MALUS

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CONTENTS

LETTER TO THE EDITOR

Note: Dr. John Pair wrote to all former members of IOCS with a request for information as to why they had dropped out of IOCS. The author of the letter below responded to that request and presented some other interesting information. I wrote a follow-up to that letter with a request for other information I thought he might be able to make available to me. The letter below was received in response to my request. Ed.

Dear Editor:

Responding to your letter of September 16, in which you requested information and data on two of my flowering crabapple originations, since the data you want is 100% botanical and since I have almost no interest at all in botany; there is really nothing more that I can provide for these botanical descriptions. As to information that would be of use and interest to the average gardener and to the "mainstream" ... I am the originator/discoverer/breeder of both 'Cl. Coralburst' and what you improperly refer to as "taxon 'Ross's Double Red.'" Both 'Cl. Coralburst' and the other one originated here approximately 1954; although I cannot give you an absolutely specific date because I worked with crabapples from 1949 on. 'Cl. Coralburst' was, in all likelihood an open pollinated seedling of Van Eseltine as ... I believe that the other one was as well but cannot state this positively as I grew thousands of seedlings during these years ... a great many of them open pollinated seedlings of Van Eseltine which could have been pollinated by any one of several hundred other crabs in our plantings here. 'Cl. Coralburst' was introduced by Cole Nursery on 1969 but your description listing the name 'Coralcole' as the varietal name of this variety; is completely wrong since the word Coralcole was first coined by Robert Lyons in 1989 ... a great many years after it had been registered officially under the varietal name of 'Coralburst'. This matter is still in litigation and I am confident that the eventual ruling will confirm that 'Cl. Coralburst' is ... in fact ... the varietal name and if there is a Trademark name for it; that Trademark name is and must be Coralcole.

As to 'Ross's Double Red' ... I gave to Father Fiala a great many of my selected crabapples for evaluation and he used some of them in his breeding program. Without seeing this plant, I cannot state positively but suspect that this is the one I gave to him which I was then referring to as 'Cl. Bluebeard' because it had a distinct blue bloom on the fruit ... much like that on a plum.

I very vigorously object and disagree with your usage of "TRADE NAME" for these flowering crabapples as well as for anything else. That is completely wrong. There is no such thing as a Trade Name and your use of this has done enormous damage to the world of Horticulture. It is the cause of much of the confusion and impropriety which now exists because you have accepted this completely improper classification.

I also object to your usage of the term TAXON. Although this is a valid usage in botany . . . it is totally useless and irrelevant to the gardener and plantsman ... the "mainstream" to which I had previously referred. The reason that you have been unable to "We don't know how to reach them with the resources at our disposal"... is that you have ignored the needs of the "mainstream" and catered solely to the desires of the botanists ... something that is self-destructive.

The last point of your letter that I wish to comment on is your statement that "I found errors on more than half of the pages (See Editor's response). Tom Green also found many taxonomic errors." It would be fully acceptable for you to say "Tom Green and I do not agree with much of what Father Fiala wrote in his book" but it is completely unacceptable arrogance to say that he was wrong and you are right. Father Fiala knew more about flowering crabapples than all of the botanists in the world put together and I will always accept his opinion rather than those of any botanist or group of botanists. Because his book is a horticultural monograph and not a botanical one; Father Fiala WAS in touch with the "mainstream," something that you are not.

As to your telling me that this book will be coming out shortly and without correction ... I feel certain that the pressure I have put on Timber Press had a lot to do with this decision. I have steadfastly told them not to dare change anything said by Father Fiala and that if the botanists disagreed with what he had said, they should write their own book and not butcher what he had said. I was annoyed by ... but accept ... their revelation that this book will contain a preface which will state that they do not agree with what he had written but are publishing it as written by him anyway. I hope that this is true although the letter I got from them last week said that "the book has greatly benefited from editing which they had done." Benefit to whom???

Your reference to "SYNONYM: Ross' Octoploid" is another example of what you are doing that is totally wrong. Ross's Octoploid is NOT the name of a plant. I had told Father Fiala that I am convinced the Coralburst is a polyploid and probably an octoploid. He was merely repeating this and not using the term Ross's Octoploid as any kind of a name. It was an opinion and NOT a name. If this is an example of the kind of "editing" that Timber Press did to this book may heaven help us all.

I will never understand how botanists are able to screw things up so badly and fail to see, or understand, what they are doing wrong. How can you possible reach the "mainstream" when you totally ignore the mainstream's interests and needs?

Yours truly,

Henry A. Ross

P.S. You are welcome to publish this letter in your bulletin . . . if you dare!

Editor's response

In reviewing the final publication of Fr. Fiala's book, I find that many of the problems have been addressed by the Editor of the publication. It should be noted that the name "Ross's Octoploid" is recognized as a synonym of Coralburst in Fiala's book "Flowering Crabapples - The Genus Malus"

Your comments are solicited. Editor.

Executive Director's response:

Letters to the Editor like the one submitted by Mr. Henry Ross are always welcome. However, we have not ever had anyone dare us to print their letter.

In 1753 Carl Linnaeus gave us an orderly system of plant (and animal) classification. Before the time of Linnaeus, plants were usually described with a single name followed by a set of descriptive nouns and adjectives. One plant could have hundreds of common names. Plant nomenclature was a mess. Linnaeus gave plants (and animals) two Latin names, the first, the genus (a group of closely related species clearly marked off from other groups) and the second, the species (a group of closely related individuals; the unit of classification; often considered to cross sexually with each other and not with other species). This is referred to as Binomial Nomenclature.

There are a relatively small number of crabapple taxa (sorry Henry, I'll explain the need to use this term below) that are from known crosses. However, most crabapples were introduced from open pollinated selections. In these cases parentage was not known to the originator. Sometimes the trees were observed for some time before given a name and were given a number or nursery name in the interim (e.g., "Tom's Pink," a tree under observation at Simpson's Nursery). If the tree appeared to be worth introducing, it was given a Trade Name, *i.e.*, a name sold in the nursery trade. Sometimes the tree was grown at an arboretum, botanic garden, university, or other nursery with its nursery name or number. This made the plant fair game for introduction by anyone who felt it worthy of introduction. Therefore, plants like 'Ellwangeriana' may have been renamed and introduced as 'Beverly' (we think they are one and the same). Sometimes people changed the name, such as 'Pretty Marjorie to 'Marjorensis Formosa' (which means Pretty Marjorie in Latin). For the most part, crabapple originators did not bother giving their introduction its proper taxonomic nomenclature or taxonomic description.

