MALUS

International Ornamental Crabapple Society Bulletin

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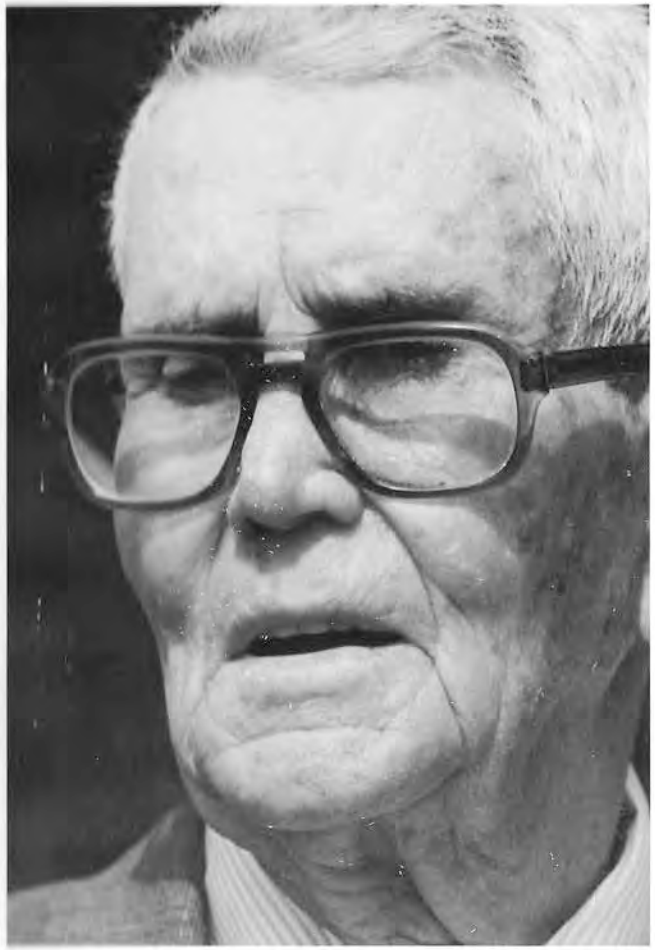

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INTERNATIONAL ORNAMENTAL CRABAPPLE SOCIETY BULLETIN

Spring 1996 **Volume 10, Number 1**

CONTENTS

FROM THE EDITOR

In the IOCS Board meetings last year, the members of the Board suggested that future issues of MALUS contain two articles about crabapples. Further, it was suggested that along with the articles about the crabapples, there be also included all known information about those crabapples. Those suggestions could not be carried out in the spring issue, and the fall issue was devoted entirely to information about diseases and aesthetic ratings. You will note that there is nothing in this issue about any specific crabapples either. James Chatfield has provided me with an article on *M.* 'Bob White' which will appear in the fall issue. To continue having these articles about specific crabapples, I will need your help. It is in the form of a write-up about your impressions of crabapples, along with a brief description, pluses and minuses, and other points of interest. I will include in the issue all of the information I have about that crabapple. The readers will then have a complete picture about the crabapples featured in MALUS.

There is another feature that the members of the Board suggested, which was a review of recent articles that have been published about crabapples. This feature will start with the next issue. You can help me with this by forwarding to me copies of any article you see that could be mentioned in MALUS. I will need the name of the article, author, a short synopsis of the article in just a few sentences, and the source of that article.

TO THE EDITOR

I am interested in a variety, or varieties, of crabapples that fruit like a Callaway but drops its fruit in October, November, or December and that is blight and scab resistant. I would also be interested in a pear or plum tree that would fruit this time of year. My interest in these trees is for wildlife food, specifically deer, in northern Mississippi and east central Alabama.

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If you can help Mr. Bailey, please drop him a line. Ed.

ROBERT C. SIMPSON

We are all saddened by the recent death of Robert C. Simpson. He died December 9, 1995 in Vincennes, Indiana. He is survived by Jane, his wife of 62 years, a son Thomas R. Simpson, daughters Susan Elliott, and Elizabeth L. Simpson-Marshall; six grandchildren; four great-grandchildren.

Mr. Simpson was born April 2, 1906 in Vincennes, Indiana. He was a graduate of Lincoln High School and Purdue University. He secured a Master's Degree in Plant Physiology in 1941 from Purdue University. He was commissioned in Field Artillery at Purdue in 1929 and served with the Army Air Force in World War II for four years with a final rank of Lt. Colonel. His total time of service in the military was about 32 years. Also, an interesting note is that he spent a year on Ascension Island, off the west coast of Africa, teaching hydroponics to the natives. This was a military activity, during the 1940's, right after WWII.

He was President of Simpson Nursery Company at time of his death. The company was founded in 1851 under the name of Knox Nurseries by Archibald Simpson, and has undergone several name changes and forms of business since then. At times the business specialized in the orchard business, and at other times it was a nursery. In 1968, when Robert C. Simpson became sole owner, the business became entirely a nursery business. He is the fourth generation to operate the business. He placed emphasis on one-year budded trees, especially crabapples and hawthorns. It was his intent to offer the most disease-resistant ornamentally fruited and fine flowering plants. The newest and best cultivars of ornamental pears were added later.

He served as President of the Indiana Association of Nurserymen in 1958, and was Editor of the Indiana Nursery News 1952-54.

Robert Simpson has been recognized for his work in the following ways:

The Holly Society of America
presented: "The Joseph C. McDaniel Award"
for:"outstanding contribution and dedicated service to the Great Rivers Chapter"
date: October 14, 1989

Indiana Association of Nurserymen
presented: "Nurseryman of the Year" award
for: "outstanding service to the Nursery & Landscape Industry of Indiana"
date: 1994-95

Indiana Association of Nurserymen
presented: "Award of Merit"
for: "Outstanding Service and Contribution to Horticulture in Indiana"
date: 1973

Kentucky Nurseryman's Association
presented: "Honorary Member"
for: "the many years of service to the nursery industry in Kentucky"
date: January 9, 1992

The Holly Society of America
presented: "The William F. Kosar Award"
for: "his outstanding work in the development and distribution of new, deciduous holly cultivars"
date: November 3, 1990

International Plant Propagators' Society
Elected a Fellow of the IPPS-Eastern Region
date: November 3, 1995

Mr. Simpson spent the past 35 years in breeding plants. The following plants have been introduced into the trade as a result of his work in this breeding:

CRABAPPLES
Brandywine
Burgundy
Canary
Centurion
Ellen Gerhart
Indian Magic
Indian Summer
Jewelberry
Prairie Maid
Ralph Shay
Red Barron
Royal Ruby
Sentinel
Silver Drift
Silver Moon
White Candle
Yellow Jewel

HAWTHORNS
Vaughn
Winter King

ORNAMENTAL PEAR

Earlyred

DECIDUOUS HOLLIES

Afterglow
Bonfire
Jim Dandy
Red Cascade
Red Escort
Sentry
Southern Gentleman
Stop Light
Sunset
Winter Red
Winter Gold

COMPREHENSIVE AESTHETIC EVALUATIONS OF CRABAPPLES IN OHIO: 1993-1995

James A. Chatfield
Ohio State University Extension
Northeast District & Horticulture and Crop Science Department

Erik A. Draper
Ohio State University Extension
Mahoning County

Kenneth D. Cochran
Ohio State University
Agricultural Technical Institute & Secrest Arboretum of the Ohio Agricultural Research and Development Center

Crabapples are woody landscape trees which provide a number of ornamental features throughout the year. Unfortunately, horticulturists and the general public often focus their attention on only one feature of a particular crabapple. One example is usage of the term "flowering crabapple". Crabapples bloom for only a short period each spring (1,2). Conversely, many crabapples exhibit good foliar and fruit displays for many months.

A second example of concentrating solely on one feature is rating crabapples only for disease (3,4,). Disease ratings are quite useful, but are often used by educators, landscapers and the public as the sole criterion for selection of crabapples. Again, disease susceptibility is only one aspect of the true landscape value of a particular crabapple.

The emphasis of our ongoing study is to provide an accurate, year-round profile of selected aesthetic qualities for many of the crabapples commercially available. Aesthetic qualities may include showiness of buds, flowers, bark, foliage and fruits, flower and fruit longevity, tree size and form, disease incidence or any subtleties which directly influence the ornamental effect of crabapples in the landscape.

