



MALUS

International
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Bulletin

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INTERNATIONAL ORNAMENTAL CRABAPPLE SOCIETY

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MALUS

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LETTER TO THE EDITOR

Dear Editor:

This is to inform you of the death of my husband, E. Paul Shisler. His association as a member of the IOCS, brief though it was before his health failed, provided him much pleasure.

I wish to thank the Society for continuing to send the Bulletin even after Paul became inactive. I found the "Tragic Tale of the Taiwan Crab" completely fascinating.

Congratulations on past achievements and best wishes for the future.

Sincerely,
Margaret Shisler
Dublin, Ohio
October 29, 1992

LETTER FROM THE EDITOR

The previous issue of **MALUS** contained many typographical and editorial errors; all due to my inexperience with a new word processing program. I apologize to the readers and to the two authors, Beth Dickson and Ruth Kvaalen, whose articles were most affected. I also owe an apology to the proof readers. What ended up in print was not entirely what the proof readers had proof read.

Please make one correction in your Fall Issue of **MALUS** on the seventh line on page 5 the word "six" should be "sixty".

CRAB ORCHARD, TENNESSEE

Joseph E. Wiles, D. Min.
Cookeville, Tenn.

Crab Orchard, Tennessee is a growing community in Cumberland County. Walton Ridge, a precipitous formation, drops sharply to Crab Orchard and forms the eastern edge of the Cumberland Plateau. The area around Crab Orchard is mostly mountainous, but the immediate area about the community is made up of varying size coves. The meadows of Crab Orchard were once part of an inland sea, which explains the sedimentary rock formations found around the area. Pioneers on their way to Nashville and other western lands came through Crab Orchard, but there was no easy way to arrive or depart until roads were built after 1800. They were very pleased to find such a place of beauty and rest after the rigors of the wilderness between Knoxville and Crab Orchard. The community is situated today at the crossing of Interstate 40 and US 70. US 70 basically follows the Walton Road and the Avery Trace. A toll road helped to build the Avery Trace portion, and it was located at Crab Orchard. Both the Walton Road and the Avery Trace followed a trail named after a Cherokee chief named Tollunteeskee.

Crab Orchard is named for the large orchard of wild crabs found in the glens. Incidentally, there are three other Crab Orchards. One is found in southern Kentucky, and two others are found in eastern Tennessee. All were named after the wild apple orchards.

Crab Orchard has been a focal point for travel for centuries. Indians, especially the Creeks and the Cherokees, used the area and made a trail through Crab Orchard. This trail connected with other trails that crisscrossed the entire United States area. Such trails were used for movement during hunting and for war parties.

Crab Orchard Mountain was next to the community and a beautiful but rugged piece of terrain. Movement through this area had to follow trails due to the roughness. The army helped build a road ten feet wide to assist travelers. One such traveler, Thomas (Big Foot) Spenser, traveled the major trail to Crab Orchard and in 1794 was killed by Creek Indians in an ambush. He was buried on a hill one mile from Crab Orchard, and the hill was named after him. He was called "Big Foot" because he left such big footprints and was reputed to have the body and strength to match his footprints. An interesting story is told about Thomas Spenser. It seems that he broke up a fight between two young men, and there was an exception taken to this. A man named Shaw disputed the matter and struck Spenser in the face. Whereupon Spenser picked up Shaw and threw him over a ten-foot wooden fence. Shaw is reported to have said to Spenser just to throw his horse over the fence, and he would be glad to ride off.

At the time Tennessee became a state in 1796 Thomas M. Clark began to meet the needs of travelers at Crab Orchard by selling various goods and stores to settlers. He had been granted a 640-acre section of the Crab Orchard area. Around 1800, a man named Sidnor build an inn named Sidnor's Stand. It was a rough but highly serviceable stopover. It was used until 1827 when Robert Burke, who also ran the toll booth for Avery Trace, bought it and tore it down. In its place he built what was then an elegant inn called Crab Orchard Inn. President Andrew Jackson used the Inn as a stopover between Nashville and Washington, D.C. This Inn was finally torn down in 1933.

Economically, the area was used for growing apples and grapes. It also produced, and still does, limestone from a massive quarry. This quarry can be seen from Interstate 40. The quarrying of Crab Orchard Stone was, and still is, a major source of income. This stone varies in width from 1/2 inch to 6 inches. Its color goes from red to pink to earth colors to yellow. It is still used in building, especially public buildings and is in such houses as the White House.

In an area which for years was called just the "Wilderness", Crab Orchard was truly a place of beauty. Due to the limestone deposits, the water was somewhat sweet to the taste. One natural

area there has an ever flowing spring and is in a cave-like formation. Each Spring the apple trees bloomed, and the Obed River kept the area well watered. While we can race past the area today, at one time it was a place Indians fought to keep out settlers. As people left Crab Orchard to continue on the Walton Road, they felt they were leaving a place next to Eden. In the Fall, the hardwood foliage is unsurpassed in beauty anywhere.

Today, Crab Orchard is a thriving community. It attracts tourists and those who have come to the Upper Cumberland to retire or make it home. It is a place of rich heritage and knows it. Recently, they have been able to obtain a federal grant for providing the community its own water system. The stone quarry industry assures Crab Orchard that it will have a place in modern Tennessee as well as the history books.

If you are ever driving along Interstate 40, and you spot the Crab Orchard exit sign, take time to stop off and see where some of the most exciting history in our nation was made. Try to view in your mind's eye how it must have looked to weary travelers almost 200 years ago. See again the massive mountains and the beautiful crab apple orchard that they saw upon arrival.

ANOTHER CRABAPPLE YOU SHOULD KNOW

Malus hupehensis cv. Cornell

Pardon W. Cornell

About 25 years ago while walking in the north pasture of the Cornell Farm in North Dartmouth, Massachusetts, I discovered a wild, small, handsome pink flowering-crabapple. Thereafter, I watched it very closely. As it matured, it became even more beautiful. I brought this tree to the attention of Cornell University at Ithaca, NY with the hope that they would be interested in marketing this crabapple. The Crabapple could be named 'Cornell Plantations', and the proceeds of the sale of this crabapple could be used to help finance the development of the Cornell Plantations, the arboretum of Cornell University.