Plant patenting does not provide assurance of a proper taxonomic description. It is more concerned with a legal description that is intended to allow for identification so that someone cannot propagate the plant under another name. It is interesting to note that there are three different crabapples called 'Cardinal', and two of them have plant patents (See MALUS Vol.6 No. 2).[1]

Mr. John den Boer is working very hard on a Crabapple Encyclopedia, to make some sense out of the 900+ crabapple taxa. The Crabapple Encyclopedia will standardize the taxonomic description of each taxon and provide historical information. (see MALUS Vol.5 No. 2 and MALUS Vol 7 No. 1 for additional information). The crabapple taxonomy is a mess partly because there was little or no interest or background in taxonomic nomenclature on the part of most originators/ discoverer/ breeders. There is also a lack of documentation on dates, sources, and other valuable information about crabapples and their origin. Mr. Ross's letter was a response to John den Boer's attempt to find out information from the originator/discoverer/breeder of 'Coralburst' and other Henry Ross introductions. There are not that many originators/discoverer/breeders of the 900+ taxa that are still alive. It is nice to be able to go directly to the source. The IOCS is thankful to Mr. Ross for providing this information about his introductions.

TAXON (singular), TAXA (plural)

Mr. Ross objects to the usage of the term TAXON. He doesn't think the "mainstream" should use it. We are now in a computer age whether we want to be or not. We have a problem categorizing all of the crabapples under one heading. There is one Genus, *Malus*. They are all *Malus*. We cannot give all the crabapples a heading of SPECIES. In fact, there are less than 50 species, *e.g.*, *M. floribunda*. We cannot give them a VARIETY heading. Varieties are subspecies, and there are even less of them than species, *e.g. M. halliana* var. *parkmanii*. We cannot call them all CULTIVAR. Cultivars are cultivated varieties, usually vegetatively propagated, but some cultivars can come from seed. Cultivars are some selection of a species or variety. Now we have crabapples with names that are trademarked and registered (see MALUS Vol 6 No. 1 and Vol 6 No. 2). There are very few of those. We cannot use the category COMMON NAME for obvious reasons. What can we call them all? Ed Hasselkus, Extension Horticulture (Emeritus), University of Wisconsin, introduced me to the term TAXA for encompassing all crabapples many years ago. I have been using it ever since.

TRADE NAME

I would be interested in Mr. Ross's objection to this term. "There is no such thing as a Trade Name and your use of this has done enormous damage to the world of Horticulture". What harm are you speaking of? Mr. Willet Wandell has written a book

on cultivars,entitled "Handbook of Landscape Cultivars." In this book, Mr. Wandell uses the name "Trade Name". This is the name that you find the plant as it is sold in the nursery trade. This is especially useful for Trademarked and Registered plants which are given unfamiliar or odd-sounding cultivar names, *e.g.* 'Sutyzam' for Sugar Tyme™. The Trade Name provides one category where you can list all crabapples whether they are a species, variety, cultivar, trademarked/registered or whatever. The Trade Name is a way to standardize a common name.

We are trying to standardize crabapple taxonomic descriptions and nomenclature. The Crabapple Encyclopedia is intended to be a model for other plant societies to help standardize the taxonomic descriptions and nomenclature for genera with large numbers of taxa. Our goal is to develop a computer CD ROM which will contain sufficient information so that someone can look at one of Mr. Ross's fine crabapple introductions and be able to identify it, and tell something about its origin and its originator. Currently, there are no keys to identify all crabapple taxa.

Final thoughts: Mr. Ross has "almost no interest at all in Botany;...". Yet his world, Horticulture, is a small subunit of Botany. We need a forum for exchange and a place to grow in our knowledge of this vast universe. MALUS is only making a small dent in increasing our knowledge about the interesting plant we call a crabapple. I hope that the "mainstream" shares this opinion. Mr Ross was also very critical of comments John den Boer made to him about taxonomic errors in Father Fiala's book and wanted us to rephrase our comments with the following derogatory words about the book, "Tom Green and I do not agree with much of what Father Fiala wrote in his book". John den Boer and I had an opportunity to see the manuscript before its printing, and I do not believe Mr. Ross had any access to a manuscript. There are errors in Father Fiala's taxonomy. He was not a taxonomist, and he was very near the end of his life at the time he completed his book. He did not have the time to have his manuscript edited for taxonomic correctness, and John and I and the rest of the IOCS Board of Directors wanted to see the book go forward rather than try to correct it. Mr. Ross, if you saw something that was in error, like calling 'Coralburst' 'Ross's Double Red', wouldn't you like to see it given a correct name? There is a lot that is good and correct in Father Fiala's book. It is very needed. We haven't ever had a crabapple book with colored photographs before. Besides, how many books are published in first printing that have no errors? The taxonomic errors can be corrected by the readers which will make later editions of Father Fiala's book even better.

(1) Mr. Ross at one time was an active member of our Society, which even helped him obtain a plant patent on his crabapple 'Coral Cascade', but he has chosen to drop his membership, thus denying him further enlightenment about the world of crabapples.

MALUS OBSCURUS - ELEYI CRABAPPLE

John H. den Boer

The crabapple that is known today as the Eleyi Crabapple has two apparent beginnings, one in France and one in England. There was a crabapple identified as *M. atropurpurea* listed in the 1904-05 catalog of Croux & Fils Nursery located in France. There is no description given of this crabapple other than "Rouge pourpre." Interestingly enough, as late as 1941 there was no descriptive information in any horticulture literature about M. atropurpurea. The Croux & Fils Nursery also identified this crabapple as *M. cerasifera atropurpurea.*

Atropurpurea reached the shores of USA on or before 1915. By the early 1930's , some nurseries sometimes sold the Purple Crabapple or Niedzwetzkyana Crabapple as *M. atropurpurea.* The trees of *M. atropurpurea* grown in Des Moines and thought to be properly identified had characteristics similar to Niedzwetzkyana except that the fruit was smaller and was round to oblate.

Malus purpurea 'Eleyi' was raised and introduced before 1920 by Charles Eley in Suffolk, England. Arnold Arboretum introduced this crabapple into the United States in 1921. Descriptions of this crabapple were available in 1920 (W. J. Bean, Gardener's Cronicls (of England) LXVIII). It had reddish leaves similar to Niedzwetzkyana, and many other characteristics like Niedzwetzkyana, except for the fruit that was much smaller and elongated. Eleyi Crabapple is a cross of *M. pumila* var. *niedzwetzkyana* and *M.* x *atrosanguinea.*

Trees purchased as Eleyi by my father and planted in Des Moines, Iowa did not produce fruit that met the description of Eleyi. The fruits from these trees were identical in size and shape to those of *M. atropurpurea.* The assumption was made that there was the usual mix-up in the nurseries and that they had not gotten the tree properly identified. Upon further searching, my father found that the only locations in the United States where there were crabapples named Eleyi that had the properly shaped fruit were at San Francisco and in the state of Washington. The problem was, that when trees were grown in Des Moines from buds taken from these location, the fruit turned out to be the same as the fruit from *M. atropurpurea.* Worse, my father found that when he sent trees propagated in Des Moines from *M. atropurpurea* to San Francisco, the fruit from those trees in San Francisco had the proper shape of Eleyi. See Figure 1.