Forty-five crabapple taxa were evaluated 26 times from September 1993 through September 1995 at Secrest Arboretum of the Ohio State University in Wooster, Ohio. Crabapples were planted in 1984 as part of the National Crabapple Evaluation Program in a replicated plot with three crabapples of each taxon. Plants were minimally maintained (no fertilization, pruning only to facilitate equipment use, no pesticide sprays, light organic mulch - similar to practices in the average home landscape).

Aesthetic ratings include flower, foliage, form and fruit characteristics, and effects of disease and pest problems. The rating system is as follows:

1 = Exceptionally ornamental crabapple. Based on outstanding flower, foliage, fruit or form at time of rating.
2 = Highly ornamental crabapple. Good flower, foliage, fruit or form at time of rating.
3 = Adequate as a landscape crabapple. Not highly ornamental at time of rating.
4 = Substandard as an ornamental crabapple at time of rating.
5 = Ornamentally unacceptable as a landscape crabapple at time of rating. Not recommended for use in the landscape.

Ratings for the crabapples in this study were averaged for the three replications on each evaluation date. These ratings were then averaged over the entire September 1993 to September 1995 period, and are presented below. The best and worst ratings for each taxon are also indicated. Of note is the fact that 37 of the 45 crabapple taxa were rated as "highly ornamental" or better at some point over the two-year period. Most importantly, a narrative description comprehensively profiling all 26 evaluations is provided.

Crabapple	93-95 Average	Best	Worst
M. 'Adams' (Adams)	2.9	1.3	4.6

{Deep red fruits, pink flowers}. Positives include firm, abundant teardrop-shaped fruits, and an attractive winter feature of flaking bark near the crown, grading into striated bark on upper trunk and branches. Negatives include fruit mummies that persisted from summer 1993 through September 1995, detracting from winter appeal, springtime bloom effect and summer appearance. Chlorotic foliage noted during summers. Moderate scab noted. No fireblight noted.

Crabapple	93-95 Average	Best	Worst
M. x *adstringens* 'Hopa' (Hopa)	4.2	2.0	5.0

{Red fruits, muted purple to pink flowers}. Positives include pastel flower show in spring. Negatives include ungainly overall tree form, and severe scab on leaves and fruits. No fireblight noted.

M. x *adstringens* 'Radiant' (Radiant)	4.0	2.0	5.0

{Bright red fruits, deep pink flowers, foliage red-purple fading to bronze}. Positives include pink blossoms and almost neon-red fruits evident in late summer. Negatives include severe scab resulting in prohibitively extensive defoliation and fruit unsightliness.

M. x *adstringens* 'Red Splendor' (Red Splendor)	2.7	1.6	4.3

{Roundish red fruits, rose-pink flowers, red-tinged foliage}. Positives include exceptional profuse red fruits from early summer to midfall, lovely pink flowers, and attractive exfoliating bark. Negatives include poor winter ratings due to rotted, half-eaten fruits. Trace of scab in 1994 and moderate scab in 1995. No fireblight is noted.

M. x *adstringens* 'Royalty' (Royalty)	4.3	2.6	5.0

{Red-purple fruits, crimson flowers, dark purple foliage}. Offers little ornamentally except where purple leaf color is desired. Negatives include poor ratings in winter due to overall plant form and horrific, blackened fruit mummies, and little contrast between foliage and flowers and developing fruit. Light scab in 1994; extensive scab in 1995. No fireblight is noted.

M. x *adstringens* 'Selkirk' (Selkirk)	3.7	1.6	5.0

{Glossy red fruits, rose-red flowers}. Positives include excellent floral show and combination of flowers with glossy red-tinged new foliage, and striking medium-large fruits in mid-summer. Negatives include deformation of fruits from codling moth larval feeding in late summer, unattractive late summer foliage and moderate fruit and foliar scab, and poor ratings in winter due to coarse, dreary overall appearance. No fireblight is noted.

Crabapple	93-95 Average	Best	Worst
M. baccata Jackii (Jack)	2.8	1.3	4.0

{Maroon-red fruits, white flowers, large tree}. Positives include large, glossy green leaves - by far the best foliage of any crabapple in the plot. In fall, contrast of yellow and rust-colored leaves with attractive burgandy fruits is outstanding. Negatives include relative sparseness of fruit clusters and mediocre overall winter appearance. No scab or fireblight noted.

M. 'Beverly' (Beverly)	3.7	1.3	5.0

{Bright pinkish-red fruits, white flowers}. Positives include impressive fruit display from late summer through early fall, and pink buds opening to snowy white flowers in spring. Negatives include persistent rotted fruits from mid-fall through winter. Fruits are partially eaten by birds, leaving an unsightly mess on the tree. Sprawling growth habit is somewhat awkward. No scab noted, moderate fireblight noted in 1994.

M. 'Cascole' (White Cascade™)	2.5	1.0	4.3

{Small yellow fruits, white flowers, weeping growth habit}. Positives include exquisite flower display with waterfall of cascading white-covered branches, and appealing overall weeping form. Negatives include dingy appearance throughout summer due to scab, which was heavy by mid summer in 1995, with considerable defoliation. No fireblight noted. Fall and winter features are ordinary.

M. 'Centzam' (Centurion®)	3.3	1.6	4.6

{Glossy red fruits, rose-red flowers, open branching structure}. Positives include attractive blossoms, fruit display in late summer and early fall, rust-orange fall foliage effect, and for some, the unusual open branching structure. Negatives include dull, sparse fruits by midfall and gangly nature of tree. Light to moderate scab noted, except in 1995 with extensive scab present. No fireblight noted. This crabapple is not outstanding at any time of year except briefly during bloom.

M. 'David' (David)	3.3	1.0	4.0

{Scarlet fruits, white flowers}. Positives include abundant snowy-white flower display, and rounded tree form. Negatives include yearly floral and fruit displays alternating from profuse to sparse, and fruit mummies from late fall to midwinter. Light scab noted in most ratings, no fireblight noted. Mediocre overall except for impressive flower display in alternate springs.

Crabapple	93-95 Average	Best	Worst
M. 'Donald Wyman' (Donald Wyman)	2.2	1.0	4.0

{Bright red fruits, white flowers, large tree}. Positives include excellent floral display, persistent glossy fruits effective into April in 1995, attractive exfoliating bark and good overall rounded growth habit. Negatives include fruit mummies in spring and early summer 1995. Scab light in 1993-1994, moderate on both fruit and leaves in 1995. No fireblight noted. One of the best red-fruited, white-flowered crabapples in the plot.

M. floribunda (Japanese Flowering)	2.9	1.3	4.0

{Fruit yellow with red blush, white flowers}. Positives include airy floral display with pink-red buds opening to white flowers, attractive blend of yellow and cider-brown fruit colors in fall, feathery effect of pedicels in winter, and good overall form. Negatives include yellow flecking of foliage in summer, and relatively ordinary appearance for much of the year. Slight scab noted in 1995. No fireblight noted.

M. 'Hargozam' (Harvest Gold™)	3.2	1.6	4.6

{Yellow to gold fruits, white flowers}. Positives include attractive fruits and contrast of clusters of yellow fruits with red pedicels in late fall. Negatives include long period of bland green fruit into midfall, and serious disease problems. Extensive scab noted. Fireblight severe in 1995 with hundreds of spur strikes following blossom infection.

M. 'Henningi' (Henning)	3.9	1.6	5.0

{Orange-red fruits, white flowers}. Positives include profuse flowering, effective fruit display in early fall, and attractive bark. Negatives include ungainly splayed upright growth habit and unattractive leaves due to scab. No fireblight noted. Growth habit is a significant detriment to landscape use.

M. hupehensis Strawberry Parfait' (Strawberry Parfait)	2.4	1.6	3.6

{Fruits start yellow with increasing red blush, flowers pink}. Positives include early red-tinged foliage effect, profuse pink blossoms, unusual erratic upright-spreading growth habit, good fall color and firm fruits in fall and through mid-winter. Negatives include some fruit mummies, and unusual shape is not for every landscape. Clean foliage; no scab or fireblight is noted.

Crabapple	93-95 Average	Best	Worst
M. 'Indian Magic' (Indian Magic)	2.9	1.3	4.0

{Red-orange fruits, pink flowers}. Positives include outstanding fall fruit display of autumnal orange-red fruits with golden yellow underside often contrasting with apricot-orange fall foliage color, appealing pink floral show in spring, and attractive bark. Negatives include yearly scab problems, with nearly complete defoliation from scab in 1995 by mid-to-late summer, although fruit scab is typically minimal. Fruit mummies were unsightly. No fireblight noted.