The late Professor Lester P. Nichols, who did considerable work in the evaluation of crabapples, was hired by Cornell Plantations to evaluate this one for them. He made numerous trips to North Dartmouth and saw the tree in many stages and concluded that it was "worthy of commercial production". He was greatly impressed that here was a Tea Crab that flowered and fruited prolifically each year, the fruits were small, and the foliage immune to Cedar-apple Rust, Fire blight, and Apple scab.

Shortly after the Nichols report, Cornell Plantations heard from the Legal Department of Cornell University. They ruled that the Cornell Plantations' name could not be used because it promoted the sale of a plant not owned by the University. While I was a student at Cornell I met Liberty Hyde Bailey, the former Dean of the College of Agriculture for many years and also the "Dean of American Horticulture". Dr. Bailey was a big man, six feet tall or more with big broad shoulders. His hands were like a lumber-jack, just massive. When I was introduced to him, he stopped talking for a moment, grasped my hand and gave it a very gentle

squeeze. In a low, quiet, friendly voice he said: "You have a very good name." Thinking about this, it became obvious as to what to do about a name for the crabapple: Simply take the Cornell Plantations' name and merely cut off the word "Plantations." Just simply call it the Cornell Crabapple.

The tree is wider than tall, and the trunk is rather short. The branches are dark gray in color and very sturdy. They twist and turn as they grow upward. When a certain upward point is reached, growth seems to stop, and thereafter the branches arch downward.

When new growth comes out in the early spring, all the leaves are a mahogany-red color. As stems elongate, the tips of the shoots remain red, whereas lower leaves take on a glossy green color. About midseason, another change takes place; the red tips disappear entirely, and all the leaves now become a darker green and are slightly leathery in texture. When fall approaches, certain other color changes come about. The first sign of winter color is a dull mahogany-red color coming all over the entire tree. After a frost a green tinge becomes blended into the mahogany-red. With repeated frosts, splashes of yellow and orange appear in the crown. About the same time any dull mahogany-red that is left now becomes glossy, and the tree is a glittering mass of yellow, orange, and a dash of mahogany-red here and yonder. Shortly thereafter, the colors fade to rust color, and the leaves wither up and drop.

As to diseases, there has never been any signs of Cedar-apple rust. As to other diseases, such as Fire blight or Apple scab, neither has ever been observed on this crabapple.

Each and every year, about the third week in May in southeastern Massachusetts, the Cornell Crabapple becomes a solid mass of bloom. The early buds first appear as little deep pink "dots". They open further into a lighter pink and at that time there is a very slight trace of fragrance. The next change is white coming into the flower along with pink. Finally, the flower turns to a pure white with a blotch of dull pink. Very soon thereafter petal fall takes place.

Fruits first appear as "little green apples" about the size of your little fingernail. They turn from a dark green to a yellowish green with a spot of red appearing on one side to the fruit. The next change is to an orange-red color, and finally the entire fruit becomes a shiny red.

These fruits persist on the tree to about mid-winter, when suddenly all of them seem to disappear, either eaten by the birds or scattered in the mulch layer beneath. In the early spring, hundreds of seedlings "pop up" in the mulch.

Through words an attempt was made to bring to you the beauty of the Cornell Crabapple, beauty in its interesting arching form, beauty in its red and green glossy foliage, beauty in its handsome flowers, beauty in its red, orange, and yellow glittering fall color, and lastly in its small, shining red fruits. All combined to make the Cornell Crabapple a stunning "knockout"!

CORNELL CRABAPPLE DESCRIPTIVE INFORMATION

John H. den Boer

Readers of **MALUS** may recall the work being done by me to develop a database containing descriptive information on crabapples. The Cornell Crabapple is the most completely described crabapple in this database. What follows is the information available on the Cornell Crabapple. The format shown is the same as that provided by the computer program associated with the database:

DESCRIPTION OF CRABAPPLE

TRADE NAME: Cornell Crabapple
TAXON: Malus hupehensis (Pampan.) Rehd. cv. Cornell

ORIGINATOR/DISCOVERER/BREEDER: Pardon Cornell
PARENTAGE: Chance seedling
NAMED BY: Pardon Cornell
NAMED FOR: Pardon Cornell

TYPE: Single
COLOR OF BUD: Pink
Dark Red
COLOR OF BALLOON: Pale Pink to White
Red
COLOR OF FLOWER: Pink to White
PETAL SHAPE: Cupped
SHAPE OF PETAL BASE: Truncate to Subcordate
Attenuate to Truncate
SHAPE OF PETAL APEX: Rounded
Bluntly Rounded to Retuse
PETAL POSITION: Slightly Overlapping
ANTHER COLOR BEFORE ANTHESIS: White
ANTHER COLOR AFTER ANTHESIS: White
Light Yellow
STYLE LENGTH BEFORE ANTHESIS: Style Longer than Stamen
STYLE COLOR: Greenish
Purplish
STYLE BASE PUBESCENCE: Style Base Villous
Style Base Heavily Villous
PEDICEL COLOR - FLOWER: Purple
PEDICEL STIFFNESS: Flexible Pedicel
PEDICEL PUBESCENCE: Glabrous
FILAMENT COLOR: White
Lavender
OVARY COLOR: Green
Reddish-green
Purplish
CALYX COLOR: Red
CALYX PUBESCENCE - INSIDE: Moderately Pubescent
Heavily Pubescent
Densely Pubescent
CALYX PUBESCENCE - OUTSIDE: Glabrous
CALYX LOBE SHAPE: Lobe Wide Spreading
CALYX TUBE CONSTRICTION: Constricted Above Ovary
Slightly Constricted
CALYX TUBE PUBESCENCE: Calyx Tube Glabrous
HYPANTHIUM PUBESCENCE: Glabrous
INFLORESCENCE POSITION: Separated
INFLORESCENCE FORM: Umbellate

DESCRIPTION OF CRABAPPLE Cont.