In his travels in Europe, my father found that the fruit of Eleyi was ovoid in England and in Holland it was either ovoid, oblate, or ellipsoid. Clearly the fruit of this tree was not consistent in shape. It depended entirely upon where this tree grew. The only conclusion that could be made from this was that Eleyi and *M. atropurpurea* were the same crabapple. The conclusion that these two crabapples were the same came between 1945 and 1948. But I am getting ahead of myself.

In 1943, Donald Wyman was preparing for his first edition of "Crab Apples for America." The name, "*M. atropurpurea*," was not a proper name for a variety. My father proposed giving the name "Jay N. Darling" to this crabapple. Mr. Wyman accepted the idea, but gave the tree the name of "Jay Darling." "Ding" Darling was the first president of the Des Moines Men's Garden Club, a syndicated cartoonist, a conservationist, guided the funding of the Migratory Bird Hunting Stamp Act, and designed the first Federal Duck Stamp.

This tree is identified today as *Malus* x *purpurea* (Barbier) Rehd. var. *eleyi* Bean, or Eleyi Crabapple. Synonyms include:

Eley
Jay Darling
Malus x atropurpurea
Malus cerasifera atropurpurea
Malus Eleyi Hesse
Malus purpurea var. Eleyi Rehd.
Malus sylvestris var. Eleyi Bailey
Pyrus eleyi Bean

No correspondence is known by me that makes a connection between Charles Eley and Croux & Fils Nursery. Regardless of the lack of evidence that such a connection exists, the following are assumed to be correct:

Originator: Charles Eley
Parentage: *M. baccata* X *M. pumila* 'Niedzwetzkyana'
Introducer: Croux & Fils
Year Introduced: 1904
Named For: Charles Eley, Suffolk, England

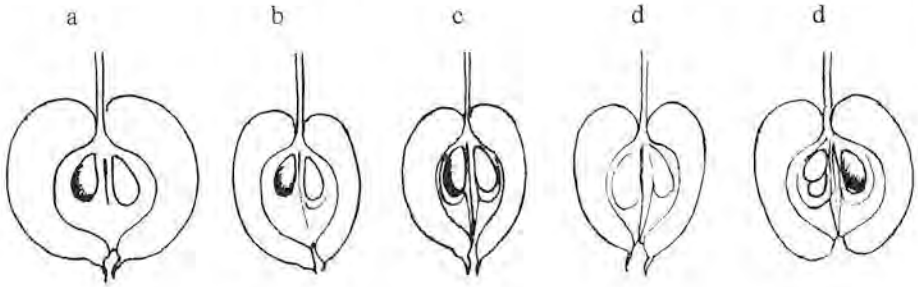
There are many similarities between Eleyi and other red-leaved crabapples. Some characteristics that differentiate Eleyi from the others are:

Purple Crabapple always has a persistent calyx; Eleyi is almost always deciduous.
Aldenham Crabapple has flattened fruit with a persistent calyx, and fruit color is brownish-red.
Red Silver Crabapple is upright and has smaller and darker colored fruit.
Lemoine Crabapple has large bronze-purple leaves.
Niedzwetzkyana has fruit about 2 ½" in diameter, whereas Eleyi's fruit is less than 1".

Eleyi Crabapple is an outstandingly beautiful crabapple, especially in the spring. The blossoms are produced in masses even by young trees. The tree blooms early. The flowers are purplish-red at first, and then gradually become lighter in color. The fruits are bright purple-red with red-tinted flesh, and about 1.8 cm in diameter. The length is more to less than the diameter depending upon where it is growing. The fruit is excellent for jelly, and if left on the tree is enjoyed by the birds. The leaves are purplish to bronze. The tree is medium in height, reaching to about 25 feet at maturity. It becomes a round-crowned tree that any owner would be proud to own.

It appears to be resistant to Cedar Apple Rust, Powdery Mildew, Fire Blight and Frog Eye. It is moderately susceptible to Scab. Because of the dark colored fruit, the tree is not as outstanding in the fall as some other trees.

Fig. 1 Typical Cross-sections of *Malus* x *purpurea* var. *eleyi*



a) Des Moines, Iowa
b) San Fransisco, California
c) Kew Gardens, England
d) The Netherlands

BLOSSOM TIMES

John H. den Boer

One good characteristic about crabapples, in general, is their extended blossoming period, approximately thirty days or more. It is often desirable to have, especially in a small garden, apple trees that bloom at different times so that the total blooming period is as long as possible. Choosing crabapples so that this can be done requires that the relative blossoming periods of the crabapples in question are known. This information is not always available.

In my work developing information about crabapples I found that blossom times were reported in different ways, and sometimes not consistently. The more usual way to report blossom times is ordinally: early, medium, late, etc. The problem with this manner of reporting is that there is no general agreement about what is a given blossom period. This results in one person, for instance, reporting that a crab blooms "early" and another reporting that it blooms "very early."

My father collected blossom dates on 219 crabapples over a period of eight years. I found that, when adjustments were made for variation in the length of the blooming season that the average lengths of each period were as follows:

Earliest	1 day
Very early	4 days
Early	3 days
Medium	3 days
Late	11 days
Very late	15 days

Most of the time, when the blossom times of two different crabapples are observed, one blooms before the other. This is especially true if there is a big difference in the blossom time. When the difference is a few days, it becomes more difficult to predict which of the two trees will bloom first. However, when selecting crabapples based on blossom time, this variability within a few days is not important. What is important is being able to select trees that will come into bloom six or seven days apart or more.

I developed a "Blossom Time Index" from my father's data that would make a more definitive statement about the blossom times of crabapples. This Index was developed using the blossom time dates that my father recorded in an 8-year period. It represents,

on the average, the number of days after the first crabapple blooms when the crabapple in question blooms. For instance, the Index for the Manchurian Crab is 0. It is the first to bloom. The Index for Bechtel Crab is 19.6. This suggests that the Bechtel Crab comes into bloom about 19½ days after the Manchurian Crab blooms. On the average, the Italian Crab comes into blossom 37 days after the Manchurian Crab does.

