) indicated they had eliminated certain crabapple selections from their product line since 1990. Of the 34 discontinued taxa identified by respondents, the cultivars 'Radiant' (19%) and 'Royalty' (15%) were most frequently mentioned (Table 3). Disease problems were cited by 75% of respondents as the predominant reason for eliminating these and other crabapples from inventories.

A large number of retailers (77%) and landscaping firms (61%) indicated they place equal emphasis on flowering, fruiting, growth habit, and disease resistance characteristics when describing a particular crabapple to a customer. Yet, approximately three-fourths of retailers (72%) and landscapers (76%) declared their customers are still most interested in flower color. The necessity of offering a variety of crabapples with all flower colors represented was re-emphasized as 36% of all respondents stated their customers were equally interested in white, red, and pink forms.

Fruiting characteristics of crabapples are a contentious issue in the selection process. In fact, 29% of respondents reported that 26% to 50% of their customers find crabapple fruit objectionable. Another 18% remarked that 51% to 75% of their customers found fruit objectionable. Intolerance of fruit-bearing crabapples by consumers has prompted a large number of respondents (82%) to carry a fruitless selection. For most (93%), 'Spring Snow' was the lone offering. Although a beautiful tree in bloom, 'Spring Snow' is subject to slight apple scab and mild fire blight (4). Because of limitations with 'Spring Snow' and the lack of a suitable fruitless alternative, crabapples that bear small, persistent fruit should be identified and promoted.

The majority of respondents (90%) felt crabapple sales had either increased or remained the same during the period from 1990 to 1996, and a slightly larger group (93%) predicted sales would increase or remain the same during the next 5 years.

Positive feelings about past sales and optimistic perceptions for the future revealed in this study, bode well for crabapple use in Iowa, and

Table 2. Respondents' answer to the request, "List your three best-selling crabapples."

Taxa <sup>z</sup>	Response (%)			
	Business focus			
	Total	Retail <sup>y</sup>	Landscape <sup>x</sup>	Other <sup>w</sup>
<i>M.</i> 'Prairifire'	23.4 (n=67)	23.9 (n=27)	22.8 (n=34)	25.0(n=6)
<i>M.</i> 'Spring Snow'	22.4 (n=64)	20.4 (n=23)	22.1 (n=33)	33.3(n=8)
<i>M.</i> 'Snowdrift'	14.3 (n=41)	14.2 (n=16)	14.8 (n=22)	12.4(n=3)
<i>M.</i> 'Indian Magic'	5.2 (n=15)	8.8 (n=10)	2.7 (n=4)	4.2 (n=1)
<i>M.</i> 'Profusion'	4.2 (n=12)	2.7 (n=3)	4.7 (n=7)	8.3 (n=2)
<i>M.</i> 'Pink Spires'	3.8 (n=11)	2.7 (n=3)	5.4 (n=8)	0.0 (n=0)
<i>M.</i> 'Red Splendor'	3.5 (n=10)	4.4 (n=5)	3.4 (n=5)	0.0 (n=0)
<i>M.</i> 'Adams'	2.1 (n=6)	0.0 (n=0)	4.0 (n=6)	0.0 (n=0)
<i>M.</i> Centurion <sup>®</sup>	1.7 (n=5)	2.7 (n=3)	0.7 (n=1)	4.2 (n=1)
<i>M.</i> 'Donald Wyman'	1.7 (n=5)	0.9 (n=1)	2.7 (n=4)	0.0 (n=0)
<i>M.</i> <i>sargentii</i>	1.7 (n=5)	1.8 (n=2)	2.0 (n=3)	0.0 (n=0)
<i>M.</i> 'Robinson'	1.4 (n=4)	1.8 (n=2)	0.7 (n=1)	4.2 (n=1)
<i>M.</i> 'Royalty'	1.4 (n=4)	2.7 (n=3)	0.7 (n=1)	0.0 (n=0)
<i>M.</i> Harvest Gold <sup>®</sup>	1.0 (n=3)	0.0 (n=0)	2.0 (n=3)	0.0 (n=0)
<i>M.</i> 'Liset'	1.0 (n=3)	0.9 (n=1)	1.3 (n=2)	0.0 (n=0)
<i>M.</i> 'Red Barron'	1.0 (n=3)	1.8 (n=2)	0.7 (n=1)	0.0 (n=0)
<i>M.</i> 'Sparkler'	1.0 (n=3)	0.9 (n=1)	1.3 (n=2)	0.0 (n=0)
<i>M.</i> 'Thunderchild'	1.0 (n=3)	0.9 (n=1)	0.7 (n=1)	4.2 (n=1)
<i>M.</i> 'A. Masterpiece'	0.7 (n=2)	1.8 (n=2)	0.0 (n=0)	0.0 (n=0)
<i>M.</i> Coralburst <sup>®</sup>	0.7 (n=2)	0.0 (n=0)	1.3 (n=2)	0.0 (n=0)
<i>M.</i> G. Raindrops <sup>®</sup>	0.7 (n=2)	0.9 (n=1)	0.0 (n=0)	4.2 (n=1)
<i>M.</i> 'Pink Perfection'	0.7 (n=2)	0.9 (n=1)	0.7 (n=1)	0.0 (n=0)
<i>M.</i> 'Radiant'	0.7 (n=2)	0.0 (n=0)	1.3 (n=2)	0.0 (n=0)
<i>M.</i> Red Jewel <sup>™</sup>	0.7 (n=2)	0.0 (n=0)	1.3 (n=2)	0.0 (n=0)
<i>M.</i> Sugar Tyme <sup>®</sup>	0.7 (n=2)	0.9 (n=1)	0.7 (n=1)	0.0 (n=0)
	<b>n=286</b>	<b>n=113</b>	<b>n=149</b>	<b>n=24</b>

