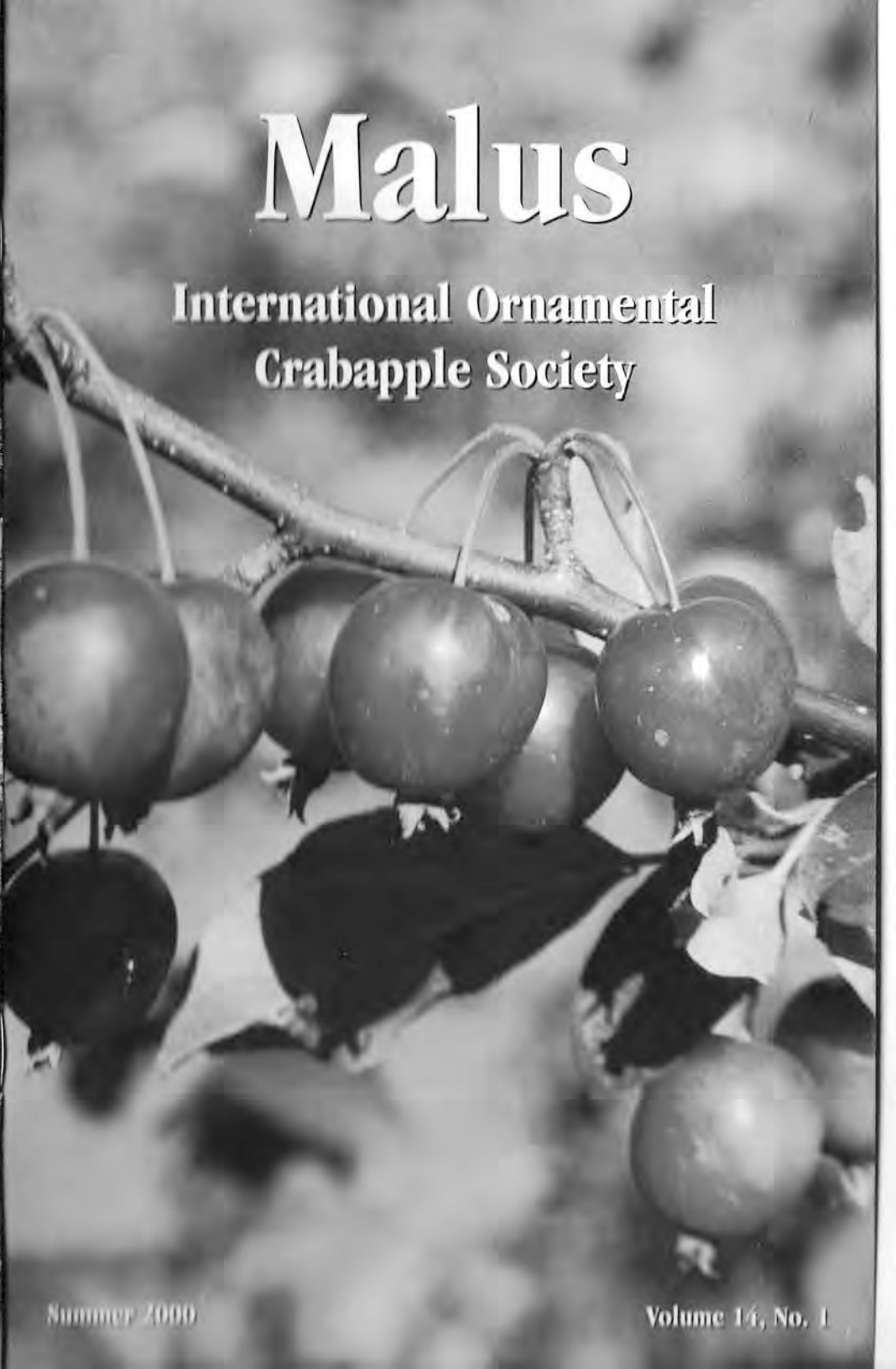




Malus

International Ornamental
Crabapple Society





A multiple of exquisite gardens make the Chicago Botanic Garden one of the most visited public gardens in the United States. (Photo by William Biderbost, CBG)

Malus

International Ornamental Crabapple Society Bulletin

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Front Cover Photo: Although with slightly larger fruit, *M. 'Callaway'* has always been a strong performer in the South. (Photo by David Guthery)

Rear Cover Photo: (Top left) *M. Coralburst™* is used for a formal effect at Boerner Botanical Gardens in Hales Corners, Wisconsin (Photo by David Guthery) (Top right) *M. 'Callaway'* at the Longenecker Gardens within the University of Wisconsin-Madison Arboretum (Photo by David Guthery) (Bottom) Crabapples outside the entry of the English Walled Garden at the Chicago Botanic Garden in Glencoe, Illinois. (Photo by William Biderbost, CBG)

President's Corner

Dear Members:

... And in this corner, sporting its silver lenticled trunks and burgundian-tinged pomes, its ... well you get the picture. Finally, having been sent to the corner many times in my career, starting in grade school, I find myself in this prestigious presidential place, poised for this State of the *Malus* address. What a fine issue for this season of presidential politicking. The ticket is balanced. Articles in *Malus* (Volume 14, Number 1) include pome tomes on: integrated pest management at the Chicago Botanical Gardens, tent caterpillar susceptibility studies from the great state of Tennessee (with crabapples donated from Oregon), recommended crabapples for Plant Hardiness Zones 6 & 7 from Tennessee and Georgia studies and apple scab evaluations from the great state of Ohio.