A test was made to find the accuracy in the predictions of the Index as compared to the actual blossom dates. The following resulted in this test:

99% of predictions were within 6 days
96% of predictions were within 4 days
85% of predictions were within 2 days

To the best of my knowledge, there is nothing published about blossom times for many of the 219 crabapples covered in the study done by my father. I took available data on published blossom times, which was reported ordinally, compared that data with the Blossom Time Indices that I developed, established boundaries within these Indices that would represent the various ordinal periods and then applied the appropriate ordinal value to each of the crabapples for which ordinal values did not exist.

Listed below and on the following pages are crabapples reported by various people to bloom in each category shown on page 10. Included with the listing, when it is available, is the Blossom Time Index (BTI) developed from the blossom dates collected by my father. An asterisk following a name shows that the name is listed once or twice more under other period(s).

BLOSSOM PERIODS FOR CRABAPPLES

EARLIEST

BTI	Name	BTI	Name
2.9	Chilko	0.0	Manchurian
	Gibbs' Golden Gage	3.8	Midget *

VERY EARLY

BTI	Name	BTI	Name
3.2	Astracan	4.3	Nippon
5.6	Cherry	5.6	Peachleaf Cherry *
5.5	Delite	6.0	Prunifolia Maliformis
6.0	Des Moines	5.2	Purple
4.7	Dolgo		Renee
5.7	Flexilis		Siberian
5.9	Hopa	6.0	Simcoe **
4.5	Jewell	5.7	Tayeshnoie
4.3	Kingsmere	5.3	Wabiskaw
3.8	Midget *	6.0	Young America
4.6	Montreal Beauty *		

EARLY

BTI	Name	BTI	Name
	Adams *		Cornell
7.3	Alexis	9.0	Cowichan
	Amisk	9.0	Crimson Brilliant
8.2	Amur	8.7	Dartmouth
6.2	Armeniacaefolia	7.4	Dauphin
7.8	Arrow *	8.0	Echtermeyer
	Aspiration	8.3	Edulis
8.1	Athabasca	8.0	Eleyi
8.5	Bedford	7.1	Ellwanger
8.7	Brier	8.0	European Wild
7.4	Carmel	7.5	Fairy
6.3	Cheal's Crimson	6.4	Flame *
9.0	Chinese	7.6	Florence
10.4	Chinese Pearleaf *	8.3	Gibb
8.6	Column Cherry		Gold
8.6	Column Pearleaf	7.5	Gurney Sweet
6.9	Column Siberian		

EARLY

BTI	Name	BTI	Name
8.8	Halliana Spontanea *	8.8	Praecox
7.7	Hartwig	8.9	Prolific
6.1	Himalayan	7.1	Prunifolia Dulcis
7.7	Izo	6.5	Prunifolia Lutea
8.8	Jack	6.6	Prunifolia Macrocarpa
7.2	Joan	8.5	Redflesh
8.8	Keo	6.2	Robin
7.2	Kit Trio	9.0	September
8.6	Kornik	6.8	Severn
7.2	Lady Northcliffe	8.5	Silvia
6.4	Linda	6.0	Simcoe **
8.1	Magdeburg	9.0	South Dakota Ben
8.5	Makamik		Strathmore
8.6	Malifolia	7.0	Tanner's Variety
8.2	Manchu	8.9	Tea
7.6	Martha	8.8	Thomas Roland
4.6	Montreal Beauty*	8.1	Timiskaming
6.7	Mrs. Bayard Thayer	7.7	Tolsteme
7.0	Nertchinsk	6.4	Virginia Seedless
8.6	Niedzwetzkyana *		Walters
7.1	Orange	8.6	Whitney
5.6	Peachleaf Cherry*	8.2	William Sim **
6.2	Pearleaf	7.1	Yellow Siberian
	Pink Cascade	8.1	Zita

MEDIUM

BTI	Name	BTI	Name
	Adams*	9.1	Carmine
	Amberina	10.2	Cashmere
9.7	Arnold		Centurion
7.8	Arrow **	9.6	Cerasiformis
	Autumn Glory	10.7	Chinese Double
	Beverly		Flowering
10.9	Bloomless	10.4	Chinese Pearleaf*
9.8	Cal Trio		Coral Cascade

MEDIUM continued

BTI	Name
9.9	Costata
	David
9.4	Denticulata
	Donald Wyman
9.3	Double Flowering
9.6	Dwarf Siberian
	Edna Mullins
10.3	Evelyn
10.0	Exzellenz Thiel
6.4	Flame *
10.8	Gloriosa
	Golden Hornet
8.8	Halliana Spontanea *
	Indian Magic
9.3	Irene
10.1	Japanese Flowering
	John Edward
9.6	John's
9.4	Katherine
10.6	Kelsey (floribunda)
9.3	Late Hyslop
10.1	Laurifolia
9.2	Lee Trio
	Liset
	Louisa
9.4	Nancy Townsend
8.6	Niedzwetzkyana*
9.1	Norman
10.1	Olga
9.1	Osman
10.8	Parkman
	Pink Princess
10.2	Piotosh
9.9	Printosh
9.6	Profusion
10.5	Quaker Beauty
9.4	Queen Choice
10.5	Red River
9.5	Red Silver
	Red Swan
12.0	Red Tip
9.2	Redbud
10.7	Rosilda
	Rosseau
9.9	Scheidecker
9.1	Seafoam
	Shakespeare
6.0	Simcoe**
	Sinai FIre
	Snowdrift
10.5	Snyder
	Sparkler
	Spring Song
10.5	Strawberry
10.8	Striped Beauty
9.3	Sugar
9.6	Toshprince
10.9	Tschonoski
9.2	Upsaliensis
10.4	Van Eseltine
9.7	Veitch's Scarlet
	Weeping Candied Apple
	White Angel
10.1	Wild Red
10.4	William Anderson
8.2	William Sim**
11.0	Yellow Fruited Pearleaf