<sup>z</sup>Of the 34 taxa listed by respondents, only those mentioned two or more times are included.

<sup>y</sup>Retail nurseries/garden centers.

<sup>x</sup>Landscape design/installation firms.

<sup>w</sup>Other = rewholesale nurseries, production nurseries, and one lawn care firm.

Table 3. Crabapples eliminated from respondents' product line since 1990.

Taxa <sup>z</sup>	Response (%)			
	Business focus			
	Total	Retail <sup>y</sup>	Landscape <sup>x</sup>	Other <sup>w</sup>
<i>M. 'Radiant'</i>	18.6 (n=22)	19.0 (n=11)	18.5 (n=10)	16.7 (n=1)
<i>M. 'Royalty'</i>	15.3 (n=18)	17.2 (n=10)	14.8 (n=8)	0.0 (n=0)
<i>M. 'Thunderchild'</i>	7.6 (n=9)	10.3 (n=6)	5.6 (n=3)	0.0 (n=0)
<i>M. 'Hopa'</i>	6.8 (n=8)	8.6 (n=5)	3.7 (n=2)	16.7 (n=1)
<i>M. 'Red Splendor'</i>	5.1 (n=6)	0.0 (n=0)	7.4 (n=4)	33.3 (n=2)
<i>M. 'Indian Magic'</i>	4.2 (n=5)	0.0 (n=0)	9.3 (n=5)	0.0 (n=0)
<i>M. 'Brandywine'</i>	3.4 (n=4)	1.7 (n=1)	5.6 (n=3)	0.0 (n=0)
<i>M. 'Adams'</i>	2.5 (n=3)	1.7 (n=1)	1.9 (n=1)	16.7 (n=1)
<i>M. 'Profusion'</i>	2.5 (n=3)	3.4 (n=2)	1.9 (n=1)	0.0 (n=0)
<i>M. 'Red Jade'</i>	2.5 (n=3)	3.4 (n=2)	1.9 (n=1)	0.0 (n=0)
<i>M. x zumi</i>	2.5 (n=3)	1.7 (n=1)	3.7 (n=2)	0.0 (n=0)
<i>M. 'Bechtel'</i>	1.7 (n=2)	1.7 (n=1)	1.9 (n=2)	0.0 (n=0)
<i>M. W. Candied Apple</i> <sup>®</sup>	1.7 (n=2)	1.7 (n=1)	1.9 (n=1)	0.0 (n=0)
<i>M. 'Dolgo'</i>	1.7 (n=2)	1.7 (n=1)	1.9 (n=1)	0.0 (n=0)
<i>M. 'Eleyi'</i>	1.7 (n=2)	1.7 (n=1)	0.0 (n=0)	16.7 (n=1)
<i>M. floribunda</i>	1.7 (n=2)	0.0 (n=0)	3.7 (n=2)	0.0 (n=0)
<i>M. 'Liset'</i>	1.7 (n=2)	1.7 (n=1)	1.9 (n=1)	0.0 (n=0)
<i>M. sargentii</i>	1.7 (n=2)	1.7 (n=1)	1.9 (n=1)	0.0 (n=0)
	<b>n=118</b>	<b>n=58</b>	<b>n=54</b>	<b>n=6</b>