Read, learn and enjoy this *Malus*, savor the rest of this wild, wonderful and challenging growing season, and mark your calendars for October 19-20, 2001. That is the date for **2001: A Crab Odyssey**. Yew, we are only a little more than a year away from the issuing in of the new mal-ennium with the IOCS crabaganza planned for Crablandia at the Secrest Arboretum in Wooster, Ohio. Included will be full slates of educational programs for both professional and amateur *Malus* lover alike, demonstrations of the new crabapple evaluation criteria program, tours of Crablandia and other Ohio collections, sessions on crab chi and crab cuisine and other assorted dainties.

As to those silver lenticled trunks and burgundian pomes above, I speak, of course of 'Prairifire', a most estimable crabapple in all its finery and with excellent disease resistance. Although, in this unusually wet spring and early summer season of 200, at least here in Ohio, we have a small amount of scab on 'Prairifire', for the first time ever in our plots. Each season in a plant lovers' life brings something anew. For something olde, let us turn to the sageful words of the well-known malusarian, the Earl of Pomeroy.

"No genus of ornamentals so gracefully combines fruit, flower, foliage and form to such wondrous aesthetic appeale as the magical *Malus*, the crown jewelle of the rose family royal..."

Finally, remember: *Don't pick those scabs!*

Jim Chatfield
President, IOCS

Integrated Pest Management for Apple Scab on Ornamental Crabapples

by Tom Tiddens

In the Chicago area, apple scab (*Venturia inaequalis*) is the number one disease problem of ornamental crabapples (*Malus sp.*) If not dealt with properly, apple scab in the worst scenario can defoliate a crabapple by early summer and greatly reduce its vitality. Severely infected crabapples are unsightly and in most situations are unacceptable. The aesthetics of ornamental crabapples is certainly a primary concern in a display setting such as at the Chicago Botanic Garden (CBG) and must be managed.

At the Garden, plant health care is the responsibility of the Integrated Pest Management (IPM) Department. There are 553 crabapples currently in the Garden's collection, with a majority of them being cultivars that are susceptible to apple scab at varying degrees. Historically their management has involved a great deal of fungicide use for apple scab control.

In 1995, the IPM Department was challenged by the Garden's Director to reduce pesticide use while still maintaining aesthetic levels appropriate for a public display garden. With a strong IPM program already in place, this was truly a challenge. I began by reviewing all areas of pesticide use by the IPM Department and identified fungicide use for the control of apple scab as being one area that needed improvement. Before 1995, nearly all crabapples in the display areas were being treated with a fungicide to control apple scab -- even some that were said to be resistant. This undefined and unfocused treatment program needed improvement -- but how to begin?

The first step was to inventory and map all crabapples. Next, I studied apple scab susceptibility reviews to determine which we should treat. Sounds simple, but I discovered that these reviews did not always come up with the same conclusions. In some instances reviews said "highly susceptible" and others said "resistant" for the same cultivar. Why were they different?... Some possible reasons could have been genetic variation, breeding method, pathogen mutations, general climate, microclimate, proximity to bodies of water, pruning, vitality level and watering practices. Which review should we follow at the Chicago Botanic Garden?... I decided that when discrepancies were encountered in the published reviews, I would use data collected from The Morton Arboretum in Lisle, Illinois because they were the geographically closest. I then compiled the information and developed a

spray plan for 1995.

That year we also began our own evaluation program. The goal was to gather data specific for the crabapples on our site so we could refine our fungicide treatment program to further reduce fungicide use and maintain optimum aesthetics. To gather the "best data" we would have had to stop treatments for a season; but of course, that was not an option for our situation. So crabapples that were treated (three well timed fungicide applications) or not treated was going to be a big variable to consider when reviewing our own evaluation data.

1995 turned out to be an excellent year to begin the evaluation program; because of a very wet spring - there was no shortage of apple scab. The crabapples were evaluated three times (mid-June, mid-July and mid-August) each year and given a rating from 0 to 4. The following is our evaluation code.

0 - No lesions present

1 - Scab slightly, very few lesions present

2 - Scab moderate, lesions present, no defoliation

3 - Scab severe, many lesions present, some leaf drop

4 - Scab very severe, defoliation

During the winter of 1995-96, I began to interpret the data to determine which crabapples should be treated in 1996. To simplify interpretation, we wanted to be able to put the data into a formula to get a numerical "resistance rating" which would separate the susceptible from the resistant cultivars. To account for the factors that some crabapples were treated and others were not, and that some did not show susceptibility until late in the season, we decided to weight our ratings. We experimented with many different formulas and found one that provided us with good data and took into consideration the above factors

$Resistance\ rating = (\#of\ sprays \times 15) + (first\ eval.\times 5) + (second\ eval.\times 10) + (third\ eval.\times 15)$

Crabapples treated with fungicide were automatically assigned resistance rating points (15 points for each spray treat). Early signs of infection noted the first (x5) evaluation were weighted lighter than the second (x10), and the second lighter than the third/final disposition (x15). All four point accumulates are then added together to yield our resistance rating. As resistance ratings increase, so does susceptibility and the need to treat