LATE

BTI	Name
	Adirondack
11.2	Aldenham
22.6	Allegheny
7.8	Arrow **
19.6	Bechtel *
17.5	Biltmore
17.2	Buncombe
	Callaway
	Cardinal (Wellington)
21.7	Charlotte
17.0	Cutleaf
12.4	Dawson
	Doubloons
12.7	Dunbar
11.4	E. H. Wilson
15.1	Elise Rathke
	Fuji
11.5	George Eden
18.2	Georgia
12.6	Giant Wild
16.9	Great Lakes
	Guiding Star
12.0	Halls
	Harvest Gold
14.1	Hoopes
14.4	Integrifolia
18.5	Kansu
11.3	Kola
11.2	Lisa
17.4	Macrocarpa
12.0	Marshall Oyama
	Mary Potter
14.8	Mathew
14.1	Nevis
22.8	Nieuwland
21.0	Nova
13.4	Oregon
15.7	Palmer
12.6	Pinkbud Sargent
	Pixie
15.7	Prairie
	Prince Charming
11.2	Purple Wave
	Red Splendor
12.0	Red Tip *
20.1	Rehder Sweet
	Royal Ruby
12.6	Sargent
	Sentinel
	Silver Moon
15.6	Sissipuk
	Snow Magic
12.4	Soulard
21.1	Spinosa
20.8	Tibetan
12.4	Tree Toringo
	Velvet Pillar
15.2	Wild Sweet
8.2	William Sim **
13.2	Winter Gold
11.7	Wynema
11.5	Zumi

BLOSSOM PERIODS FOR CRABAPPLES Continued

VERY LATE

BTI	Name	BTI	Name
19.6	Bechtel*	26.8	Prince Georges
37.1	Florentine	29.0	Southern
26.5	Fringepetal	26.6	Veitch
24.4	Honan		

Three crabapples are listed in three blossom periods. They are:

Arrow
Simcoe
William Sim

Based on the Blossom Time Indices for these crabapples, it is my opinion that Arrow and William Sim should not be considered a Late bloomer and Simcoe should not be considered a Medium bloomer. If these corresctions are made, then the Blossom Time Indices for the various periods would vary as follows:

Earliest	0.0 to 3.8 days after Manchurian blooms	
Very Early	3.2 to 6.0	"
Early	6.0 to 10.4	"
Medium	9.1 to 12.0	"
Late	11.2 to 22.8	"
Very Late	19.6 to 37.1	"

Your assistance is asked to help in identifying blossom periods for any crabapple not listed above. If you are aware of any information that is missing from the above list, please advise the writer.

IRRIGATION AND CRABAPPLE GROWTH

R. Kjelgren, C. Spihlman and B. R. Cleveland
Department of Plant and Soil Science
Southern Illinois University, Carbondale, Illinois

This study indicated that, even when irrigated, trees produced in field nurseries with in-ground fabric containers grow less than those conventionally produced without fabric containers. Trees in fabric containers appear to be subject to more severe water stress during periods of low rainfall due to fewer roots exploiting soil water outside the container, which can further limit growth. These results suggest that more frequent irrigation may often be necessary for trees produced in fabric containers to compensate for a diminished volume of available soil water and thus sustain optimum growth.

In-ground fabric containers are proposed as an enhanced method for producing field-grown nursery stock. In contrast to conventional production by direct planting of plant material into the field, the non-woven, synthetic-fabric container encloses the root system with soil in the field. This confinement constricts large-root penetration into soil outside the container and promotes root branching inside the container. Consequently a tree produced in a fabric container has a smaller root ball that is easier to harvest and handle than conventionally produced plants of similar size.

In-ground fabric containers appear, however, to be an alternative to, rather than an enhancement of, conventional field production. Planting with fabric containers is more difficult because management is needed to avoid reported reductions in top growth. Fertilization practices may need to be adjusted, but whether irrigation practices too may need adjusting has not been examined.

Root restriction would logically affect the volume of soil roots can exploit, likely creating a smaller reservoir of extractable soil water. In turn, this could lead to more rapid soil-water depletion, more frequent tree water stress, and potential growth limitation when other conditions are managed for optimum growth. More frequent depletion of soil water to stressful levels can be avoided by nurseries with permanent irrigation systems, but for those in moderate-to-high rainfall regions that rely on temporary irrigation systems on an as-needed basis, more frequent irrigation could increase costs. In either case knowledge of the potential for water stress can be used to make informed management decisions regarding tree production with in-ground fabric containers. The objective of this study was to determine if trees produced with in-ground fabric containers in a field-nursery setting are more subject to water stress than those conventionally produced without fabric containers.

This study was conducted on a Hosmer silt loam (fine-silty, mixed, mesic, Typic Fragiudalf) with a water holding capacity of approximately 0.2 m/m (2.4 in/ft) in the 0.6 m (2 ft) topsoil layer. The experiment was laid out in a complete-block, split-plot design with five replications, and randomly assigned treatments were +/- irrigation main plots and +/- in-ground fabric-container subplots. Three-year-old, clonally propagated *Malus* x *zumi* grown in 11 L (3 gal) containers in a peat:Perlite (1:1 by vol.) mix were transplanted into either 0.36 m (14 in) fabric bags located in a 0.6 m (2 ft) wide weed-free tree row in early September 1990 and backfilled with native soil, or were planted directly into native soil to emulate conventional production. Trees were spaced at 1.5 m (5 ft) within the row, and main plots were separated by three border trees to limit subsurface water movement. The tree row was mulched to 0.1 m (4 in) depth with wood chips, and further weed appearance was controlled with a directed post-emergent, non-selective herbicide (Glyphosate). All trees were fertilized with 56 g (0.125 lb) of actual N per tree applied as ammonium nitrate in mid-November 1990. Both treatment and border trees in the irrigated treatment were drip irrigated daily during the 1991 growing season with one emitter located at the base of each tree. Initially 3.9 L (1 gal) were applied, but after detecting incipient water stress in late June we increased this to 7.8 L (2 gal) per day. The border trees were not irrigated with the non-irrigated treatments.

We measured seasonal changes in water relations of the treatments to assess development of water stress. Starting in mid-June predawn water potential (Ψ) was monitored every 1.5 - 2 weeks during the growing season. A single leaf was excised from each tree before dawn, immediately sealed in an aluminum bag, and returned to the laboratory for measurement with a pressure chamber, usually within an hour (model Arimad II, Kfar Charuv-Water Supply Accessories, Ramat Hagolan, Israel). At midday, between 12 noon and 2 PM, we also measured stomatal conductance(g_s) on three dates, and Ψ on two of those three dates. Water potential was measured as previously described, and g_s was measured with a steady-state porometer (Model 1600, LI-COR Inc., Lincoln NE) on four representative, fully illuminated, mature leaves per tree. During the study period we collected daily rainfall amounts from a weather station approximately 4 km (2.5 miles) away from the experimental site.

Integrated tree responses to irrigation and fabric-container treatments were measured in late summer and early fall. In late August osmotic adjustment was determined from pressure volume curves. Approximately 0.3 m (1 ft) shoot of current-year's growth was excised from each tree predawn and recut under water to remove cavitated vessels in the lower 0.1 m (4 in) of stem. Foliage was then enclosed with plastic wrap and allowed to rehydrate. After 24 hours of rehydration we took paired weight and Ψ measurements on a single excised leaf from each treatment until the range of the pressure chamber was exceeded. Osmotic potential Ψ at saturation was calculated as the y-intercept of the linear portion of the resulting pressure-volume curve.