M. 'Indian Summer' (Indian Summer)	3.0	1.6	4.0

{Red fruits, rose-red flowers}. Positives include prolific midsummer to fall display of red fruits, the contrast of fruits to orange fall foliage and flaky bark. Negatives include persistent fruit mummies and moderate to extensive scab on leaves. No fireblight noted.

M. 'Jewelberry' (Jewelberry)	3.4	2.3	5.0

{Red fruits, white flowers}. Positives include attractive, three-lobed leaves, good fruit display in fall, and overall diminutive plant form. Negatives include dingy overall appearance in summer months and extensive foliar scab. No fireblight noted. Significant winter injury occurred in 1994.

M. 'Jewelcole' (Red Jewel)	2.8	1.3	4.6

{Cherry-red fruits, white flowers,}. Positives include attractive, persistent fruits into the winter months, clean summer foliage, and attractive blooms. Negatives include unappealing late winter to early spring appearance and some fruit mummies. No scab noted. Fireblight is moderate.

M. 'Mary Potter' (Mary Potter)	2.5	1.0	3.3

{Red fruits, white flowers, weeping-spreading habit}. Positives include profuse pink buds opening to exquisite blossom display, elegant spreading growth habit, masses of reddish fruits, and salmon-colored young bark revealed as older bark peels away. Negatives include fruit mummies in winter months and some branch die-back due to winter injury in 1994. Light scab and fireblight noted.

Crabapple	93-95 Average	Best	Worst
M. x *moerlandsii* 'Liset' (Liset)	3.3	2.0	4.6

{Maroon-red fruits, rose-red flowers}. Positives include very attractive fruit display from midsummer to fall, contrast of fruits with peach-colored fall foliage, and attractive summer foliage. Negatives include unattractive fruit mummies in late fall, and awkward splayed growth habit. Light to moderate (1995) scab noted. Fireblight not noted. Unusual, apparently normal splitting of bark on stems is characteristic.

M. x *moerlandsi* 'Profusion' (Profusion)	3.2	2.0	5.0

{Red fruits, purple-red flowers}. Positives include effective, abundant, cherry-red fruits in the summer. Negatives include lack of contrast between purple-bronze colored foliage and fruits and flowers, mediocre winter appearance including rotted fruits, and extensive unsightliness and defoliation from apple scab, especially in 1995. No fireblight noted.

M. 'Molazam' (Molten Lava®)	1.7	1.0	2.6

{Red-orange fruits, white flowers, spreading-weeping habit}. Positives include fiery red fruits, yellowing fall foliage, and cascading branch structure, providing an overall "molten lava" effect. Excellent winter ratings due to overall plant structure including layered horizontal branching, feathery red pedicel effect in winter, and attractive blooms. Negatives include dense, somewhat cluttered foliage effect in summer and dinginess from scab in 1995. Slight scab in 1994, moderate to extensive in 1995. No fireblight noted.

M. 'Ormiston Roy' (Ormiston Roy)	2.7	1.6	4.0

{Orange-yellow fruits, white flowers}. Positives include attractive orange fruits in the fall, deep-furrowed orange-like bark, and good floral show. Negatives include mummified fruit, with mummies from 1993 persisting through winter 1995. Slight scab in 1995, slight fireblight in 1994.

M. 'Prairifire' (Prairifire)	2.4	1.3	4.0

{Purple-red fruits, coral-red flowers,}. Positives include attractive show of firm purplish fruits, spectacular bloom with flowers contrasting with emerging red-tinged green foliage, fall contrast of orange-like spur leaves with fruits and other foliage, and lenticel-speckled bark. Negatives include nondescript winter and early summer appearance. No disease noted; very clean foliage.

Crabapple	93-95 Average	Best	Worst
M. 'Ralph Shay' (Ralph Shay)	3.5	2.0	5.0

{Large red fruits, white flowers}. Positives include pleasing floral show and bright red fruits before codling moth larval damage makes fruit unsightly. Negatives include ugliness of fruits throughout most of the year, including rotted mummies. Light scab in 1994, extensive scab in 1995. No fireblight noted.

M. 'Red Barron' (Red Barron)	3.5	1.6	5.0

{Dark red fruits, reddish-pink flowers}. Positives include interesting pumpkin-shaped fruits and exfoliating bark. Negatives include mummified fruits that persisted from 1993 through summer 1995, gangly overall tree form, and scab problems that were extensive in 1995. No fireblight noted.

M. 'Red Jade' (Red Jade)	2.2	1.6	4.0

{Red fruits, white flowers, spreading-weeping growth habit}. Positives include graceful spreading growth habit in fall and winter months, attractive fruits, and red flower buds opening into white blossoms. Negatives include some fruit rotting in early winter and moderate scab in 1995, causing some smudginess on fruits. No fireblight noted.

M. 'Robinson' (Robinson)	3.6	2.3	4.6

{Dark red fruits, deep pink flowers}. Positives include peach to burnt orange-colored fall foliage, abundant fruits, and attractive flowers. Negatives include poor winter ratings due to rotted fruit and overall coarseness, and extensive to heavy scab in summer months, resulting in considerable defoliation in 1995. No fireblight is noted.

M. x *robusta* 'Dolgo' (Dolgo)	4.1	2.0	5.0

{Bright red-purple plum-like fruits, snowy-white flowers}. Positives include edible, almost fluorescent red-purple fruits, striking for a brief period from mid-summer to mid-August. Negatives include major fruit mess problems due to drop, plop, and rot. Lacks ornamental effect for much of the year. No scab or fireblight noted. This is one of the large-fruited cultivars that give crabapples a generally unwarranted bad reputation as a messy landscape tree.

Crabapple	93-95 Average	Best	Worst
M. 'Ruby Luster' (Ruby Luster)	4.4	3.0	5.0

{Rose-purple fruits, pink flowers}. Large tree with ugly, misshapen fruits. Light scab in 1994; tree virtually defoliated by scab in 1995. No fireblight is noted. Not an effective ornamental tree.

M. sargentii (Sargent)	3.1	2.0	4.3

{Red fruits, white flowers, dwarf spreading habit}. Positives include attractive, low-spreading growth habit, fine snowy-white blossom show, effective firm fruits in late summer to early fall, and clean foliage except for Japanese beetle feeding. Negatives include shriveling of fruits by midfall persisting into winter. Winter injury in January of 1994. No scab or fireblight is noted.

M. 'Sentinel' (Sentinel)	2.2	1.0	4.0

{Red fruits, red-pink buds open to pink-tinged white flowers, vase-shaped growth habit}. Positives include mostly upright habit, sensational floral display, pleasing yellow fall foliage contrast with fruits, and attractive firm fruits persisting well into winter. Negatives include unattractive fruit mummies by spring and into the summer and nondescript summer appearance. Trace of scab noted. No fireblight is noted.

M. 'Silver Moon' (Silver Moon)	3.4	1.6	5.0

{Purple-red fruits, white flowers}. Positives include dense upright form, snowy-white floral show (limited bloom in 1995), attractive fruits, and very clean foliage. Negatives include poor winter ratings due to cluttered growth habit and significant fireblight problems. No scab is noted.

M. 'Snowdrift' (Snowdrift)	3.1	1.3	4.0

{Salmon-red fruits, white flowers}. Positives include excellent flower display, attractive fruits, and feathery effect of pedicels in winter. Negatives include shriveled fruits by late fall, poor overall foliar color, and extensive scab. No fireblight noted. Most ratings are mediocre.

Crabapple	93-95 Average	Best	Worst
M. 'Sutyzam' (Sugar Tyme®)	2.6	1.0	3.6

{Brilliant red fruits, white flowers}. Positives include stunning sugar-white floral display, showy, persistent and profuse fruits, and good overall form. Negatives include general mediocrity if flowers/fruits are not abundant, as in 1994 due either to winter effects or other factors. Slight scab noted. No fireblight noted.

M. toringo 'Winter Gold' (Winter Gold)	3.6	2.0	4.3

{Yellow fruits, white flowers}. Positives include impressive flower show in years where blooms are present (very sparse in 1995 on some replicates in plot), and attractive, butter-yellow fruits contrasted with bright red pedicels by midfall. Negatives include extended periods of unattractive green fruits before yellowing in midfall, and extensive fireblight strikes on replicate that flowered heavily in 1995. Scab extensive in 1995, moderate in 1994.

M. 'Velvetcole' (Velvet Pillar™)	3.7	3.0	5.0

{Reddish fruits, pink flowers}. Positives include upright growth habit and feature of purple foliage. Negative include dingy overall foliar appearance, sparseness of fruits, persistent fruit mummies and severe scab problems, including near total defoliation in 1995 by early August. Is not effective ornamental at any time of the year.