BLOSSOM TIME - RANGE: Early
 FRAGRANCE OF FLOWER: Slight Fragrance
 Moderate Fragrance
 COLOR - IMMATURE FRUIT: Green
 RIPE FRUIT COLOR - SHADED SIDE: Yellowish-green
 RIPE FRUIT COLOR - SUNNY SIDE: Red
 Yellow
 Yellowish-green
 BLUSH INTENSITY: Obvious Blush
 BLUSH COLOR: Brownish-red
 BLOOM INTENSITY: None
 LENTICEL INTENSITY: Absent or not Visible
 LUSTER: Glossy
 WAX ON FRUIT: Fruit not Waxy
 FLESH COLOR - BODY OF FRUIT: Yellowish-green
 FLESH COLOR - NEAR SKIN: Yellowish-green
 CORE-LINE INTENSITY: Faintly Visible
 CORE-LINE COLOR: Yellow
 SEED COLOR BEFORE MATURITY: White
 SEED COLOR AFTER MATURITY: Light Brown
 CALYX PERSISTENCE: Calyx Deciduous
 CALYX DEPRESSION: Shallow
 PEDICEL COLOR - FRUIT: Purple
 FRUIT SHAPE - LONGITUDINAL: Oblate
 FRUIT SHAPE - TRANSVERSE: Round or Nearly Round
 FRUIT PERSISTENCE ON TREE: Drops Late in the Fall
 Drops During the Winter
 COLOR - YOUNG LEAVES: Green
 Reddish
 COLOR - MATURE LEAVES: Green
 Dark-green
 COLOR - FALL LEAVES: Red
 Orange
 Brown
 LEAF SHAPE: Elliptical
 Ovate
 LEAF MARGIN: Serrulate
 LEAF BASE SHAPE: Inequilateral
 Rounded
 LEAF APEX SHAPE: Acute
 Acuminate
 PUBESCENCE - TOP SURFACE - YOUNG: Surface Glabrous
 PUBESCENCE - BOTTOM SURFACE - YOUNG: Surface Glabrous
 PUBESCENCE - TOP SURFACE - MATURE: Surface Glabrous
 PUBESCENCE - BOTTOM SURFACE - MATURE: Surface Glabrous
 LOBES - VIGOROUS SHOOTS: Not Lobed
 LOBES - MATURE SHOOTS: Slightly Lobed
 Sometimes Lobed
 Not Lobed

DESCRIPTION OF CRABAPPLE Cont.

PETIOLE PUBESCENCE: Petiole Glabrous
 TREE SHAPE - YOUNG: Vase
 TREE SHAPE - MATURE: Vase
 Broad-headed
 Spreading
 BRANCHING TEXTURE: Coarsely Branched
 BRANCHING HABIT: Dense
 Horizontal
 Upward
 THORN-LIKE SPURS: Spurs Absent

<u>TREE AGE</u>	<u>TREE HEIGHT</u>	<u>TREE WIDTH</u>
Over 20 years:	17 feet	25.5 feet

MEASUREMENTS

(Dimensions in centimeters, weight in grams)

<u>Characteristics</u>	<u>Ave.</u>	<u>Std. Dev.</u>	<u>No.</u>
NUMBER OF FLOWER PETALS:	5.000	0.000	40
FLOWER DIAMETER:	4.095	0.274	20
PETAL LENGTH:	1.990	0.110	20
PETAL WIDTH:	1.505	0.113	20
PEDICEL LENGTH:	2.482	0.592	40
CALYX LENGTH:	0.444	0.111	40
CALYX WIDTH:	0.295	0.057	40
OVARY DIAMETER:	0.230	0.040	40
HYPANTHIUM LENGTH:	0.484	0.104	40
HYPANTHIUM DIAMETER:	0.448	0.066	40
NUMBER OF STAMENS:	19.775	1.025	40
NUMBER OF STYLES:	3.075	0.267	40
INFLORESCENCE NUMBER:	5.775	0.947	40
FRUIT DIAMETER:	1.146	0.102	20
FRUIT LENGTH:	0.973	0.085	20
RATIO - FRUIT LENGTH/DIA.:	0.850	0.042	20
PEDICEL LENGTH OF FRUIT:	2.836	0.235	20
CALYX SCAR DIAMETER:	0.453	0.074	20
LEAF LENGTH:	10.556	1.253	40
LEAF WIDTH:	4.488	0.617	40
RATIO - LEAF BLADE/WIDTH:	1.820	0.211	20
PETIOLE LENGTH:	2.557	0.684	40
STIPULE LENGTH:	0.800	0.158	5

COMMENTS

Registered 4 Nov 1988 by Pardon W. Cornell

MALUS ANNE E

David E. Guthery
Horticulturist/Landscape Designer
Johnson's Nursery, Inc.
Menomonee Falls, Wisconsin

In a large part of the United States, the ornamental crabapple is the most important small-scale landscape tree. One of the best is *Malus Anne E*[®] ('Manbeck Weeper'). The original plant was first observed by Michael Lee, assistant manager of Manbeck Nurseries, Inc. in New Knoxville, Ohio. It appeared as a chance seedling in a hedgerow and was recognized for its unique weeping form. Today, the original plant measures only 11 feet in height with a spread of 15 feet. Manbeck Nurseries registered the trademark *Anne E*[®] in 1985.

A distinct weeper, *Anne E*[®] is diminutive in stature, although it may be trained higher. In the spring, the cardinal red buds unfold to 39 mm (1.5"), single white flowers. The flower's margin is accented by a light crimson blush which fades within a day or two of opening.

Showy in fruit, the 10 mm ($\frac{3}{8}$ ") diameter fruits maintain a good red color from early September through January, when they are taken by the birds.

Unlike most crabapples, *Anne E*[®] consistently develops a good yellow fall color. In addition, its new bark is an attractive red color.