The following are some examples of this evaluation system:

# of Crabs in the group	Taxa	# of Sprays, 1997	First Evaluation 6/23/97	Second Evaluation 7/21/97	Third Evaluation 8/11/97	Resistance Rating	1998 Spray "Yes/No"
1	<i>M. 'Adams'</i>	3	1	1	1	75	Yes
1	<i>M. 'Red Jade'</i>	3	1	1	2	90	Yes
4	<i>M. 'Selkirk'</i>	3	1	1	2	90	Yes
1	<i>M. 'Beverly'</i>	0	2	2	2	60	No
1	<i>M. sargentii</i> 'Tina'	0	1	1	1	30	No
1	<i>M. 'Beverly'</i>	0	1	2	3	70	Yes
1	<i>M. King Arthur</i> ®	0	1	1	1	30	No
1	<i>M. 'Red Jade'</i>	3	2	2	3	120	Yes
2	<i>M. sargentii</i>	0	1	1	1	30	No
3	<i>M. 'Snowdrift'</i>	3	1	1	2	90	Yes
2	<i>M. 'Adirondack'</i>	0	0	0	0	0	No
3	<i>M. 'Wintergold'</i>	3	1	1	2	90	Yes
1	<i>M. 'Profusion'</i>	3	0	0	0	45	No
2	<i>M. 'Adams'</i>	0	3	3	3	90	Yes
2	<i>M. Weeping Candied Apple</i> ®	0	1	1	2	45	No
1	<i>M. floribunda</i>	0	3	3	3	90	Yes
3	<i>M. Harvest Gold</i> ®	3	2	3	3	130	Yes
1	<i>M. 'Indian Summer'</i>	3	2	2	2	105	Yes

The resistance ratings points for our crabapples ranged from 0 to as high as 155. I selected a cutoff line of 70 points or above to get a "yes" for spraying. However, I did not let this evaluation solely guide my decision. Any crabapple that receives a resistance rating in the mid-range was looked at individually. I also considered the location and prominence of these crabapples. Crabapples in the perimeter areas were considered differently than those in highly maintained display areas.

We have conducted this review at the Chicago Botanic Garden for the past five years. Each winter I review data and refine the treatment list. Many mid-range cultivars have gone "on and off" the treatment list during the 5 years of the evaluation process; which has clarified their status. At this point, I feel we have a very focused fungicide treatment program that meets our organizational goals of aesthetics as well as plant health. We are now able to maintain our crabapple collection at the appropriate level with the least amount of spraying. Additionally, these reviews are shared with our Collections Department to help guide in new selections as well as removals. Over the past few years many of our most susceptible crabapples have been removed and replaced with better taxa.

The following is a list of the best and the worst crabapples in regards to apple

scab from our evaluations over the past five years here at the Chicago Botanic Garden:

Best:

M. 'Satin Cloud'
M. King Arthur®
M. trans. Golden Raindrops™
M. 'Starlight'
M. 'Hub Tures'
M. 'Liset'
M. 'Prairifire'
M. sargentii 'Tina'
M. 'Adirondack'
M. 'Red Peacock'

Worst:

M. 'Evelyn'
M. 'Indian Magic'
M. 'Indian Summer'
M. Velvet Pillar™
M. 'Selkirk'
M. 'Snowdrift'
M. 'Red Splendor'
M. 'Hooks 15'
M. floribunda
M. Centurion®

In combination with the fungicide treatment program, we use cultural maintenance practices at the Chicago Botanic Garden to reduce susceptibility to apple scab. Crabapples are pruned properly to promote air circulation, fallen leaves are removed to lessen the inoculum source, trees are watered as needed with an effort to keep the leaves dry in the process. They are fertilized once every three years and each tree has the root zone mulched to the drip line. The key is to maintain the tree's vitality as best we can. I have noticed very clearly that even a resistant crabapple that is newly planted or stressed often exhibits apple scab; and that when these stresses are removed the resistance quality returns. Proper planting and special first year care of newly planted crabapples is essential to help them achieve their potential vigor as soon as possible. These very important cultural activities should be the second line of defense. First being the selection and siting; and the final being fungicide treatments.

The original purpose of this evaluation was to direct our apple scab fungicide spray program and reduce pesticide use; but in the process, it truly accomplished a lot more. We now have five years of data that have been used and reviewed in many different ways. We have clearly identified our most disease prone crabapples and removed them. We compiled a list of the best and worst crabapples in regards to apple scab at the Chicago Botanic Garden, which we are sharing. Finally, we have developed a model program for the long-term management of an existing crabapple collection.

Also I am happy to say that the fungicide use for the control of apple scab on the Garden's crabapple collection has been reduced. This program in combination with others has yielded a 33% decrease in pesticide use by the IPM Department as

compared to 1994 -- and without a loss in quality!

Tom Tiddens is the Integrated Pest Management Supervisor at the Chicago Botanic Garden, which is located in Glencoe, Illinois. A special thanks to: Mike Brouillard, Cindy Baker, Tom Pfauter, Alana Mezo and Bob Gutner who all assisted with the Malus evaluations over the past five years.