M. 'Weepcanzam' (Weeping Candied Apple™)	3.2	2.0	4.0

{Cherry-red fruits, pink flowers, weeping aspect of upper branches}. Positives include the irregular weeping habit, red-tinged foliage and namesake fruits. Negatives include fruit scab, which in heavy scab years such as 1995, negated all fruit effect by masking color with brown to grayish scab lesions. No fireblight noted. Unusual weeping nature of upper branches is not for every landscape.

M. 'White Angel' (White Angel)	3.6	2.3	5.0

{Red fruits, white flowers}. Positives include attractive flowers, showy, medium-sized, abundant fruits effective into fall (effect obscured by sooty blotch disease in 1995), and interesting red coloration of previous season's growth noted in March. Negatives include awkward growth habit (until tree is considerably older), and unattractive fruit mummies. No scab or fireblight noted.

Crabapple	93-95 Average	Best	Worst
M. x zumi 'Bob White' (Bob White)	2.6	1.0	4.6

{Yellow fruits, white flowers). Positives include persistent, small, firm, yellow-gold fruits maturing by mid-winter into orange-gold color. It is a real standout in the winter landscape. Exceptional floral display of delicate white blossoms opening from pinkish-red buds. Negatives include fruit and floral display that alternates yearly from profuse to sparse. Summer appearance is mediocre, although foliage is clean. No scab or fireblight noted. For overall effect, this is the best yellow-fruiting cultivar in the plot.

M. x zumi calocarpa (Redbud)	3.1	1.3	4.3

{Bright red fruits, white flowers}. Positives include excellent flower show, clusters of abundant, tiny red fruits in fall, and nuances such as fine feature of feathery pedicels in winter. Negatives include shrivelled fruits and overall poor winter ratings. Slight to moderate scab noted.

M. x *zumi* 'Professor Sprenger' (Professor Sprenger)	3.5	1.8	4.6

{Orange-red fruits, white flowers}. Positives include attractive white flowers and orange-red fruits. Negatives include persistent mummified fruits, and overall unsightliness due to heavy frogeye leaf spot, which resulted in significant defoliation. Moderate scab in 1995, extensive yearly frogeye leaf spot. No fireblight noted.

Even with the 26 ratings there are many limitations to our study. First, it is only two years of data. Factors such as winter damage or severe disease in a given year may overly influence the ratings for that limited time period.

Second, due to time and experimental design constraints we limited the evaluations to the 45 crabapples replicated in the plot. Many need to be added, including a number that rate highly in other reports (4,6,7). To address this issue, a new crabapple plot is being planted at Secrest Arboretum to include numerous new selections. A number of selections with consistently substandard ratings in the current plot will be excluded from future evaluations.

Third, the data are for only one site: Wooster, Ohio. Clearly, crabapples vary in their ornamental effectiveness and disease susceptibility depending upon local environmental conditions. A number of other studies provide data on effectiveness over a wider range of geographical area (4,6,7). Some effort was made in 1995 to include information from other Ohio sites relative to disease susceptibility (8).

Fourth, aesthetic ratings inevitably involve some subjectivity by the evaluators. Personal preferences relative to plant form, flower color, fruit size, the importance of clean foliage, and other factors enter into the ratings. To address this partly, we involved guest evaluators to a limited extent in 1995 (8).

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WORLD WIDE WEB

The Board of Directors of IOCS has authorized the connection of IOCS with the Internet. We are looking for suggestions from you as to what you would like to see made available. Suggestions are also solicited for the Home Page appearance.

CRABAPPLES IN GENERAL / DISEASES IN PARTICULAR

John H. den Boer

The previous issue of MALUS was devoted entirely to disease ratings. There was very little in that issue that would enlighten the reader as to how these ratings are affected by the location in which a crabapple may be growing. That source of that data was a much larger source of data representing years of effort by many people. The data were taken from nine different time/hardiness zones. These time/hardiness zones are identified by a letter representing the time zone and a number representing a hardiness zone, P, M, C, and E representing Pacific, Mountain, Central and Eastern time zones. The hardiness zones are numbered for the USDA Hardiness Zones and range from 4 located in the northern states to 7 located in the southern states. At the end of this article is a list of locations in each time/hardiness zone from which data were obtained for this study on disease ratings. As you can see from a quick review of those listings, there are three zones represented by only one location, M/5, M/8, and C/4. There is no consistency in the variety of crabapples in these twelve zones. There are only twenty-five crabapples reported in all twelve zones. Many more are reported in only one zone. In some cases there are only one or two reports on disease ratings, in others over 100. As can be imagined, there is little to nothing available to make statistical inferences. Therefore, I am presenting "observations" relative to the data that are available for disease ratings on crabapples.

To make these observations I: (1) counted all the occurrences of each rating, for each time zone/hardiness zone; (2) calculated the percent of the occurrences of each rating within each set of zones; (3) calculated the average rating for all crabapples within each time zone and within each hardiness zone, and then made some appropriate comments. This review starts with the disease ratings and ends with the aesthetic rating.

OBSERVATIONS ON SCAB RATINGS:

The lowest average scab ratings occur in the Mountain Time Zone, the highest in the #5 USDA Hardiness Zone. In general, the scab ratings are better in the more southern areas of the country and get progressively worse to the north.

OBSERVATIONS ON FIRE BLIGHT

The area most severely affected by fire blight is that area defined by the Mountain Time Zone and USDA Hardiness Zone #5. The other areas in this time zone are also affected, but not to as great an extent. Another area affected, but to a lesser extent, is that area covered by the Eastern Time Zone and #7 Hardiness Zone.

OBSERVATION ON CEDAR/APPLE RUST RATINGS

The Northern zones of the country are more prone to cedar/apple rust than the Southern zones. The Central Time Zone is more affected by cedar/apple rust than other time zones.

OBSERVATIONS ON POWDERY MILDEW

Powdery mildew is a more severe problem in the zone defined by the Eastern Time Zone and the #7 USDA Hardiness Zone than any other area in the country.

OBSERVATIONS ON FROGEYE LEAF SPOT

There is not very much difference between the best and worst areas in the country for frogeye leaf spot. The data show the worst area to be defined by the Central Time Zone and #5 Hardiness Zone, followed by another in the Eastern Time Zone and #7 Hardiness Zone. No frogeye leaf spot was reported in the Mountain Time Zone.

OBSERVATIONS ON AESTHETIC RATING

There is little difference in the aesthetic ratings from one area to another. The best and worst areas are side-by-side in the Eastern Time Zone.

SCAB

NUMBER OF OCCURRENCES PER ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7	Total
0	683	270	191	587	2997	53	3886	2295	1595	12557
1	218	0	73	155	768	7	785	341	276	2623
2	182	0	5	214	1056	4	1204	542	242	3449
3	141	0	0	124	940	4	1240	540	154	3143
4	122	0	0	139	606	1	1201	438	87	2594
5	5	0	0	0	70	0	259	44	11	389
Total	1351	270	269	1219	6437	69	8575	4200	2365	24755

PERCENT OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7
0	51	100	71	48	47	77	45	55	67
1	16	0	27	13	12	10	9	8	12
2	14	0	2	18	16	6	14	13	10
3	10	0	0	10	15	6	15	13	7
4	9	0	0	11	9	1	14	10	4
5	0	0	0	0	1	0	3	1	0

AVERAGE RATINGS - BEST TO WORST

TIME/HARDINESS ZONE		TIME ZONE		HARDINESS ZONE	
M/5	0.00	Mountain	0.02	8	0.27
M/8	0.27	Pacific	1.12	7	0.68
C/7	0.39	Central	1.30	6	1.19
E/7	0.69	Eastern	1.30	4	1.25
P/8	1.12			5	3.00
E/6	1.19				
C/4	1.25				
C/5	1.32				
E/5	1.52				

FIRE BLIGHT

NUMBER OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7	TOTAL
0	1352	92	269	1218	6332	69	8170	4180	2262	23944
1	0	72	0	1	40	0	142	14	52	321
2	1	55	0	0	36	0	136	2	27	257
3	0	31	0	0	18	0	68	1	18	136
4	0	12	0	0	11	0	56	3	6	88
5	0	8	0	0	0	0	4	0	0	12
Total	1353	270	269	1219	6437	69	8576	4200	2365	24758

PERCENT OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7
0	100	34	100	100	98	100	94	100	96
1	0	27	0	0	1	0	2	0	2
2	0	21	0	0	1	0	2	0	1
3	0	11	0	0	0	0	1	0	1
4	0	4	0	0	0	0	1	0	0
5	0	3	0	0	0	0	0	0	0