The slightly cupped, glossy green foliage has proven to be highly resistant to apple scab. My observations from 1989-1991 at the Longenecker Gardens within the University of Wisconsin-Madison Arboretum showed *Anne E*[®] to be free of apple scab, fire blight, and cedar-apple rust. Evaluations in Ohio have also shown high scab resistance by *Anne E*[®]. In addition, Michael Lee has found *Anne E*[®] does not develop deadly stem cankers, as does Red Jade.

Anne E[®] is reliably hardy through USDA zone 4 and requires proper soil drainage and exposure to full sun.

FLORAL DESCRIPTION OF ORNAMENTAL CRABAPPLES at the LONGENECKER GARDENS, UNIVERSITY OF WISCONSIN-MADISON ARBORETUM

David E. Guthery and Edward R. Hasselkus

During the spring of 1990, the flowers of the ornamental crabapples in the collection of the Longenecker Gardens in the University of Wisconsin-Madison Arboretum were described, utilizing the Royal Horticultural Society (RHS) Colour Chart. The RHS Colour Chart was utilized due to its thorough handling of the rosybloom colors as well as its relative ease of use. In addition, the RHS Colour Chart is considered by many to be the standard color chart in the horticultural field. Several other color charts were examined, most of which were considered sufficiently lacking in the color range needed to describe fully the rosybloom flower colors.

The table which follows is a list of all the crabapples which flowered in the Longenecker Garden's collection. Following each crabapple taxon is first a description of the number of petals present on an individual flower. Single flowers have five petals. Semi-double flowers have six to eleven petals, and double flowers have 12 or more petals. Semi-double and double flowers confer a longer flower display, as the flowers are better able to resist shattering. Following the petal description is a description of the bud/balloon stage detailing first the official RHS color number followed in parentheses by its tint. The balloon stage is defined as the stage in the floral development when the petals are fully hydrated, yet still are clasped together; contrasting with the bud stage, when the petals are not fully hydrated. Color determinations were made at an intermediate stage of development between the bud and balloon stages, rather than at both stages, due to time limitations. After the bud/balloon description, the flower description follows, similarly stating the color number followed by the tint in parentheses. Finally, the diameter of the flower is listed.

While the table below encompasses the ornamental crabapples which flowered in our collection, the following taxa of flowering age did not produce any flowers in the spring of 1990:

Malus x hartwigii
Malus baccata var. *mandsurica* NA#51192
Malus cv. Ruby Luster
Malus sikkimensis
Malus x sublobata
Malus cv. NA #49317

In addition, the following taxa produced relatively insignificant numbers of flowers:

Malus cv. Beverly
Malus cv. Cashmere
Malus cv. Evelyn
Malus cv. Oekonomierat Echtermeyer
Malus prunifolia var. *xanthocarpa*
Malus x purpurea cv. Lemoinei
Malus x zumi cv. Calocarpa Yellow Fruit

The following taxa exhibited a strong tendency towards biennial flowering in 1989 and 1990:

Malus cv. Adams
Malus cv. Pink Spires
Malus cv. Robinson
Malus cv. Sutyzam

Malus: FLOWER DESCRIPTIONS

<u>Taxon</u>	<u>Petal #</u>	<u>Bud/Balloon Color</u>	<u>Flower Color</u>	<u>Flower Size</u>
<i>M.</i> cv. Adams	Single	53 (B)	60 (C)	38 mm
<i>M.</i> cv. Adirondack	Single	68 (C)	White with pink blush fading	40 mm
<i>M. x adstringens</i> cv. Pink Beauty	Single	54 (A)	54 (D)	48 mm
<i>M. x adstringens</i> cv. Red Splendor	Single	60 (B)	73 (D)	41 mm
<i>M.</i> cv. Amberina	Single	58 (C)	White with pink blush fading	31 mm
<i>M.</i> cv. American Beauty	Double	64 (A)	61 (C)	47 mm
<i>M.</i> cv. Amerspirzam	Single	60 (C)	48 (C)	20 mm
<i>M.</i> cv. Ames White	Single	46 (A)	White	42 mm

Malus: FLOWER DESCRIPTIONS

<u>Taxon</u>	<u>Petal #</u>	<u>Bud/Balloon Color</u>	<u>Flower Color</u>	<u>Flower Size</u>
<i>M. angustifolia</i> f. <i>plena</i> Prince Georges	Double	46 (A)	73 (D)	45 mm
<i>M.</i> cv. <i>arnoldiana</i>	Single	54 (B)	White with pink blush fading	48 mm
<i>M. asiatica</i>	Single	55 (B)	White with pink blush fading	45 mm
<i>M. x atrosanguinea</i>	Single	53 (C)	65 (C)	27 mm
<i>M.</i> cv. Autumn Glory	Single	53 (C)	53 (C)	32 mm
<i>M. baccata</i>	Single	White	White	45 mm
<i>M. baccata columnaris</i>	Single	White	White	53 mm
<i>M. baccata</i> var. <i>Gracilis</i>	Single	60 (C)	White	40 mm
<i>M. baccata</i> f. <i>jackii</i>	Single	White	White	35 mm
<i>M. baccata</i> P.I. #213351	Single	White	White	45 mm
<i>M. baccata</i> cv. Walters	Single	57 (A)	White	33 mm
<i>M.</i> cv. Barbara Ann	Double	60 (B)	70 (C)	37 mm
<i>M.</i> cv. Baskatong	Single	60 (A)	61 (C)	38 mm
<i>M.</i> cv. Beverly	Single	51 (A)	White	33 mm
<i>M.</i> cv. Birdland	Single	52 (A)	White with pink blush fading	34 mm
<i>M.</i> cv. Blanche Ames	Double	65 (C)	White with pink blush fading	34 mm
<i>M.</i> cv. Bob White	Single	51 (B)	White with pink blush fading	29 mm
<i>M.</i> cv. Branzam	Double	46 (C)	62 (C)	48 mm
<i>M.</i> cv. Callaway	Single	58 (C)	White with pink blush fading	41 mm
<i>M.</i> cv. Canterzam	Single	53 (C)	White	25 mm
<i>M.</i> cv. Cascole	Single	46 (D)	White with pink blush fading	30 mm
<i>M.</i> cv. Cashmere	Single	60 (A)	White with pink margins fading	40 mm
<i>M.</i> cv. Centennial	Single	56 (D)	White	45 mm
<i>M.</i> cv. Centzam	Single	60 (A)	58 (A)	45 mm
<i>M.</i> cv. Chrishozam	Single	53 (B)	65 (C)	31 mm
<i>M.</i> cv. Cinzam	Single	53 (C)	White	27 mm
<i>M.</i> cv. Coralcole	Double	60 (A)	56 (D)	24 mm
<i>M. coronaria</i>	Single	62 (A)	White	43 mm
<i>M.</i> cv. Dainty	Single	60 (A)	67 (B)	37 mm
<i>M.</i> cv. Dauphin	Single	55 (A)	White	52 mm
<i>M.</i> cv. David	Single	51 (A)	White with pink blush fading	35 mm
<i>M.</i> cv. Dolgo	Single	50 (D)	White	40 mm
<i>M.</i> cv. Donald Wyman	Single	53 (C)	White with pink blush fading	40 mm
<i>M.</i> cv. Dorothea	Semi-double to double	53 (B)	67 (D)	38 mm