In early October all trees were cut at the soil line, and current-year trunk growth was measured on a 25 mm (1 in)- thick basipetal cross section. All foliage was harvested,and leaf area of a random 25-leaf subsample was measured with a leaf area meter (Model 3000 LI-COR, Lincoln, NE), and the subsample and bulk foliage sample were dried at 60°C (140°F) for two days and then weighed. Total tree leaf area was calculated as the sum of subsample leaf area plus the product of subsample specific leaf area (m^2/g) and bulk foliage weight. Finally, we excavated root balls and counted the number of roots $\leq$ 2 mm (0.08 in) in diameter that exceeded the 0.18 mm (0.07 in) radius of the fabric container. For trees not in fabric containers a root ball larger than the radius of the fabric container was dug, and then the roots that passed through a vertical plane equal to the container radius were counted. Water relations and growth measurements were compared among treatments with analysis of variance (SAS Inst. Inc., Cary NC) appropriate for a split-plot design.

Rainfall in 1991 during the study period was characterized by an extended dry period during the growing season (Fig. 1). June was particularly dry, as only 12 mm (0.5 in) of rain fell, and July and August were slightly more moist with 36 mm (1.4 in) and 42 mm (1.7 in), respectively. This region on average receives 100-150 mm (3-5 in) of rain per month during the summer, and low rainfall during 1991 affected tree/water relations. All crabapples depleted soil water to deficient levels in late June as predawn Ψ fell below -2 MPa in the non-irrigated trees.

While more negative predawn Ψ within both irrigation treatments declined during periods, the non-irrigated trees were under greater water stress. Trees in fabric containers osensibly did not deplete available soil water in their root zones more reapidly than those not in containers, as there were no differences in predawn Ψ. Similarly, we did not detect any significant differences in midday Ψ between any treatments. The lack of differences was probably due to reduced transpiration in the non-irrigtated trees that moderated internalk water deficits

Midday g_s variation among treatments was similar to that of predawn Ψ (Table 1). Irrigated treatments exhibited g_s levels nearly an order of magnitude higher than those in the non-irrigated treatments, but again we did not find any effect of the fabric containers. Incipient water stress is most evident in midday stomatal closure, and due to progressive closure midday g_s becomes insensitive to increasing water-stress severity. Consequently stomatal sensitivity to soil-water status is then much more apparent during cooler mid-morning hours. Low g_s of the non-irrigated trees in June indicated that they were already under moderate water stress as a result of low rainfall the previous three weeks. It is possible that we missed potential effects of the fabric containers on mid-morning g_s on all three dates, particularly considering that several growth responses of trees in fabric containers were lower than those of trees not grown in containers (Table 1).

Irrigation and fabric-container treatments both had significant effects on integrated plant responses (Table 1). Trunk growth, and to a lesser extent leaf growth, of non-irrigated trees were less than the irrigated trees, consistent with the high sensitivity of expansive growth to water stress. Fabric containers reduced total leaf area and the number of roots above 2 mm in size, and resulted in more negative Ψ_x Less penetration of large roots through the container was expected because of the constricting effect of the fabric on radial root growth. Significantly more nagitive Ψ_x in both irrigated and non-irrigated trees grown in fabric containers indirectly indicated less root growth. Fewer roots as a result of the impeding fabric probably meant a weaker sink for carbohydrates, and the consequent solute build-up in the foliage could account for the decreased Ψ_x. Lower Ψ in the fabric-container trees may have resulted in higher predawn turgor potential from nighttime resaturation that obscured differences in predawn Ψ.

Reduced root growth resulted in less leaf total area of trees grown in fabric containers, consistent with other reports of reduced growth with production in fabric containers. This observed reduction in growth is possibly due to restricted nutrient uptake. Trunk growth, however, in the irrigated-container treatment was not affected., With adequate water for normal photosynthesis, a reduced root sink could have resulted in increased carbohydrate allocation to trunk development.

There was evidence that trees grown without irrigation in fabric containers were more subject to water stress, despite the absence of differences in water relations. The interaction between irrigation and fabric containers in midday g_s, growth responses, or Ψ_x, was not significant at P = 0.05, ostensibly indicating that non-irrigated trees in fabric containers were not under greater water stress. The data exhibit a trend, however, towards all growth responses and Ψ_x of the non-irrigated trees in fabric containers being lower than the other three treatments. In particular the Irrigation x Container interaction term for trunk growth and Ψ_x were both significant at P = 0.2. While the test for significance in this study did not achieve the prevailing level of certainty, a cautious approach towards this trend in the data is necessary.

Viewed another way, these data indicate that there was still an 80% probability that fabric containers caused less trunk growth in non-irrigated trees during particularly dry years, and such a trend would probably be compounded. Potentially a feed-forward cycle could be established where the smaller root system of trees in fabric containers without adequate irrigation would be less able to supply water to top growth. In turn less water would reduce leaf area and trunk growth, reducing carbohydrate production and further limiting root growth. Ultimately limited growth would likely extend the production cycle and add to grower costs. Production uncertainty with in-ground fabric containers could be reduced by greater irrigation frequency to compensate for the truncated volume of extractable soil water.