AVERAGE RATINGS - BEST TO WORST

TIME/HARDINESS ZONE		TIME ZONE		HARDINESS ZONE	
P/8	0.00	Pacific	0.00	4	0.00
M/8	0.00	Central	0.03	8	0.00
C/4	0.00	Eastern	0.07	6	0.01
C/7	0.00	Mountain	0.67	7	0.08
E/6	0.01			5	0.09
C/5	0.03				
E/7	0.08				
E/5	0.10				
M/5	1.34				

CEDAR/APPLE RUST

NUMBER OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7	TOTAL
0	1351	270	269	1119	5999	69	8342	3987	2318	23724
1	0	0	0	36	148	0	122	95	22	423
2	2	0	0	13	135	0	65	73	19	307
3	0	0	0	23	111	0	31	32	6	203
4	0	0	0	27	44	0	16	13	0	100
Total	1353	270	269	1218	6437	69	8576	4200	2365	24757

PERCENT OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7
0	100	100	100	92	93	100	97	95	98
1	0	0	0	3	2	0	1	2	1
2	0	0	0	1	2	0	1	2	1
3	0	0	0	2	2	0	0.5	1	0
4	0	0	0	2	1	0	0.5	0	0

AVERAGE RATINGS - BEST TO WORST

TIME/HARDINESS ZONE	
P/8	0.00
M/5	0.00
M/8	0.00
C/7	0.00
E/7	0.03
E/5	0.05
E/6	0.09
C/5	0.14
C/4	0.20

TIME ZONE	
Pacific	0.00
Mountain	0.00
Eastern	0.06
Central	0.15

HARDINESS ZONE	
8	0.00
7	0.03
5	0.09
6	0.09
4	0.20

POWDERY MILDEW

NUMBER OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7	TOTAL
0	1336	270	269	1218	6419	69	8512	4193	2139	24425
1	6	0	0	0	12	0	34	1	105	158
2	7	0	0	1	5	0	20	5	93	131
3	2	0	0	0	1	0	9	0	27	39
4	2	0	0	0	0	0	1	1	1	5
Total:	1353	270	269	1219	6437	69	8576	4200	2365	24758

PERCENT OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7
0	99	100	100	100	100	100	100	100	90
1	0	0	0	0	0	0	0	0	5
2	1	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	0

AVERAGE RATINGS - BEST TO WORST

TIME/HARDINESS ZONE	
M/5	0.00
M/8	0/00
C/4	0.00
C/5	0.00
C/7	0.00
E/6	0.00
E/5	0.01
P/8	0.03
E/7	0.16

TIME ZONE	
Mountain	0.00
Central	0.00
Pacific	0.03
Eastern	0.03

HARDINESS ZONE	
4	0.00
6	0.00
5	0.01
8	0.03
7	0.15

FROGEYE LEAF SPOT

NUMBER OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7	TOTAL
0	1322	270	269	1193	5919	68	8231	4047	2242	23561
1	16	0	0	3	215	0	84	42	20	380
2	12	0	0	15	183	0	164	71	70	515
3	3	0	0	7	96	1	88	27	32	254
4	0	0	0	1	24	0	9	13	1	48
TOTAL	1353	270	269	1219	6437	69	8576	4200	2365	24758

PERCENT OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7
0	98	100	100	98	92	100	96	96	95
1	1	0	0	0	3	0	1	1	1
2	1	0	0	1	3	0	2	2	3
3	0	0	0	1	2	0	1	1	1
4	0	0	0	0	0	0	0	0	0

AVERAGE RATINGS - BEST TO WORST

TIME/HARDINESS ZONE

M/5	0.00
M/8	0.00
C/7	0.04
P/8	0.04
C/4	0.05
E/5	0.08
E/6	0.08
E/7	0.11
C/5	0.15

TIME ZONE

Mountain	0.00
Pacific	0.04
Eastern	0.07
Central	0.13

HARDINESS ZONE

8	0.03
4	0.05
6	0.08
5	0.11
7	0.11

AESTHETIC RATING

NUMBER OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7	TOTAL
0	23	6	12	13	208	1	258	138	104	763
1	85	60	53	67	622	14	790	368	355	2414
2	82	96	82	113	469	33	763	302	479	2419
3	62	62	70	56	325	12	898	202	382	2069
4	80	36	42	21	454	6	1114	177	233	2163
5	7	10	0	6	24	0	141	33	36	257
TOTAL	339	270	259	276	2102	66	3964	1220	1589	10085

PERCENT OF OCCURRENCES BY ZONE LOCATION

Rate Value	P/8	M/5	M/8	C/4	C/5	C/7	E/5	E/6	E/7
0	7	2	4	5	10	2	7	11	7
1	25	22	20	24	30	21	20	30	22
2	24	36	30	41	22	50	19	25	31
3	18	23	30	20	15	18	23	17	24
4	24	13	16	8	22	9	28	15	14
5	2	4	0	2	1	0	4	3	2

AVERAGE RATINGS - BEST TO WORST

TIME/HARDINESS ZONE

E/6	2.01
C/4	2.08
C/7	2.12
C/5	2.13
E/7	2.24
M/8	2.32
P/8	2.33
M/5	2.34
E/5	2.57

TIME ZONE

Central	2.12
Pacific	2.33
Mountain	2.33
Eastern	2.39

HARDINESS ZONE

6	2.01
4	2.08
7	2.23
8	2.33
5	2.40

REPORTING LOCATIONS

PACIFIC / #8 HARDINESS ZONE

- Louis Brown Horticultural Farm
- Chester Swartze Nursery
- McGill Nursery
- Moller's Nursery
- Northwestern Washington Research Unit
- J. Frank Schmidt & Son Co.
- University of Washington Arboretum
- Washington State Arboretum

MOUNTAIN / #5 HARDINESS ZONE

- Colorado State University

MOUNTAIN / #8 HARDINESS ZONE

- New Mexico State University

CENTRAL / #4 HARDINESS ZONE

- Minnesota Landscape Arboretum
- North Dakota State University
- University of Wisconsin Arboretum
- Westside Nursery

CENTRAL / #5 HARDINESS ZONE

- Boerner Botanical Gardens
- Chicago Botanic Gardens
- Den Boer Arboretum
- Hendricks Sodding & Landscaping
- Iowa State University
- Klehm's Nursery
- Longenecker Gardens
- Marshall Nursery
- Morton Arboretum
- Municipality of Delavan
- Nebraska Nurseries, Inc.
- Neumann's Nursery
- Pioneer Gardens & Nursery
- Poplar Farm
- Stonegate Farm Nurseries
- University of Nebraska

CENTRAL / #7 HARDINESS ZONE

- Tennessee Valley Authority Reservation

Continued . . .

REPORTING LOCATIONS Cont.

EASTERN / #5 HARDINESS ZONE

- Cole Nursery
- John Connon Nurseries
- Davey Nursery
- Deeter Nursery
- Dow Gardens
- Dugan Nursery
- Eisler Nursery
- Falconskeape
- Hidden Lake Gardens
- Holden Arboretum
- Lake County Nursery
- Manbeck Nursery
- Michigan State University
- Michigan State University Beaumont Nursery
- Niagara Horticultural School
- Purdue Horticultural Park
- Rowe Arboretum
- Royal Botanical Garden
- Secrest Arboretum
- Studebaker Nursery
- Wade & Gatton Nursery
- Weston Nursery
- Willoway Nursery

EASTERN / #6 HARDINESS ZONE

- Arnold Arboretum
- Bald Hill Nursery
- Boulevard Nurseries
- Case Estates
- Dawes Arboretum
- Enterprise Nursery
- Evergreen Tree & Landscaping Services
- Winand K. Hock Residence
- Hooendorn Nurseries, Inc.
- London Grove Nursery
- Longwood Gardens
- Manor View Nursery
- Moon's Nursery
- L. P. Nichols Residence
- Pennsylvania State University Campus
- Pennsylvania State University Flower Trail Garden

EASTERN / #6 HARDINESS ZONE Cont.

- Pennsylvania State University Research Fruit Farm
- Rock Springs Test Plot
- R. & A. Nursery
- Rhode Island Nurseries
- Spring Grove Cemetery
- Swarthmore College
- Tyler Arboretum
- University of Rhode Island
- University of Rhode Island (Peckham Farm)

EASTERN / #7 HARDINESS ZONE

- Clemson University
- Gwinette Tech.
- Milliken Corporation
- U. S. National Arboretum
- North Carolina State University
- Sandhill Extension Station

THE FIALA ORNAMENTAL CRABAPPLES

David E. Guthery
Johnson's Nursery. Inc.