Ornamental Crabapples Range in Resistance to Injury by Eastern Tent Caterpillar Feeding

by William E. Klingeman, Willard T. Witte and Philip C. Flanagan

Summary

Feeding injury caused by the eastern tent caterpillar, *Malacosoma americanum* (Fabr.) (Lepidoptera:Lasiocampidae), was quantified in 1999 among 58 ornamental crabapple varieties (*Malus* spp.) which were planted in Greeneville, Tennessee (plant zone 6b) in 1992. *M.* 'Red Barron', *M.* 'Profusion', *M.* 'Royalty', *M.* 'Selkirk', *M.* 'Liset' and *M.* 'Dolgo' had the highest levels of defoliation while *M. sargentii*, *M. sargentii* 'Dwarf', *M.* Coralburst™ and *M.* Brandywine® crabapples appeared uninjured by Eastern tent caterpillar feeding. Resistance was not correlated to crabapple leaf color.

Materials and Methods

In 1992, the J. Frank Schmidt & Son Co. donated a collection of 58 crabapples for disease resistance trials conducted by University of Tennessee researchers. Crabapples were planted in 5 replications with 3 trees of each cultivar per replication, at the Tobacco Experiment Station in Greeneville, TN. In 1999, large populations of Eastern tent caterpillar enabled us to investigate caterpillar feeding preferences among these crabapples. On April 20, counts were made by independent observers of the number of eastern tent caterpillar tents per tree. On May 4, when eastern tent caterpillars were observed leaving trees to pupate, defoliation was independently ranked, where (1.0) represented uninjured trees, (2.0) represented

1-25% defoliation of the entire plant canopy, (3.0) represented 26-50% defoliation, (4.0) represented 51-75% defoliation and (5.0) represented 76-100% defoliation. Data presented in Figures 1 and 2 represent cultivar means for values that were averaged among the three trees in each replicate.

Results and Discussion

No correlation was apparent for the feeding injury of Eastern tent caterpillars with crabapple leaf color (data not shown). Among blush or bronze-leaved cultivars, *M.* 'Red Barron' and *M.* 'Profusion' had high levels of feeding injury as did the purple-leaved cultivars *M.* 'Royalty', *M.* 'Selkirk' and *M.* 'Liset' (Figure 1). The green-leaved cultivar *M.* 'Dolgo' also had high levels of tent caterpillar defoliation (Figure 2). *M. sargentii*, *M. sargentii* "Dwarf" and *M.* Coralburst™, all having green leaves, and the blush/bronze-leaved *M.* Brandywine®, all appeared uninjured by the Eastern tent caterpillar feeding. Only minimal injury was apparent on *M.* 'David', *M.* 'Indian Summer', *M.* 'Pink Princess', *M.* 'Louisa', *M.x zumi* var. *calocarpa*, *M.* 'Adams', *M.* 'Adirondack', *M.* 'Red Jade', *M. floribunda* "Dwarf" and *M.* 'Robinson'.

In contrast to our observations, a Michigan study found no Eastern tent caterpillar infestations on *M.* 'Red Barron', but moderate infestations in *M.* Brandywine®. Selection of crabapples for landscape use and production in the Southeast should be based on Eastern tent caterpillar injury as well as feeding preferences of the Japanese beetle (*Popillia japonica* Newman).

Limited numbers of adult Japanese beetles were present at the Tobacco Experiment Station in 1999 and our ability to assess Japanese beetle feeding injury was inhibited. However, studies conducted by other researchers have indicated that the volatile compound, linalool, is a key component in determining plant attractiveness to Japanese beetles. Contrasting studies have demonstrated that plant resistance to beetle feeding pressure is positively correlated with the phenolic agent phloridzin. From these studies, *M.* 'Radiant', *M.* 'Red Splendor', *M.* 'Dolgo', *M.* 'Royalty' and *M.* 'Baskatong' have proven to be susceptible to Japanese beetles. *M. baccata* 'Jackii', *M.* Harvest Gold®, *M.* 'Jewelberry', *M.* 'David', *M. floribunda* and *M.* Brandywine® are crabapple taxa that have demonstrated resistance.

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M. americanum Feeding Injury Ranking
(1=0%, 2=1-25%, 3=26-50%
4=51-75%, 5=76-100%)