Malus: FLOWER DESCRIPTIONS

<u>Taxon</u>	<u>Petal #</u>	<u>Bud/Balloon Color</u>	<u>Flower Color</u>	<u>Flower Size</u>
<u>M. cv. Doubloons</u>	Double	53 (B)	White	32 mm
<u>M. cv. Ellwangeriana</u>	Single	55 (B)	White	36 mm
<u>M. cv. Evelyn</u>	Single	53 (C)	67 (C)	35 mm
<u>M. cv. floribunda</u>	Single	63 (A)	50 (D)	30 mm
<u>M. cv. Gibb's Golden Gage</u>	Single	54 (B)	White with pink blush fading	40 mm
<u>M. x gloriosa</u>	Single	53 (B)	55 (B)	30 mm
<u>M. cv. Golden Hornet</u>	Single	53 (C)	White to pink blush fading	41 mm
<u>M. cv. Gorgeous</u>	Single	54 (C)	White	32 mm
<u>M. cv. Gwendolyn</u>	Single	53 (C)	54 (D)	31 mm
<u>M. cv. Hargozam</u>	Single	53 (B)	White with pink blush fading	38 mm
<u>M. cv. Henningi</u>	Single	53 (C)	White	38 mm
<u>M. cv. Henry F. DuPont</u>	Single	46 (A)	70 (B)	55 mm
<u>M. cv. Henry Kohankie</u>	Single	59 (A)	White with pink blush fading	38 mm
<u>M. hupehensis</u>	Single	5 (C)	White with pink blush fading	35 mm
<u>M. cv. Indian Magic</u>	Single	60 (A)	58 (A)	45 mm
<u>M. cv. Indian Summer</u>	Single	59 (A)	70 (C)	43 mm
<u>M. ioensis</u>	Single	51 (A)	White with pink blush fading	40 mm
<u>M. ioensis f. fimbriata</u>	Double	46 (B)	65 (C)	43 mm
<u>M. ioensis cv. Klehm's Improved Bechtel</u>	Double	68 (C)	62 (D)	36 mm
<u>M. ioensis var. Nevis</u>	Single	White with slight pink tinge	White	24 mm
<u>M. ioensis f. Plena</u>	Double	58 (C)	56 (D)	35 mm
<u>M. cv. Jewelberry</u>	Single	60 (B)	White	25 mm
<u>M. cv. Jewelcole</u>	Single	56 (D)	White	32 mm
<u>M. cv. Katherine</u>	Double	58 (C)	56 (D)	40 mm
<u>M. cv. Kibele</u>	Single	59 (A)	60 (C)	41 mm
<u>M. cv. Kinarzam</u>	Single	47 (D)	White	30 mm
<u>M. cv. Kirk</u>	Single	58 (C)	White	30 mm
<u>M. cv. Lanzam</u>	Single	68 (C)	White	25 mm
<u>M. cv. Liset</u>	Single	59 (A)	74 (C)	48 mm
<u>M. cv. Lullaby</u>	Single	60 (B)	White with pink blush fading	35 mm
<u>M. cv. Manbeck Weeper</u>	Single	53 (C)	65 (C)	39 mm
<u>M. mandshurica</u>	Single	56 (D)	White	45 mm
<u>M. mandshurica cv. NA #44110</u>	Single	53 (C)	White	28 mm
<u>M. mandshurica cv. NA #44111</u>	Single	53 (C)	White	33 mm