With the recent publication of Father John L. Fiala's book, Flowering Crabapples: The Genus Malus, it is an appropriate time to look at his introductions, many of which are still relatively unknown. While he selected 126 named cultivars, you would be hard pressed to find more than a dozen actively produced in the nursery trade. (A notable exception to the nursery trade is Roy Klehm of Beaver Creek Nursery, who has actively introduced a majority of the Fiala crabapples available today.) Why are so few Fiala crabapples available? I am not entirely sure.

Father Fiala used a variety of crabapple selections for his breeding work, but he relied heavily upon (in descending order of frequency): *Malus* 'Amberina', *M.* 'Winter Gold', *M.* 'Red Swan', *M.* 'Chrishozam,' *M.* 'Liset,' *M.* 'Red Jade,' *M.* 'Serenade,' *M.* 'Van Eseltine,' *M.* x *zumi* 'Woosteri,' *M.* 'Coral Cascade,' *M.* 'Satin Cloud,' *M.* x *purpurea* 'Lemoinei,' and *M.* x *zumi*. In addition, he utilized colchicine treatments to induce polyploid crabapples. His tetraploids include: *M.* 'All Saints,' *M.* 'Ambergold,' *M. hupehensis* 'Donald,' *M.* 'Grandmother Louise,' *M.* 'Joy', *M.* 'My Bonnie,' *M.* 'Peter Murray,' *M.* 'Tea Time,' and *M.* 'Tetragold.' His octoploids include *M.* 'Copper King,' *M.* 'Egret,' *M.* 'Fountain,' *M.* 'Mollie Ann,' *M.* 'Satin Cloud,' *M.* 'Shinto Shrine,' and *M.* 'Thumbelina.'

In his book, Father Fiala states that his goals in breeding were "(1) to produce newer multibreds, especially among the weeping crabapples, (2) to introduce small, disease resistant trees with heavy, persistent annual fruit in an extensive range of color and (3) to induce polyploids." He certainly achieved most, if not all, of his objectives.

He stated that form was particularly important, especially weepers. In total, he produced 35 different weepers ranging from the graceful *M.* 'Red Swan' to the stiff semi-weeping *M.* 'Sinai Fire.' Broad-spreading, "*M. floribunda*-like" forms also seem to be a favorite such as *M.* 'Leprechaun.' In addition, many of his selections tend to be smaller-scale, more useful in today's urban environment.

Fruit quality was also an important selection criterion. Most of his selections have highly colorful, small fruits. Many of them are mini-fruited crabapples possessing fruit often only 0.6 cm in diameter. On average, his selections possess 1.15 cm size fruits, an attribute not normally sought after especially in earlier breeders' work. Small fruits

help minimize litter problems and are more attractive to birds. One self-stated goal in fruit quality that Father Fiala fell short on is persistence. Of all his crabapple selections, only *M.* 'Amberina' exhibits any real persistence, hanging around until March or early April. Most of the rest are normally taken by birds by November.

Flowers played a more minor role in his selection process, although he did select many double and semi-double flowered forms. His double-flowered forms include: *M.* 'Angel Choir,' *M.* 'Bridal Crown,' *M.* 'Cranberry Lace,' *M.* 'Karen,' *M.* 'Mazam,' *M.* 'Sarah,' and *M.* 'Sheila.' His semi-double forms include: *M.* 'Doubloons,' *M.* 'Eline,' *M.* 'Firecracker,' *M.* 'Full Sails,' *M.* 'Grandmother Louise,' *M.* 'Magic Mirror,' *M.* 'Showboat,' and *M.* 'Twosome.' He felt there were few good double and semi-double flowered crabapples in the trade and was always looking to improve the group. He also favored white-flowered cultivars (91 introductions) over red (22) or pink (13) cultivars. This trend is probably more an outgrowth of his objective of selecting both scab-resistant crabapples and ones with small, highly colorful fruit, both of which are more likely found within the white-flowering parentage.

On the whole, Father Fiala did a reasonable job of selecting for disease resistance. In fact, Chris Hackett, manager of Beaver Creek Nursery in Poplar Grove, Illinois, considers the Fiala crabapples to be, as a group, very disease resistant. However, many of his selections have shown problems with fireblight. Apparently Falconskeape Gardens in Medina, Ohio, lacked the right conditions to develop fireblight, and he could not screen well for it like he could apple scab. He makes some note of this in commenting on *M.* 'Van Eseltine.' "At Falconskeape Gardens, Medina, OH, this crabapple (Van Eseltine) is not affected by fireblight, although others claim their trees are severely affected." In addition, if you examine the parentage of many of his selections, often at least one parent is known to be commonly affected by fireblight. *M.* 'Winter Gold,' known to be often affected with fireblight, is used in 15 crosses alone. Another susceptible crabapple, *M.* 'Red Jade,' is also used 10 times and is one of the main parents of *M.* 'Red Swan;' which itself is used in 13 different crosses. Other known fireblight susceptible crabapples used were *M.* 'Van Eseltine,' (7 crosses), *M.* 'Chrishozam,' (12), *M.* 'Redbird,' (4), and *M.* 'Silver Moon.,' (1). Dr. Thomas Green believes that fireblight may be the major liability of the Fiala crabapples.

The following is an overview of all the Fiala crabapples currently available in the trade to the best knowledge of the author.

***M.* 'Amberina' (Amberina)** - Father Fiala often regarded this as his best crabapple. Originating from a cross of *M.* 'Chrishozam' X *M.* 'Kirk', it is semi-dwarf and oval in outline, but becoming broader with age. Maturing at about 12 feet, it is well suited to smaller sites. Crimson red buds open to 1 ¼ " single, white flowers, often with a pink

blush which fades. The fall color can be a good yellow to orange. The 0.6 - 0.8 cm cardinal red fruits persist in good color until late March or early April. At Ohio State, Smith and Treaster have found *M.* 'Amberina' to be susceptible to highly susceptible to apple scab, but both Guthery and Hasselkus and Delahaut and Hasselkus have found it to be highly resistant in Wisconsin . Dr. Thomas Green rates it highly resistant to scab and fireblight.

***M.* 'Autumn Glory' (Autumn Glory)** - The result of a cross between *M.* x *zumi* X *M.* x *zumi* 'Woosteri,' it is round to broad-spreading in form, reaching slowly about 15 feet. Cardinal red buds open to single which flowers (3.2 cm in diameter) with an intense pink blush which fades. The small, 0.67 - 0.9 cm fruits persist only through October, when they are either taken by birds or simply shrivel into little raisin-like mummies. It has proven to be highly resistant to apple scab.

***M.* 'Chrishozam' (Christmas Holly)** - An early selected seedling of *M.* x *zumi*, it resembles *M.* x *zumi calocarpa* in many ways. Similar in form, it may become slightly wider to about 15 feet. Chris Hackett has also found it to be a stronger grower. Likewise, it has similar single white flowers (3.1 cm in diameter) with red buds and a strong pink blush when initially opened. However, the small 0.9 - 1 cm fruit lacks some of the persistence of the Redbud Crabapple, rarely hanging on much past early November. Maybe it should be renamed! It has performed fairly well in the National Crabapple Evaluation Program (NCEP), placing average to above-average normally. Fireblight has been noted by the NCEP and by Smith and Treaster. It has proven to be highly resistant to apple scab.

***M.* 'Doubloons' (Doubloons)** - A unique tree in that while semi-double and double in flower, it has a fairly good fruit display. Its flowers are white (3.2 cm in diameter), preceded by red buds. The small 1 cm fruit turns a pleasing yellow by October and after a hard frost, persists through December as a lively cider color. It is a small, upright spreading tree, approximately 12 feet by 10 feet. It has proven to be susceptible (Guthery and Hasselkus) to resistant (Delahaut and Hasselkus) to highly resistant (Green) to apple scab. Originated as a cross between *M.* 'Spring Song' and (*M.* 'Dorothea' X *M.* 'Winter Gold').

***M.* 'Gemstone' (Gemstone)** syn: 'Garnet' - Name changed recently due to conflict with an existing older cultivar. A cross between *M.* x *zumi* 'Woosteri' and *M.* 'Chrishozam.' A small, upright-spreading tree to 8 - 10 feet in height. It has red buds which open to single white flowers. The 1 cm garnet-red fruits persist only until November. Very narrow leaves give it a finer texture than most crabapples. Severe fireblight forced its removal from the University of Wisconsin-Madison Arboretum's collection. Severe apple scab was also noted (Delahaut and Hasselkus).