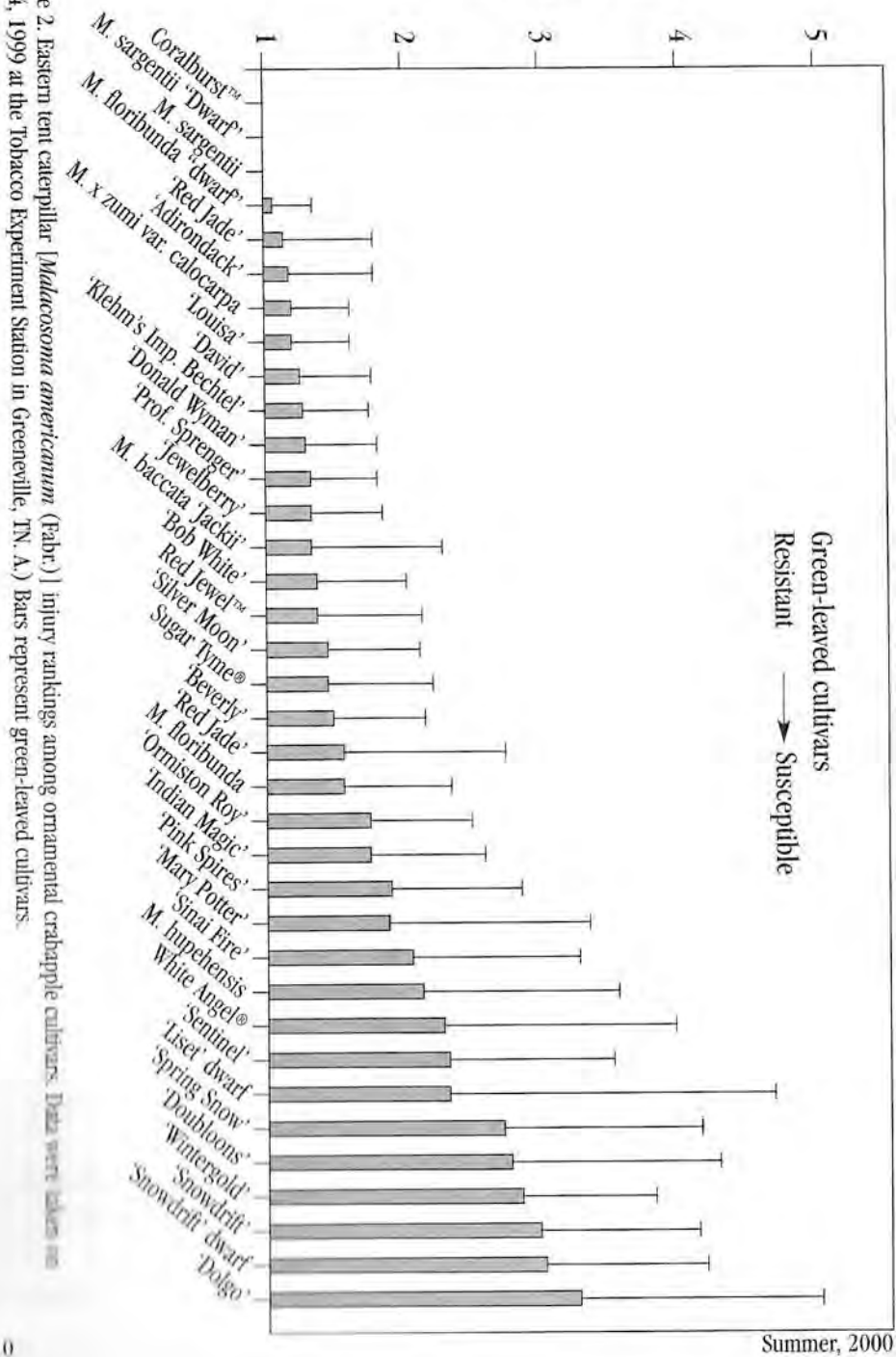


Figure 2. Eastern tent caterpillar [*Malacosoma americanum* (Fabr.)] injury rankings among ornamental crabapple cultivars. Data were taken on May 4, 1999 at the Tobacco Experiment Station in Greeneville, TN. A.) Bars represent green-leaved cultivars.