Malus: FLOWER DESCRIPTIONS

<u>Taxon</u>	<u>Petal #</u>	<u>Bud/Balloon Color</u>	<u>Flower Color</u>	<u>Flower Size</u>
<u>M. manshurica cv. NA #49327</u>	Single	54 (C)	White	38 mm
<u>M. cv. Maria</u>	Single	60 (A)	67 (D)	35 mm
<u>M. cv. Mary Potter</u>	Single	46 (A)	White	34 mm
<u>M. cv. Mazam</u>	Double	58 (C)	White	59 mm
<u>M. moerlandsii cv. Winter Gold</u>	Single	54 (A)	White	37 mm
<u>M. cv. Molazam</u>	Single	53 (C)	White with pink blush fading	36 mm
<u>M. cv. Mount Arbor</u>	Single	60 (A)	66 (D)	37 mm
<u>M. cv. Naragansett</u>	Single	53 (C)	White with pink blush fading	35 mm
<u>M. cv. Oekonomierat Echtermeyer</u>	Single	3 (C)	69 (A)	46 mm
<u>M. cv. Ormiston Roy</u>	Single	54 (A)	White with pink blush fading	29 mm
<u>M. cv. Pink Dawn</u>	Single	59 (A)	70 (C)	43 mm
<u>M. cv. Parsii</u>	Single	60 (A)	56 (D)	37 mm
<u>M. cv. Pink Spires</u>	Single	60 (B)	56 (D)	52 mm
<u>M. cv. Prairifire</u>	Single	60 (A)	66 (C)	40 mm
<u>M. cv. Professor Sprenger</u>	Single	46 (A)	White with pink blush fading	33 mm
<u>M. cv. Profusion</u>	Single	61 (A)	74 (C)	52 mm
<u>M. prunifolia fastigiata</u>	Single	68 (C)	White	57 mm
<u>M. x purpuria Lemoine</u>	Single	60 (A)	61 (C)	46 mm
<u>M. cv. Pygmy</u>	Single	60 (A)	60 (C)	53 mm
<u>M. cv. Radiant</u>	Single	59 (A)	67 (B)	40 mm
<u>M. cv. Ralph Shay</u>	Single	51 (A)	With pink blush fading	41 mm
<u>M. cv. Red Barron</u>	Single	59 (A)	58 (A)	53 mm
<u>M. cv. Red Jade</u>	Single	53 (C)	White	44 mm
<u>M. cv. Red Swan</u>	Single	54 (B)	White	38 mm
<u>M. cv. Robinson</u>	Single	59 (A)	60 (C)	38 mm
<u>M. x robusta var. persicifolia</u>	Single	54 (D)	White	45 mm
<u>M. rockii</u>	Single	53 (C)	White	40 mm
<u>M. cv. Rosseau</u>	Single	46 (A)	70 (C)	44 mm
<u>M. cv. Royal Ruby</u>	Double	60 (A)	58 (A)	44 mm
<u>M. cv. Royscezam</u>	Double	60 (B)	69 (A)	60 mm
<u>M. x adstringens cv. Royalty</u>	Single	60 (A)	60 (C)	50 mm
<u>M. sargentii</u>	Single	51 (B)	White	26 mm
<u>M. sargentii cv. Rosea</u>	Single	58 (C)	White	32 mm
<u>M. sargentii cv. Tina</u>	Single	53 (C)	White	21 mm
<u>M. cv. Sentinel</u>	Single	53 (C)	56 (D)	25 mm
<u>M. cv. Serenade</u>	Single	53 (C)	White with pink blush fading	35 mm

Malus: FLOWER DESCRIPTIONS

Taxon	Petal #	Bud/Balloon Color	Flower Color	Flower Size
<u>M. sieboldii</u>	Single	60 (B)	White	32 mm
<u>M. sieboldii</u> var. Fuji	Double	53 (C)	White with pink blush fading	35 mm
<u>M. cv. Selkirk</u>	Single	60 (B)	68 (C)	43 mm
<u>M. sieversii</u>	Single	60 (A)	65 (C)	45 mm
var. <u>niedzwetzkyana</u> cv. Erie				
<u>M. sieversii</u>	Single	46 (A)	63 (C)	59 mm
var. <u>niedzwetzkyana</u> cv. Makamik				
<u>M. cv. Silver Drift</u>	Single	53 (C)	White	33 mm
<u>M. cv. Sinai Fire</u>	Single	46 (D)	White	38 mm
<u>M. cv. Sirgazam</u>	Single	White	White	40 mm
<u>M. cv. Snowcap</u>	Single	White	White	38 mm
<u>M. cv. Snowcloud</u>	Single to semi-double	54 (A)	White	44 mm
<u>M. cv. Snowdrift</u>	Single	54 (A)	White	44 mm
<u>M. cv. Snow Magic</u>	Single	46 (A)	White	34 mm
<u>M. x soulardi</u>	Single	46 (D)	56 (C)	37 mm
<u>M. cv. Sparkler</u>	Single	60 (B)	67 (C)	37 mm
<u>M. spectabilis</u>	Single	56 (C)	White	30 mm
<u>M. spectabilis plena</u>	Double	53 (C)	56 (D)	45 mm
<u>M. cv. Spring Snow</u>	Single	68 (C)	White	45 mm
<u>M. cv. Spring Song</u>	Single	74 (C)	White with pink blush fading	36 mm
<u>M. cv. Strawberry Parfait</u>	Single	53 (B)	65 (B)	38 mm
<u>M. cv. Sutyzam</u>	Single	58 (B)	White with pink blush fading	39 mm
<u>M. cv. Susan</u>	Single	58 (B)	White with pink blush fading	28 mm
<u>M. cv. Thunderchild</u>	Single	61 (A)	63 (A)	40 mm
<u>M. cv. Turesii</u>	Single	58 (C)	White	34 mm
<u>M. cv. Van Ezeltine</u>	Double	60 (C)	65 (C)	38 mm
<u>M. cv. Velvetcole</u>	Single	46 (A)	63 (D)	40 mm
<u>M. cv. Weepcanzam</u>	Single	60 (A)	63 (A)	43 mm
<u>M. cv. White Angel</u>	Single	62 (C)	White	43 mm
<u>M. cv. White Candle</u>	Single, semi-double, double	52 (A)	White with pink blush fading	54 mm
<u>M. cv. Zumarang</u>	Single	53 (C)	White with pink	33 mm
<u>M. x zumi</u> var. <u>calocarpa</u>	Single	46 (A)	White with pink blush fading	40 mm
<u>M. x zumi</u> cv. Winter Gem	Single	54 (A)	White	40 mm
<u>M. x zumi</u> cv. Wooster	Single	60 (B)	White with pink blush fading	37 mm

NORTH AMERICAN PLANT PRESERVATION COUNCIL

Barry Glick

The North American Plant Preservation Council (NAPPC) was formed recently by Barry Glick for the purpose of making more worthwhile plants available to gardeners. Modeled after England's National Council for the Conservation of Plants and Gardens, NAPPC is a non-profit organization that documents outstanding plant collections throughout the United States and Canada. While that goal sounds similar to that of the American Association of Botanical Gardens and Arboreta (AABGA), the two groups have recently formed an agreement that should guard against duplicate efforts. AABGA will direct its efforts to identifying and listing plant collections held by public gardens, universities, and other public institutions. NAPPC will identify and list collections held by private collectors and nurseries. Nor should the council be confused with the Center for Plant Conservation. The latter concentrates on preserving rare and endangered native plants, while NAPPC will focus on collections of cultivated plants.