***M.* 'Kirk' (Kirk)** - The result of a cross of *M.* x *zumi* #243 X *M.* x *zumi* #768. It is a weak grower, forming a rounded tree to 15 feet. It has single, white flowers 3 cm in diameter which open from crimson red buds. The flowers have a good pink blush upon opening. The 0.8 cm fruit ripens to an oxblood red color persisting into November. It is highly resistant to scab.

***M.* 'Leprechaun' (Leprechaun)** - The result of a cross between *M.* 'Chrishozam' X (*M.* x *zumi* #243 X *M.* x *zumi* #768), it resembles a dwarf *M. floribunda* form, reaching only 8 - 10 feet in height. Similar in flower, the single, white flowers have an intense pink blush upon opening. The 0.5 - 0.6 cm red fruits persist through November. Unfortunately it has been observed to be susceptible (Delahaut and Hasselkus), (Guthery and Hasselkus) to highly resistant (Green) to apple scab.

***M.* 'Lullaby'(Lullaby)** - An open weeper, it reaches 10 feet with a slightly greater spread. Red flower buds open to single white flowers (3.9 cm in diameter) with a nice pink blush which fades upon opening. In fall, abundant 0.6 - 0.9 cm fruits are a beautiful buttercup yellow with a cardinal red cheek. The fruit later turns to a cider color after a hard frost and persists until December. It has proven to be susceptible (Delahaut and Hasselkus), (Guthery and Hasselkus) to highly resistant (Green) to apple scab.

***M.* 'Luwick' (Luwick)** - The result of a complex cross between (*M.* x *zumi* #768 X *M.* x *purpurea* 'Lemoinei') X [(*M.* 'Oekonomeriat Echtermeyer' X *M.* x *zumi* #243) X *M.* x *zumi* #1023], it is a graceful weeping tree reaching only 6 - 8 feet high by 10 feet wide. Chris Hackett compares it to *M. sargentii* 'Tina,' but not as stiff and slightly larger. Not surprisingly, it also has narrow leaves. Deep pink buds open to pale pink flowers which fade to white. Unfortunately, it has poor fruit quality. The 0.6 cm red fruits turn a cider color after a hard frost and last only into November. It is resistant to susceptible (Delahaut and Hasselkus) to apple scab.

***M.* 'Mazam' (Madonna)** - One of the showiest crabapples in flower, the double white flowers (5.9 cm in diameter) resemble small roses lining its branches and because of its double nature, it stays in bloom often a week longer than other single-flowered crabapples. However, unlike its flowers, its fruit quality is dismal. The brownish-red fruits quickly turn to blackened mummies. Definitely an upright crabapple when young, its upright oval form could be useful in street tree situations for many years. It eventually spreads to 20 feet high to 15 - 20 feet wide. It has proven to be resistant (Delahaut and Hasselkus, Green, Smith and Treaster) to scab. Dr. Thomas Green has found it be to moderately susceptible to fireblight. Bob Simpson discontinued growing it because of fireblight.

***M.* 'Maria' (Maria)** - Unlike other Fiala crabapples, *M.* 'Maria' is a rosybloom. Its single red flowers are 3.5 cm across. Slightly larger in fruit, 1.2 - 1.5 cm, the red fruits are already shriveling by November. The new growth emerges a bright red, which is not unusual considering its parentage: (*M.* x *purpurea* 'Lemoinei' X *M.* 'Red Jade') X [*M.* 'Liset' X (*M.* 'Liset' X *M.* 'Red Jade')]. It has an interesting broad spreading form, reaching 12 feet in height and 15 in spread, not unlike *M.* 'Mary Potter.' Unfortunately, it has proven to be susceptible (Delahaut and Hasselkus, Guthery and Hasselkus) to scab.

***M.* 'Mollie Ann' (Mollie Ann)** - An unusual tetraploid crabapple which was induced through colchicine treatment. It resulted from the manipulation of a cross involving (*M.* 'Dorothea' X *M.* x *zumi*) X (*M.* 'Shinto Shrine' X *M.* 'Lullaby'). Everything about *M.* 'Mollie Ann' is finely textured, including the branches, the leaves, and even the flowers. Semi-weeping in habit, it reaches 10 - 12 feet in height and spread. The finely petaled white flowers open from red buds. The 1 cm buff-gold fruit does not persist past November. Delahaut and Hasselkus observed no scab, but did note fireblight.

***M.* 'Molazam' (Molten Lava)** - One of his best selections, it has always rated highly in the NCEP study. Specimen quality in habit, it has a back-and-forth branching habit which can be best described as a wide arching weeper. It reaches 10 - 12 feet tall by 15 feet wide. The cardinal red buds unfurl to single white blossoms (3.6 cm in diameter) with a good pink blush which fades. The 0.9 cm oxblood red fruits persist until January. It also has a consistent yellow fall color, and the younger bark is red during the winter, adding more interest. It has proven to be resistant (Delahaut and Hasselkus) to highly resistant (Green, Guthery and Hasselkus, Smith and Treaster) to apple scab. It has proven to be moderately susceptible (Green) to fireblight. It resulted from the cross of *M.* 'Chrishozam' X *M.* 'Red Jade.'

***M.* 'Red Peacock' (Red Peacock)** - Like *M.* 'Amberina' and *M.* 'Molazam,' this Fiala crabapple looks very promising. Of all the Fiala crabapples, it has the best fruit quality. Small (1 - 1.2 cm in diameter) red jewel-like fruits persist until about early January. The single white flowers open from red buds with an intense pink blush. In habit, it is rounded but with slightly drooping branch tips, reaching 12 feet in height by 14 feet in width. In addition it is very dense with a lot of inter-branching much like *M.* 'Snowdrift.' It is highly resistant (Delahaut and Hasselkus, Green) to scab. Parentage is *M.* 'Molazam' X (*M.* 'Luwick' X *M.* x *zumi* #243).

***M.* 'Red Swan'(Red Swan)** - An extreme weeper, it is essentially an improved *M.* 'Red Jade.' Not surprisingly, it has *M.* 'Red Jade' in its past, the result of a cross between (*M.* 'Red Jade' X *M.* 'Molazam') X (*M.* 'Red Jade' X *M.* x *purpurea* 'Lemoinei'). Everything about *M.* 'Red Swan' is pendulous, even the flowers which hang *Halesia*-like as single white flowers, opening from pink buds, from the branches.

The fruit is much more colorful than *M.* 'Red Jade' and equally as persistent. It has proven to be highly resistant to scab. Unfortunately, Chris Hackett at Beaver Creek Nursery has had major problems with fireblight, although our propagator, Michael Yanny, has not yet seen any fireblight. I, too, have never observed fireblight in *M.* 'Red Swan' at test sites, and Green rates it as highly resistant.

***M.* 'Satin Cloud' (Satin Cloud)** - A unique octoploid resulting from colchicine treatment of a seedling of the cross involving (*M.* 'Coralburst' X tetraploid *M.* x *zumi*) X (tetraploid *M.* 'Dorothea' X tetraploid *M.* x *zumi*). The result is an interesting compact form neat in appearance. Definitely wider than tall, reaching 10 feet, with almost spur-like branches due to the very constricted internodes. Not surprisingly, it is slow growing, but could be useful in smaller gardens. The pale pink buds open into white flowers often clustered on spur-like shoots. The flowers are said to have a slight cinnamon fragrance, although I have yet to detect it. The 1 cm fruits turn an amber yellow in fall and hang on into November. So far, *M.* 'Satin Cloud' has proven to be highly resistant to scab.

***M.* 'Serenade' (Serenade)** - The result of a cross between (*M. toringoides* X *M.* x *zumi*) X (*M.* 'Golden Candles' X *M.* x *zumi* #768), it is a slower growing semi-weeper reaching 12 feet high and wide. High resistance to scab seems to be its main forte. The strong blush on its single white flowers (3.5 cm in diameter) does make the flowers appear almost pink in color for a day or two. Later, 1.1 - 1.2 cm elongated fruits with a rounded base turn a cardinal red with a yellow cheek. After a hard frost they turn a dark cider color and are gone by early November.