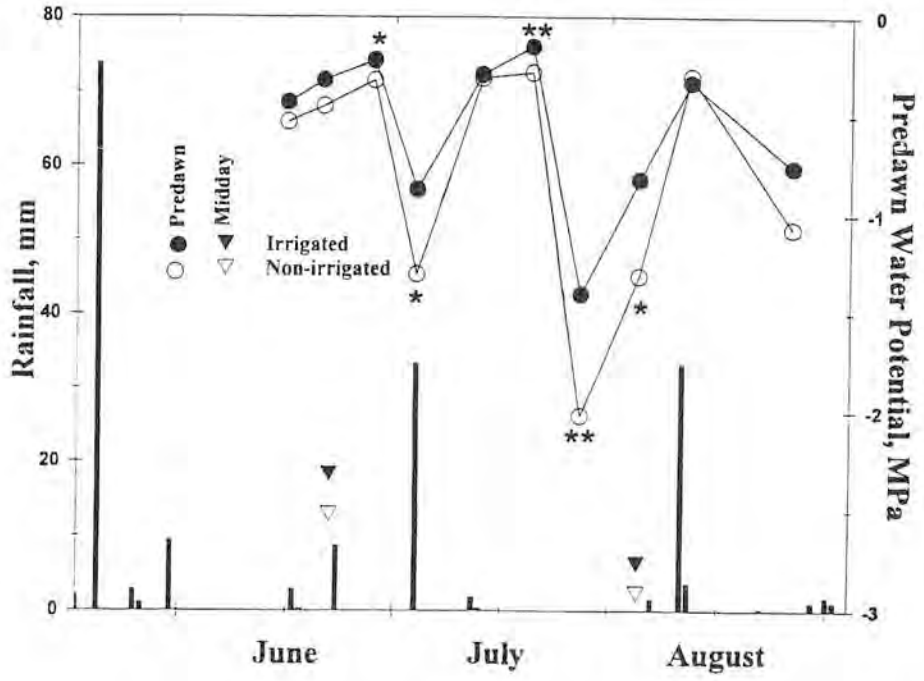


Fig. 1. Rainfall and predawn water potential for crabapples grown with in-ground fabric containers with and without irrigation. Asterisks (*,**) above and below the data points indicate significant (P=0.05,0.01, respectively) differences between irrigation treatments corresponding to the data collection date along the X-axis. On dates with no asterisks there were no significant differences between irrigation treatments. Data from fabric-container treatments are not shown because significant differences were not detected.

Table 1. Midday stomatal conductance on three dates, osmotic potential at saturation, and final leaf area, diameter increment, and root growth for irrigated/non-irrigated crabapples grown with/without in-ground fabric containers.

	Stomatal conductance		
	June 20	July 25	Aug 2
	mmole/m²-s		
Irrigated			
With container	250 ± 57	273 ±12	248 ± 12
Without	221 ± 17	250 ± 39	248 ± 31
Non-irrigated			
With container	25 ± 13	23 ± 15	30 ± 11
Without	32 ± 13	18 ± 13	26 ± 13
Irrigated[x]	**	**	**
Container	ns	ns	ns

	Osmotic potential[z]	Trunk increment	Total leaf area	Root number[y]
	MPa	mm	m²	#
Irrigated				
With container	-1.88 ± 0.2	14.8 ± 2.2	3.78 ± 0.68	71 ± 20
Without	-1.57 ± 0.3	14.9 ± 0.9	5.00 ± 0.88	120 ± 29
Non-irrigated				
With container	-2.35 ± 0.1	8.4 ± 0.5	2.79 ± 0.99	41 ± 15
Without	-1.65 ± 0.6	10.2 ± 0.8	3.43 ± 0.30	84 ± 39
Irrigated[x]	ns	**	*	ns
Container	**	ns	*	**

z At saturation
y Number of roots greater than 2 mm diameter exceeding 180 mm away from trunk
x**,*,ns=significance at P=0.01,0.5 and non-significant, respectively

FLOWERING CRABAPPLES
The Genus Malus
by
Fr. John L. Fiala

Review by John H. den Boer

The book that Fr. John Fiala wrote is now available from Timber Press, Inc. and other book stores. From an appearance standpoint, it deserves a place on the coffee table. The 245 colored photographs in the book are magnificent. No book that I know of on the subject of crabapples includes as much information about crabapples as this book does.

There are about 110 pages of descriptive information about crabapples. The care and propagation of the trees is discussed fully with suggestions included for proper handling of problems associated with propagation, diseases, and pests. Many suggestions are provided for the selection of crabapples for various purposes. Unfortunately, some of the crabapples, which happen to be those of his creation, are not available commercially.

Considerable space is devoted throughout the book on people and places that have contributed to the lore and development of crabapples. Fr. Fiala has been unsparing in giving credit where credit is due. This book is an excellent source for material on the history of crabapples. The listing of names is divided into two groups, the basis of which is not understood by me. The first list, as the author states, contains names of crabapples of "documented authentic origin." However, the second list contains many names that are included in Roland Jefferson's book "Crabapples of Documented Authentic Origin."

Fr. Fiala has proposed making changes in the naming of some crabapples, and changing the classification of others. His discussions will probably not have much effect with taxonomists who specialize in this study. It does make for interesting reading.

There are some errors in the descriptive data, some perhaps, because of assumptions he has made. For instance, he states that *M.* 'Abbondanza' is a synonym of *M.* 'Abundance.' This is not so. Abbondanza has red fruit about 4.8 cm in diameter. Abundance has dark red to purple fruit about 1.5 cm in diameter. There are also some inconsistencies with data in his book and other sources of information. An example, the parentage in the book for Spring Song is given as (*M.* 'My Bonnie' x *M. sieboldii*)

x (*M.* 'Dorothea' x *M.* 'Winter Gold'). In the Woody Plant Registration the parentage is given as: (*M.* 'My Bonnie' x *M. zumi*) x (*M.* 'Dorothea' x *M. zumi*). It is stated that Namew "does not appear to be any U.S. collection." My records show that this tree is located at the National Arboretum, University of Vermont, and at the Secrest Arboretum.

Many names show "Name only." I'm not sure what this means. Some of these names include information, generally about disease ratings. Descriptive data are available for about one-fourth of those crabapples. More than 10% of those crabapples have not been introduced. About 5% are apples.

The descriptions often include results of disease evaluations made by Les Nichols. Parentage is also generally included, when known. The descriptions normally include the size and color of the flower and the fruit, and size of the tree. Locations are identified where disease evaluations have been made. And often other comments are included.

Fr. Fiala has put much of himself into this book, including observations and opinions. His efforts to bring about new and better crabapples, through the use of a carcinogen without proper protection, could have led to his premature death. His fascination with the ploidy levels in plants led to his use of this chemical. He felt that higher ploidy levels would result when the flowers were treated with this chemical, and that this would lead to better plants. Nothing is mentioned about this chemical in his book, but he does mention the ploidy levels at every opportunity.

It is extremely unfortunate that all of Fr. Fiala's papers were lost in a fire. There is no way now to identify the sources of much of the information in his book, or to follow up on information alluded to in his book.

The Editor of this book is to be complimented. I found only one error in spelling. The letter "d" in the name "Den Boer" was properly upper case or lower case, except in the Index. The Editor is forgiven for this. This is a book every crabapple lover should have.

The book is available from better bookstores and garden centers, as well as directly from Timber Press, Inc., 113 S.W. Second Avenue, Suite 450, Portland, OR 97204-3527. Telephone Nos. (800) 327-5680, (503) 227-2878, Fax (503) 227-3070. Cost is $49.50 (to order direct form publisher, please add $6.50 for shipping and handling).