M. americanum Feeding Injury Ranking
(1=0%, 2=1-25%, 3=26-50%
4=51-75%, 5=76-100%)

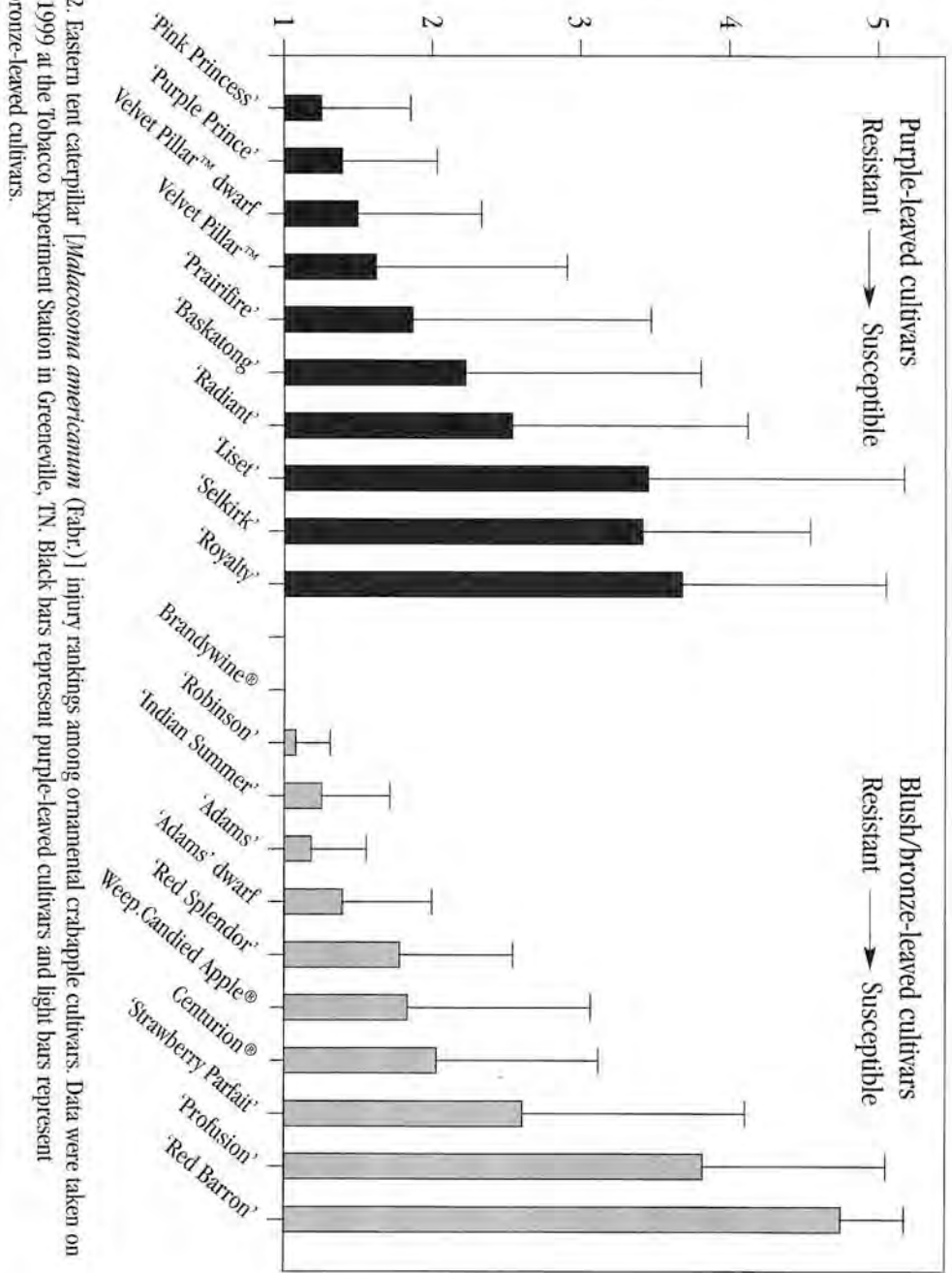


Figure 2. Eastern tent caterpillar [*Malacosoma americanum* (Fabr.)] injury rankings among ornamental crabapple cultivars. Data were taken on May 4, 1999 at the Tobacco Experiment Station in Greeneville, TN. Black bars represent purple-leaved cultivars and light bars represent blush/bronze-leaved cultivars.

Ornamental Crabapple Cultivar Recommendations for Plant Hardiness Zone 6 and 7

by H.P. Conlon, W.T. Witte, K.M. Tilt, M.T. Windham and A.S. Windham

Summary

Nature of Work:

Crabapple (*Malus* spp.) is a major small to medium size tree representing over 300 taxa. Most crabapple taxa are susceptible to one or more serious diseases in the landscape among which are fireblight, apple scab, cedar-apple rust and powdery mildew. Observational and research evaluations of crabapple taxa were reported through the 70's and 80's in the several northeastern and midwestern states. (see L.P. Nichols et al and T.L. Green.²). Previous papers reported at SNA by K. Tilt et al³ and W. Witte et al⁴ reported that disease pressure from apple scab was less significant at either trial sites in Greeneville, Tennessee (plant zone 6b) or in Brewton, Alabama (plant zone 8a). Sutton et al⁵ states that apple scab "is generally not as important in apple orchards in the southeastern United States."

Results and Discussion:

A summary of the results from the Tennessee and Alabama studies and additional information from other sources is contained in Table 1. The term "ornamental crabapple" refers to those taxa which (1) show high resistance to the four major diseases reported for *Malus* spp. and (2) produce fruit equal to or less than 5/8" in diameter. The double attractions of colorful fruit and bird feeding during the fall and winter seasons have spurred greater production, sales and marketing for planting the better ornamental crabapples in residential and commercial landscapes. The listing also singles out those cultivars susceptible to frog-eye leaf spot. This leaf spot fungus does not result in significant premature leaf drop through spring and summer seasons.

Significance to Industry:

This information represents the latest information on the selection of crabapple cultivars based on their ornamental and aesthetic values in the landscape. This listing should prove valuable to nursery producers wishing to improve their catalog inventory and to landscapers and garden center operators desiring disease resistant crabapple cultivars for residential and commercial properties and for attracting fruit-feeding birds. Most ornamental crabapples are small trees and offer an alternative to the over-planted and taller callery pears within plant zones 6 and 7.

Acknowledgement:

The authors wish to thank J. Frank Schmidt and Son Co. Boring, Oregon for generously donating 60 cultivars of crabapples in Tennessee and Alabama trial sites.