<sup>z</sup>Of the 34 taxa listed by respondents, only those mentioned two or more times are included.  
<sup>y</sup>Retail nurseries/garden centers.  
<sup>x</sup>Landscape design/installation firms.  
<sup>w</sup>Other = rewholesale nurseries, production nurseries, and one lawn care firm.

presumably in other regions of the United States and Canada. Still, nursery and landscape businesses must continually evaluate the appropriateness of crabapple selections they offer. Fellow green industry professionals and an increasing number of sophisticated gardening clients demand crabapples with excellent

ornamental utility and superior disease resistance.

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**Résumé.** Un questionnaire de sondage a été envoyé à 180 membres actifs de l'Association des producteurs en pépinières et des paysagistes de l'Iowa afin de vérifier l'importance des aubépines dans l'industrie des pépinières et du paysagement en Iowa; aussi pour identifier le nombre de variétés offertes et pour tracer un portrait des préférences du consommateur qui ont une influence sur l'inventaire en aubépines auprès des répondants. La plupart des répondants (83%) ont identifiés les aubépines comme les arbres à fleurs favoris des consommateurs, les cultivars 'Prairifire', 'Spring Snow' et 'Snowdrift' étant les plus populaires. Un peu moins des deux tiers des répondants ont indiqué avoir éliminé certaines sélections d'aubépines de leurs lignes de production depuis 1990. Les cultivars 'Radiant' et 'Royalty' ont été cités les plus fréquemment comme abandonnés, surtout en raison de problèmes de maladies. Le milieu des affaires doit absolument continuer d'évaluer l'intérêt des aubépines offertes sur le marché afin de proposer seulement les sélections ayant un excellent attrait ornemental et une résistance supérieure aux maladies.

**Zusammenfassung.** An 180 aktive Mitglieder der Vereinigung Baumschulen und Landschaftsbau in Iowa wurde ein Erhebungsfragebogen verschickt, um die Bedeutung von Zieräpfeln für die Baumschulindustrie zu untersuchen, um die Anzahl der angebotenen Zieräpfelsorten zu ermitteln und um die Nachfrage der Kunden nach bestimmten Sorten, welches die Bestandsaufnahme der Zieräpfel beeinflusst, zu charakterisieren, so wie sie von den Teilnehmern an der Umfrage wahrgenommen werden. Die meisten Antworten (83 %) beschrieben den Zieräpfel als einen vom Kunden bevorzugten, blühenden Baum, wobei die Sorten 'Prairifire', 'Spring Snow' und 'Snowdrift' besonders populär sind. Etwas weniger als zwei Drittel aller Teilnehmer zeigten an, daß sie seit 1990 bestimmte Zieräpfelsorten aus ihrem Programm genommen haben. Die Sorten 'Radiant' und 'Royalty' wurden häufig als Sorte mit unterbrochener Produktion aufgrund von auftretenden Krankheiten genannt. Die Unternehmen müssen kontinuierlich die Leistungsmerkmale von Zieräpfeln in der Produktion bewerten, um sicherzugehen, daß sie nur solche Selektionen mit ausgezeichneten Eigenschaften und Krankheitsresistenzen anbieten.