FRUITING OF ORNAMENTAL CRABAPPLES

John C. Pair and Linda R. Parsons

A comparison of over 50 cultivars of crabapples has been conducted for the past several years at the KSU Horticulture Research Center in Wichita, Kansas. New additions are received annually through the National Crabapple Evaluation Program (NCEP) sponsored by the International Ornamental Crabapple Society (IOCS). Flowering is of primary importance, but no less important are other attractive features that occur at other seasons of the year. The second most important time to view crabapples is the late fall and winter, when persistent fruits provide another dimension to the genus *Malus*.

Two factors were rated regarding the fruit on crabapples in the trial, namely display and quality through the season. Fruit display obviously is affected by the annual or bi-annual flowering habit of the tree. Display in Table 1 reflects the amount of fruit following the spring of 1993 flowering season. Most productive were cultivars Indian Summer, Indian Magic, Jewelberry, Sentinel, Sugar Tyme®, Christmas Holly™, Beverly, Centurion, David, Donald Wyman, Manbeck Weeper, Mary Potter, Midwest, and Ormiston Roy. Most persistent into March were Centurion, Donald Wyman, Indian Summer, Indian Magic, Sentinel, and Sugar Tyme®.

The quality of the fruit, including persistence, color retention, and overall attractiveness from October through March also was noted (Table 1). Cultivars with striking fruit early in October included Beverly, Christmas Holly™, David, Donald Wyman, Ellen Gerhart, Glen Mills, Harvest Gold™, Liset, Manbeck Weeper, Mary Potter, Molten Lava®, Naragansett, Red Barron, Redbird, Sentinel, Sinai Fire, Sugar Tyme®, Velvet Pillar™, Pink Satin, Redbud, and Purple Prince™. Best fruit quality in mid-March included Donald Wyman, Ormiston Roy, and Sugar Tyme®. (Table 1, Quality). Some cultivars, such as Spring Snow, have no fruit and are frequently used where any fruit would be a nuisance. Others, such as Snowdrift, have an excellent fruit crop early, which is preferred by birds. In fact, fruit is stripped from the trees by early autumn. No longer should the flowering crabapple be considered a messy tree, if the proper cultivar is chosen..

Table 1. Crabapple fruit display and quality ratings at Wichita, Kansas [1/]

Variety	Display		Quality		
	10/19/93	3/15/94	10/19/93	01/06/94	03/15/94
Adirondack	1.0	0.7	4.3	2.0	1.3
Beverly	5.7	4.0	6.0	2.3	2.3
Burgandy	3.5	4.5	3.5	3.0	2.0
Candymint Sargent	0.0	0.0	0.0	0.0	0.0
Centurion	5.3	6.0	6.5	4.7	3.3
Christmas Holly™	7.0	2.0	7.7	1.3	2.0
David	6.5	3.5	7.0	3.5	2.0
Donald Wyman	6.0	8.0	8.0	9.0	6.0
Doubloons	2.7	1.0	3.0	2.0	2.0
Ellen Gerhart	5.0	2.0	8.5	3.5	2.0
Floribunda	1.0	0.3	1.0	1.7	1.0
Glen Mills	2.3	1.3	9.0	8.0	2.7
Golden Raindrops (young)	0.0	0.0	0.0	0.0	0.0
Golden Raindrops	0.3	0.3	3.0	1.0	0.7
Harvest Gold™	5.0	2.0	9.0	4.0	2.0
Indian Magic	6.0	7.0	7.0	6.3	3.7
Indian Summer	8.4	7.3	7.6	4.6	3.0
Jewelberry	8.5	5.5	6.5	3.0	2.0
Liset	3.0	1.9	8.0	1.5	2.0
Louisa (weeping)	3.3	0.7	5.3	1.0	1.3
Madonna	1.3	1.3	1.3	2.0	2.0
Manbeck Weeper	7.0	3.0	9.0	3.5	2.0
Mary Potter	7.0	3.0	8.0	3.0	2.0
Midwest	6.0	4.0	6.0	3.0	2.0
Molten Lava®	4.5	1.0	9.0	2.0	2.0
Naragansett	2.7	1.0	9.0	7.7	2.7
Ormiston Roy	5.7	4.7	8.0	7.7	5.3
Pink Princes	1.3	0.7	3.0	0.7	1.3
Pink Satin	3.3	1.0	8.3	2.3	2.0
Pink Spires	5.0	2.0	8.0	3.0	2.0
Prairie Maid	0.0	0.0	0.0	0.0	0.0
Prairifire	6.0	2.7	8.7	3.7	2.0
Purple Prince™	1.5	1.0	8.0	3.5	2.0
Radiant	2.3	1.3	2.0	2.0	2.0
Ralph Shay	4.0	3.0	7.0	5.0	3.0
Red Barron	5.0	6.0	8.0	6.0	4.0
Redbird	3.7	1.0	9.0	1.7	1.7
Redbud	0.3	0.3	9.0	1.7	0.3
Royal Ruby	1.0	1.0	1.0	2.0	2.0
Ruth Ann	1.5	1.0	2.9	1.5	2.0
Sentinel	7.0	7.0	8.0	5.0	3.0
Sinai Fire	3.0	1.0	8.5	2.5	2.0
Sprint Snow	0.0	0.0	0.0	0.0	0.0
Sugar Tyme®	6.5	9.0	8.5	8.0	7.0
Vanguard	5.0	2.0	6.0	3.0	2.0
Velvet Pillar	1.7	1.3	9.0	5.3	5.0
Walters	3.0	2.3	4.7	7.0	3.3
Weeping Candied Apple	5.0	5.5	4.0	2.0	2.0
White Cascade	0.7	0.3	4.5	0.3	0.7
NA40006	2.0	1.0	3.0	1.0	2.0

[1/] Display and quality were rated on a scale of 0 to 9, with 0 = poorest and 9 = best.

ROBERT C. SIMPSON HONORED

Bob Simpson was honored on September 25, 1994 with the dedication of a garden in downtown Vincennes. Mayor Belle Kasting presented Bob with a bronze plaque that was placed on a rock in the garden. Dallas Foster, IAN member, gave a presentation that described Bob's impact on the nursery industry. Bob is recognized throughout the country as an authority on ornamental crabs, deciduous hollies, and hawthorns. He has introduced many cultivars of these different ornamental plants. Bob was born April 2, 1906, in Vincennes. He grew up in the family orchard business. Bob graduated from Purdue University and during World War II taught hydroponics to the natives on Ascension Island. He is a retired Lt. Colonel in the US Air Force. Bob was IAN President in 1958 and won the IAN Award of Merit in 1973. Congratulations to Bob and his wife Jane.

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Front Cover Photo: *Malus* x *purpurea* var. *eleyi*