The council, formed in August 1991, asked over 150 plant societies to let their members know about the organization. The group already has over 100 plant collections listed in its database. The listing includes so far collections of hostas, *Stewartia*, iris, begonias and *Acer* species.

A board of directors, horticultural heavyweights from nurseries, botanical gardens, and other horticultural organizations, oversees council operations and determines the standards for the collections. NAPPC plans to publish a directory of the collections soon. Each entry is to include the name of the collector, location, and number of cultivars and species. The list will also indicate if the garden is open to the public and list the hours of operation or a phone number if the collection can be viewed by appointment only. The directory is to be updated quarterly and a new one published each year.

NAPPC is intended to be a clearinghouse for information about plants and the experts who grow them. While the plant collections database is the council's first priority, other goals include arranging conferences and exhibitions and visits to gardens and nurseries.

The group hopes to encourage the conservation of uncommon plants through propagation and distribution. These plants may be valuable for historic, aesthetic, scientific, or educational reasons. A good example is the true German iris, *Iris germanica*, sometimes called grandmother's early blue and sometimes sold as the cultivar 'Purpurea'. A pre-ninth century iris, it's the one Van Gogh made famous in his 1889 painting. "It's commonly seen in gardens throughout Delaware and Pennsylvania," says Dr. Arthur Tucker, a council board member, "but if it's bought through a catalog, you don't receive the same plant." Collection holders are encouraged to distribute such plants, thereby preserving them for future generations.

NAPPC also will work with interested collectors to establish living wills. The council will serve as a connection between collectors and institutions so that a plant collection won't be lost in the event of a collector's death.

The council is funded through private donations and relies on volunteer workers. Board members and others have donated money as well as plants, which Glick has bartered for legal work, clerical help, graphic design, and printing.

The directory and updates and, eventually, a monthly newsletter will be available for an annual fee. For information write to:

Barry Glick, Executive Director
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Rt. 5
Renick, West Virginia 24966

DESCRIBING CRABAPPLES

John H. den Boer

Much is being done to describe crabapples. Elsewhere in this issue is a listing of the description of the Cornell Crabapple. You may have reason to wonder why so much descriptive information is necessary. Is it really necessary? The answer depends on what you want or need to do with descriptive information. For the casual reader perhaps all that might be needed is color of the flower and fruit, perhaps the color of the leaves, the size of the fruit and the tree, and that's enough. For the person wanting something more definitive, much more is needed.

Before I go further I need to define two terms; descriptor and description. A descriptor for a crabapple is a general characteristic such as color of flower. Many colors can be used to describe the color of a flower. "Red colored flower" is a description of a flower. White could be another description of a flower. There are over 100 descriptors used to describe crabapples. These descriptors cover flowers, fruit, leaves, and trees. Some descriptors are not always applicable. For instance, if there is no blush on the fruit, the color of the blush would not be applicable.

Descriptions of crabapples are used to differentiate one crabapple from others. If each crabapple had one description that was unique to that crabapple, then any and all crabapples could be identified by that characteristic unique to each. We could then say that each characteristic used to identify a crabapple had a very high descriptive efficiency.

Descriptive efficiency is defined as: 1 minus (total number of crabapples having a particular descriptor defined minus the total number of crabapples having a particular characteristic within that descriptor) times 100. Or, in a word, the descriptive

efficiency of a description is the percent of crabapples described for a given descriptor having a specific description for that descriptor subtracted from 100%. Let me use inflorescence of a blossom as an example. A flower has an inflorescence that is either umbellate or corymbiform, or both, three possibilities. At the moment there are 231 crabapples for which inflorescence has been described. There are 197 crabapples that have an umbellate inflorescence, 31 that have corymbiform inflorescence, and 3 that have both.

The three descriptions mentioned above then have the following efficiencies:

Umbellate:	15%	(1 - 197/231) x 100
Corymbiform	86.6%	(1 - 31/231) x 100
Both	98.7%	(1 - 3/231) x 100

Those descriptions having the highest descriptive efficiency are most likely to be involved in the development of "Clinchers": those few descriptions required to identify positively one crabapple from all others. Unfortunately, the ability to develop "Clinchers" depends on having a description for all applicable descriptors for all crabapples, all 900 plus crabapples known, or believed known to exist. Since this information is not now available, nor is it expected to be available any time in the near future, there needs to be a substitute for "Clinchers". I prefer the term "Indicators" since this does not connote finality. Indicators are those sets of descriptions that are unique to one crabapple based on available information. When "Indicators" are developed for a crabapple, it needs to be remembered that those "Indicators" are no longer valid when new information becomes available., that those "Indicators" need to be reconfirmed whenever there is descriptive information added to any other crabapple for any descriptor used in the "Indicator" set.

It was mentioned that there were three crabapples identified as having both umbellate and corymbiform inflorescence. These are:

<u>Malus toringoides</u>	Cutleaf Crabapple
<u>Malus toringoides</u> var. Macrocarpa	Macrocarpa Crabapple
<u>Malus fusca</u>	Oregon Crabapple

One additional descriptor is sufficient to create an "Indicator" for each of the above three crabapples: fruit diameter. Fruit diameter is a dimensional descriptor, as are all other measurements and counts used to describe characteristics of crabapples. The descriptive efficiency of these measurements is more difficult to calculate. Even to describe them is more difficult. First it must be understood that measurements vary; sizes of fruit within a tree varies within some limit; it varies from tree to tree within the same species or cultivar; it varies from tree type to tree type. In addition to the average values varying, the amount of spread in the measurements varies also. There is a statistical method for comparing measurements of some sort from one tree to another to determine if there is sufficient difference between the measurements to say that the measurements of the two groups of data came from two entirely different types of trees. That method depends on the average values of each set of data and the spread (difference between the high and low values) within each set. The term, Standard Deviation (Std. Dev), is the technical term used to describe this variability in a set of data. The total number of readings for each set also is involved in the method. The general meaning for descriptive efficiency is still the same, how well does a specific set of data distinguish one crabapple from all others. The following will illustrate how this works.