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RECOMMENDED ORNAMENTAL CRABAPPLES FOR TENNESSEE LANDSCAPES

Taxa	Mature Form (Height x Spread)	Flower	Fruit ($>5/8$ " diameter)
<i>M.</i> 'Adams'	20' x 20'	magenta	red
<i>M.</i> 'Adirondack'	18' x 10'	white	orange-red
<i>M. baccata</i> 'Jackii'	20' x 20'	white	red
<i>M.</i> 'Beverly'	20' x 20'	white	red
<i>M.</i> 'Bob White'	20' x 20'	white	yellow
<i>M.</i> 'Callaway'	25' x 25'	white	red (1" diameter)
<i>M.</i> Centurion®	20' x 15'	pink	red
<i>M.</i> 'David' ^a	20' x 20'	white	red
<i>M.</i> 'Dolgo'	40' x 25'	white	red (1 3/4" dia.)
<i>M.</i> 'Donald Wyman'	20' x 20'	white	red
<i>M.</i> 'Doubloons'	18' x 16'	double white	yellow
<i>M.</i> 'Indian Summer'	20' x 18'	magenta	red
<i>M.</i> 'Liset' ^a	15' x 15'	red	red
<i>M.</i> 'Louisa' ^b	15' x 15'	pink	yellow
<i>M.</i> 'Ormiston Roy'	20' x 25'	white	yellow-orange
<i>M.</i> 'Prairifire'	20' x 20'	red-purple	dark red
<i>M.</i> 'Professor Sprenger' ^a	20' x 20'	white	orange-red
<i>M.</i> Red Jewel® ^a	16' x 12'	white	cherry-red
<i>M.</i> 'Robinson'	25' x 25'	deep pink	red
<i>M. sargentii</i>	8' x 15'	white	red
<i>M. sargentii</i> 'Tina'	5' x 8'	white	red
<i>M.</i> 'Silver Moon' ^a	20' x 12'	white	red
<i>M.</i> 'Sinai Fire'	15' x 15'	white	red
<i>M.</i> Sugar Tyme® ^a	18' x 18'	white	red
<i>M.</i> Weeping Candied Apple®	15' x 15'	magenta	yellow
<i>M.</i> 'White Cascade'	15' x 15'	white	lime-yellow
<i>M. x zumi</i> var. <i>calocarpa</i>	20' x 20'	white	red

^a Good fireblight resistance

^b Susceptible to frog eye leaf spot

Evaluation of Crabapples for Apple Scab at the Secrest Arboretum in Wooster, Ohio: 1999

by James A. Chatfield, Erik A. Draper, Kenneth C. Cochran, Peter W. Bristol and Charles E. Tubesing

Summary

Crabapples in a replicated plot at the Secrest Arboretum of The Ohio State University's Ohio Agricultural Research and Development Center were evaluated for apple scab three times in 1999. Seventeen of the selections had no scab at any of the three ratings in 1999. Compared to average scab ratings over the past seven years, 40 of the 42 crabapple taxa in the plot had equal or lower scab incidence than normal in 1999, reflecting the drier than normal spring and summer weather and summer weather in Wooster in 1999. Average scab ratings are reported for the past seven years for 28 of the crabapple taxa in the plot, while data for only the past three years is reported for 14 of the more recently planted taxa. Fifteen crabapples removed from the plot in 1998 due to poor overall aesthetics are also summarized for the reader's information.

Introduction

Apple scab (*Venturia inaequalis*) is a major fungal disease problem of many crabapples species (*Malus* spp.). Although it generally is not a major health problem for the tree, it can severely impact ornamental effect and the marketability of highly susceptible crabapples.

Symptoms of apple scab on crabapple include olive to gray to brown to black spots on foliage, yellowing and discoloration of foliage, leaf drop and scabby lesions on the fruits. Apple scab can be effectively controlled with a fungicide spray program and certain cultural and sanitary practices (thinning to avoid dense canopies, cleanup of leaves at the end of the season) are also beneficial for control.

However, the best method for control of apple scab is through the use of genetically resistant crabapple selections. The evaluations presented here are the latest in a series of apple scab evaluations for Ohio (1-3).

The authors emphasize that apple scab in particular and diseases and pests in general are not the only consideration relative to crabapple effectiveness in the landscape. This is the rationale for the inception of more comprehensive evaluations

of a number of different aesthetic criteria. These include fruit, flower and foliage features and pest problems. These are reported in a series of publications from data collected in the Secrest plot (4-7). The comprehensive crabapple evaluations at Secrest are a continuing project and are being expanded to include a second plot with additional selections.

Materials and Methods

Forty-one crabapples in the replicated crabapple plot at Secrest Arboretum were rated for apple scab disease on June 8, 1999; July 12, 1999; and August 11, 1999. This plot is in a completely randomized design with three replications of each crabapple selection (except for *M. x zumi* var. *calocarpa* with two surviving replicates and *M. Red Jewel*® with one surviving replicate). The plot was planted in 1984 and is not treated with fungicides or insecticides.

Apple scab evaluations were based on the following rating system:

0 = No scab noted.

1 = Slight scab; less than 5% of leaves affected; no negative effect on aesthetics.

2 = Moderate scab; 5-20% of leaves affected; some yellowing; little or no defoliation; moderate negative effect on aesthetics.

3 = Extensive scab; 20-50% of leaves affected; significant defoliation and/or leaf yellowing; significant negative effect on aesthetics.

4 = Heavy scab; 50-80% of leaves affected; severe defoliation and discoloration of leaves; severe negative effect on aesthetics.

5 = Extreme scab; 80-100% of foliage is affected, and defoliation is complete or nearly complete.

Scab on crabapple fruits was factored into the overall scab ratings.

Table 1: Apple Scab Ratings for Crabapple Selections at Secrest Arboretum (6-9-99, 7-12-99, 8-11-99) and the Average Rating for Secrest Arboretum from 1993-1999.