***M.* 'Sinai Fire' (Sinai Fire)** - The result of a cross between *M.* 'Red Swan' X *M.* 'Amberina,' it is a stiff weeper, much on the order of *M.* 'Weeping Candied Apple.' It reaches 15 feet in height and spread. The red flower bud open to single white flowers (3.8 cm in diameter). The fruits are 1 - 1.3 cm in diameter. Initially red in color, they turn a brownish-red in color with a hard frost, persisting until January. It has proven to be highly resistant to scab; however, it has had so many problems with fireblight in our fields that we have dubbed it "Sinai Fireblight." Still, Dr. Thomas Green rates it as highly resistant to fireblight.

***M.* 'Spring Song' (Spring Song)** - A somewhat promising selection, it is a compact, rounded tree reaching about 10 -12 feet in height and spread, although Father Fiala describes it as an upright tree. The rose flower buds open to single, whit flowers (3.6 cm in diameter). The fruit display is nice. The small (0.9 cm - 1.2 cm) yellow fruits with red cheeks turn a cider color after the first frost and persist until November. It appears to be resistant (Green, Guthery and Hasselkus) to apple scab. It is a result of the cross of (*M.* 'My Bonnie' X *M.* x zumi) X (*M.* 'Dorothea' X *M.* 'Winter Gold').

***M.* x *zumi* 'Woosteri' (Wooster)** - This is certainly the odd duck among Father Fiala's selections. Very regular in form, its most interesting aspect is its foliage which is waxy green and highly cupped, giving it a unique substance. While the white flowers (3.7 cm in diameter) which emerge from red buds with a pink blush is typical of his selections, the fruits are not. They are much larger (1.4 - 1.5 cm) and dull red in color, turning to a brown-red after frost. They persist only until November. It does live up to its disease resistance billing, not showing any problems with apple scab. Unfortunately, it has had problems with winter dieback, both at Beaver Creek Nursery and at the University of Wisconsin-Madison Arboretum. Except for the disease resistance, I am not sure what else he saw in this one.

While there are some interesting Fiala crabapples, I am not sure both history and the nursery trade will be kind to his introductions, most of which lack the knockout punch needed to find a place in already crowded crabapple production lists. *M.* 'Amberina' might be the cream-of-the-crop. With one exception, it has proven to be resistant to scab and is the only Fiala crabapple with showy, retentive fruit. Its smaller stature gives it a unique niche in the crowded white flowers-red fruits crabapples. *M.* 'Molazam' and *M.* 'Red Swan' also look very good, but probably not for fireblight susceptible regions. *M.* 'Red Peacock' looks promising, and I would wholeheartedly endorse it if its fruit persisted slightly longer. Unfortunately, with a glut of crabapples in the marketplace, new crabapples must have qualities that surpass those of *M.* 'Red Jewel' or *M.* 'Donald Wyman.' Or they must have a unique form or aspect before a nursery can devote major resources to producing it.

Other selections look like they could be the foundation for future breeding work and are definitely a step in the right direction. *M.* 'Doubloons' is an interesting start for a semi-double to double flowering crabapple with a pretty good fruit display, something not seen as of yet. *M.* 'Satin Cloud' too, could be potentially useful because of its octoploid nature and dense habit. Unfortunately, many of the others do not have sufficient merit in today's crowded crabapple marketplace to make a place for themselves.

While these evaluations may seem critical, these currently available introductions, numbering only 20, are really just the tip of the iceberg. Even now, after his death, new Fiala crabapples are being introduced into the marketplace. J. Frank Schmidt & Son Co. just recently introduced *M.* 'Purple Prince.' Roy Klehm at Beaver Creek Nursery continues to introduce some of his new selections like *M.* 'Cranberry Lace,' *M.* 'Egret,' and *M.* 'Orange Crush.' Unfortunately, there are countless others mentioned in his book which have never seen quarters beyond Falconskeape Gardens that need to be evaluated. This may not be possible with the recent demise of Falconskeape Gardens. Nevertheless, he remains and always will remain one of the greatest figures in the history of crabapples.

EVALUATING CRABAPPLE RESISTANCE TO APPLE SCAB UNDER EPIDEMIC CONDITIONS

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The year, 1994, was the worst-year-ever for apple scab in Indiana.., until the following year. Indeed, those two years, 1994 and 1995, have been excellent years in which to evaluate crabapples for their resistance to apple scab. As such, an evaluation was made in both years at a large commercial nursery field planting in northern Indiana. The majority of crabapples evaluated had been planted out in 1990 as one-year old whips. Trees were planted in rows approximately 200 feet in length with 5 feet between trees and 7 feet between rows. Ten trees of each cultivar were evaluated each year.

The year 1995 presented an exceptional opportunity for scab evaluation. In addition to weather conditions being ideal for scab, a massive carryover of primary scab spores was present from the 1994 epidemic. The combination of ideal weather conditions for scab infection along with the exceptionally high number of primary spores resulted in complete defoliation of many susceptible cultivars by late June. Indeed, when the 1995 survey was made on July 13, many of the most susceptible cultivars were already showing flushes of new growth as a result of the severe defoliation which occurred in the previous month.

Cultivars were rated for apple scab severity on a scale of 0 to 5 according to that recommended by the National Crabapple Evaluation Program. Cultivars were then placed into one of three Classes: Class I (0 - 1 rating): cultivars with high resistance to scab; Class II(>1 - 3 rating): cultivars with moderate resistance to apple scab; and Class III (>3 - 5 rating): cultivars with high susceptibility to scab (Table 1). A rating of 3 (most leaves with scab symptoms, moderate defoliation) was chosen to separate between classes II and III since it was the first rating to introduce defoliation as a primary symptom. Only the 1995 data were used to establish classes. We chose to use only the 1995 data in that it was a defining year in separating amongst moderately resistant and highly susceptible cultivars.

Many of the cultivars rated as highly susceptible in our current study are rated as highly resistant in other reports. This discrepancy is most likely due to differences in disease pressure. While our 1995 study was made under conditions of very high disease pressure, many scab evaluations are made in years the disease pressure is moderate to low. Such "low disease pressure ratings" when combined with "high disease pressure ratings" are biased toward a more resistant rating since negative data

(low to no scab present) are being used in the overall evaluation of cultivar resistance. If disease pressure is zero, even the most susceptible of cultivars would be rated as resistant. Indeed, I wonder about the value of rating for scab in those years with little or no disease pressure. The value of our 1995 data is that growers can be assured that those cultivars in Class I will not get scab (other than "resistant-type" lesions) in even the worst scab years.

The three classes are artificial groupings of similarly rated cultivars for one year, nothing more. However, we do feel the three classes are a true reflection of cultivar resistance in those years when conditions are optimum for severe scab infection. The groupings of cultivars into classes are intended primarily for extension purposes as a convenient aid to help nurserymen and homeowners better decide on what cultivars to plant. Cultivars in Class III are especially suspect for future planting, while cultivars in both Classes I and II, in the author's opinion, have adequate resistance to be recommended for future planting.

Table 1. Classes of Crabapples Based on Their Resistance to Apple Scab*

Class I (0 - 1) High Resistance	Class II (>1 - 3) Moderate Resistance	Class III (>3 - 5) High Susceptibility
Anne E (0.2)	Canary (2.4)	Adams (4.0)
Baskatong (0.5)	Candymint Sargent (1.8)	Brandywine (3.5)
Bob White (0)	Centurion (2.8)	Weeping Candied Apple (3.5)
Jack (0)	David (2.0)	Indian Magic (4.2)
Japanese Flowering (0.6)	Donald Wyman (3.0)	Profusion (4.2)
Louisa (0.5)	Doubloons (3.0)	Indian Summer (5.0)
Ormiston Roy (1.0)	Harvest Gold (3.0)	Robinson (4.0)
Prairie Maid (0)	Jewelberry (2.0)	Snowdrift (4.0)
Prairifire (0.5)	Liset (1.5)	Velvet Pillar (5.0)
Red Jewel (1.0)	Madonna (3.0)	White Candle (3.6)
Redbud (1.0)	Mary Potter (2.0)	White Cascade (3.8)
Sargent (0)	Molten Lava (2.0)	
Silver Moon (0)	Selkirk (1.5)	
Sinai Fire (0.7)	Sentinel (1.5)	
Sugar Tyme (0.6)	Silver Drift (1.5)	
Tea (0.4)		
White Angel (0)		

*Apple Scab severity was rated on a scale of 0 to 5 according to that recommended by the National Crabapple Evaluation Program:
0=totally free of all scab symptoms
1=very few leaves with scab symptoms; no defoliation
2=many leaves with scab symptoms; no defoliation
3=most leaves with scab symptoms; moderate defoliation
4=most leaves with scab symptoms; heavy defoliation
5=total defoliation

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