Crabapple	Secrest 6-9-99	Secrest 7-12-99	Secrest 8-11-99	Secrest 1993-99
<i>M. baccata</i> 'Jackii'	0.0	0.0	0.0	0.0
'Beverly'	0.0	0.0	0.0	0.0
'Bob White'	0.0	0.0	0.0	0.0
'David'	0.0	0.3	0.6	0.8
'Dolgo'	0.0	0.0	0.0	0.0
'Donald Wyman'	1.0	1.6	2.3	1.5
<i>M. floribunda</i>	1.0	1.0	1.0	0.7
Harvest Gold®	1.3	1.6	2.0	2.5
'Indian Magic'	1.3	2.0	2.6	2.6
'Indian Summer'	1.0	1.0	2.3	2.1
'Liset'	0.0	0.3	1.3	0.9
'Mary Potter'	0.0	1.0	1.0	0.6
Molten Lava®	0.6	1.0	1.0	1.2
'Ormiston Roy'	0.0	0.0	0.0	0.2
'Prairifire'	0.0	0.0	0.0	0.0
'Professor Sprenger'	0.0	0.0	0.0	0.7
'Red Jade'	1.0	1.0	1.6	1.3
Red Jewel®	0.0	0.0	0.0	0.1
'Red Splendor'	1.0	1.0	1.0	1.4
<i>M. sargentii</i>	0.0	0.0	0.0	0.0
'Sentinel'	0.0	0.3	1.3	0.7
'Silver Moon'	0.0	0.0	0.0	0.0
'Snowdrift'	1.0	2.0	3.0	2.2
'Strawberry Parfait'	0.0	0.0	0.0	0.1
Sugar Tyme®	0.0	0.3	0.6	0.6
White Angel®	0.0	0.0	0.0	0.0
'White Cascade'	1.0	2.0	2.0	2.1
<i>M. x zumi</i> var. <i>calocarpa</i>	0.0	1.0	1.0	0.8

0 = No scab noted.

1 = Slight scab; less than 5% of leaves affected; no negative effect of aesthetics.

2 = Moderate scab; 5-20% of leaves affected; some yellowing; little or no defoliation; moderate negative effect on aesthetics.

3 = Extensive scab; 20-50% of leaves affected; significant defoliation and/or leaf yellowing; significant negative effect on aesthetics.

4 = Heavy scab; 50-80% of leaves affected; severe defoliation and discoloration of leaves; severe negative effect on aesthetics.

5 = Extreme Scab; 80-100% of foliage is affected and defoliation is complete or nearly complete.

Scab on crabapple fruits was factored into the overall scab ratings.

Table 2: Apple Scab Ratings for Crabapple Selections at Secrest Arboretum rated on 6-9-99, 7-12-99, 8-11-99 and the Average Rating for Secrest Arboretum from 1997-99.

Crabapple	Secrest 6-9-99	Secrest 7-12-99	Secrest 8-11-99	Secrest 1993-99
'Adirondack'	0.0	0.0	0.0	0.0
Camelot®	0.0	0.0	0.0	0.0
'Canary'	0.6	0.6	1.0	1.7
Lancelot®	0.0	0.0	0.0	0.0
'Louisa'	0.0	0.0	0.0	0.0
'Narangansett'	1.0	1.0	1.3	1.5
'Pink Satin'	1.0	1.3	1.3	1.4
'Prairie Maid'	0.0	0.0	0.0	0.0
'Purple Prince'	0.0	0.0	0.0	0.0
<i>M. sargentii</i> 'Candymin'	0.0	0.0	0.0	0.0
'Silver Drift'	0.0	0.0	1.0	0.7
'Sinai Fire'	0.0	0.0	0.0	0.0
Golden Raindrops™	0.0	0.0	0.0	0.0
Winter Gem™	0.3	1.0	1.0	1.5

0 = No scab noted.

1 = Slight scab; less than 5% of leaves affected; no negative effect of aesthetics.

2 = Moderate scab; 5-20% of leaves affected; some yellowing; little or no defoliation; moderate negative effect on aesthetics.

3 = Extensive scab; 20-50% of leaves affected; significant defoliation and/or leaf yellowing; significant negative effect on aesthetics.

4 = Heavy scab; 50-80% of leaves affected; severe defoliation and discoloration of leaves; severe negative effect on aesthetics.

5 = Extreme Scab; 80-100% of foliage is affected and defoliation is complete or nearly complete.

Scab on crabapple fruits was factored into the overall scab ratings.

Table 3: Apple Scab Ratings for Crabapple Selections at Secrest Arboretum from 1993-1997. These crabapples were discontinued in the plot due to poor overall aesthetic ratings.

Crabapple	1993-1997 Ratings
'Adams'	1.8
Centurion®	1.5
'Henningi'	2.0
'Hopa'	2.9
'Profusion'	2.8
'Radiant'	3.1
'Ralph Shay'	2.0
'Red Barron'	2.0
'Robinson'	2.5
'Royalty'	2.0
'Ruby Lustre'	1.9
'Selkirk'	1.7
Velvet Pillar™	2.8
Weeping Candied Apple®	1.8
'Wintergold'	2.5

0 = No scab noted.

1 = Slight scab; less than 5% of leaves affected; no negative effect of aesthetics.

2 = Moderate scab; 5-20% of leaves affected; some yellowing; little or no defoliation; moderate negative effect on aesthetics.

3 = Extensive scab; 20-50% of leaves affected; significant defoliation and/or leaf yellowing; significant negative effect on aesthetics.

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5 = Extreme Scab; 80-100% of foliage is affected and defoliation is complete or nearly complete.

Scab on crabapple fruits was factored into the overall scab ratings.

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Crabapples are an integral part of the gardens within the Chicago Botanic Garden, located in Glencoe, Illinois. (Photo by William Biderbost, CBG)