The three mentioned crabapples have the following information available on fruit diameter:

<u>Name</u>	<u>Ave. Dia.</u>	<u>Std. Dev.</u>	<u>No. of Readings</u>
Cutleaf	1.304	0.099	40
Macrocarpa	2.432	0.099	20
Oregon	0.850	0.089	36

As was mentioned, Std. Dev. is a measurement of the variability of a set of data. This statistic multiplied by 6 would give an approximation of the total spread expected from the data. Taking the values for the Cutleaf Crabapple, the measurements for the diameter of its fruit would be expected to be within about 1.00 and 1.60 cm. Similarly, the diameter for Macrocarpa Crabapple would be expected to be between 2.1 and 2.7 and for Oregon Crabapple 0.68 and 1.12 cm approximately.

As you can see, the size range for *Macrocarpa* is sufficiently greater than the other two so that you would agree that that fruit was significantly greater than the other two and for that reason a tree with inflorescence both umbellate and corymbiform and fruit size between 2.1 and 2.7 cm could be safely call *Malus toringoides* var. *Macrocarpa*. What about the other two? There is an overlapping in the expected size ranges of the Cutleaf and Oregon crabs. The statistical method used does not compare just the range of readings, but rather takes into account the average values and the number of readings as well as the Standard Deviation and, in this case does indicate that there is cause to believe that a difference exists between these two sets of data and that the trees are not the same.

In summary, then, it can be said that each of the following three crabapples have at least one set of clinchers, which are:

Cutleaf:	Inflorescence both umbellate and corymbiform Fruit dia. = 1.304, Std. Dev. = 0.099, and number of readings = 40
Macrocarpa:	Inflorescence both umbellate and corymbiform Fruit dia. = 2.432, St. Dev. = 0.099, and number of readings = 20
Oregon:	Inflorescence both umbellate and corymbiform Fruit dia. = 0.850, Std. Dev. = 0.089, and number of readings = 36

It could well be that other "Indicators" exist for these crabapples. The probability of single descriptions being clinchers for any crabapple is very remote. The possibility of pairs of descriptions is much greater. Combinations of three or more descriptions for use as a "Indicator" would be expected more often still.

The time is not too far off when it will be possible to develop "Indicators" for all of the known crabapples. Don't be surprised when you find that some crabapples require a very considerable number of descriptions to distinguish them from all other crabapples. It will be very interesting to see these "Indicators" once they have been developed.

FROGEYE LEAF SPOT, BOT CANKER, BLACK ROT

by Thomas L. Green
Research Plant Pathologist
Morton Arboretum

Frogeye Leaf Spot is caused by *Botryosphaeria obtusa* (Schwein.) Shoemaker (syn. *Physalospora obtusa* (Schwein.) Cooke, an ascomycete fungus. Black Rot is the more common name of this disease among the apple growers. Bot (*Botryosphaeria*) Canker is the name given to the disease when it attacks twigs and branches. It is a common disease of apples and pears and has been reported in Australia, New Zealand, Europe, India, North and South America, and Zimbabwe, Africa. In the United States, it is most severe in the Southeast, but it occurs throughout the eastern states. C. H. Peck first reported Black Rot on apple fruit in New York in 1879. W. B. Alwood was the first to report Frogeye Leaf Spot in 1892. However, it was not until 1908 that W. M. Scott and J. B. Rorer positively identified the pathogen. Fruit losses of 25-50% have been reported in the southeastern United States. This fungus differs from most other *Malus* pathogens in that it not only attacks the leaves and fruit, but causes branch cankers.

Frogeye Leaf Spot: Symptoms usually appear 1-3 weeks after petal fall. Infections begin as small purple flecks that enlarge to circular lesions to 5 mm in diameter. The margins of the lesions remain purple; the centers become tan to brown, giving the lesions the appearance of the eye of a frog. Heavily infected leaves can become chlorotic (yellow) and fall prematurely. Leaf lesions may be invaded by various secondary micro-organisms, which enlarge the lesions in an irregular manner, forming lobes or concentric rings.

Bot Canker: Branch cankers begin in the bark as slightly sunken, reddish-brown areas. Some remain small but can enlarge to become 0.5 m long or longer. The canker may be a superficial roughening of the bark, but in some instances the bark is killed and the wood cracks. The Black Rot fungus may attack bark adjacent to Fire Blight cankers or bark damaged by cold injury. Subsequent cankers can become quite large. Infected branches may be weakened enough to break with heavy fruit loads. Sometimes the branches are girdled and killed.

Black Rot Fruit infection can occur early in the season. Sepal infection is the most common form of early-season infection. First symptoms appear as minute red specks that later turn purple with a red-ring border. After a few weeks, the entire sepal lobe becomes infertile and turns dark brown. Sepal infections result in a blossom-end rot. After petal fall, the skin of young developing fruit may become infected. Infections appear as reddish flecks that develop into purple pimples 0.1-1.0 mm in diameter. These lesions do not enlarge rapidly until the fruits begin to mature. Infections on more mature fruit are often black, irregularly shaped, and surrounded by a red halo. As the lesions enlarge, they form a series of concentric rings alternating from black to brown. The lesions are firm and not sunken. Tiny black fungal fruiting bodies, pycnidia, are scattered over the surface of older lesions. Infected fruit tend to mummify and remain attached to the tree. The large size and weight of apples usually results in fruit-drop if they are not otherwise harvested. Fruits of many of the smaller-fruited persistent crabapple cultivars are commonly infected with this pathogen.

Rot can also occur around the seed cavity or core and is associated with early-season infection. Early-season infection of the carpels may result in premature fruit drop within a month of petal fall. Infected fruit often turn color and ripen 3-6 weeks before uninfected fruit.

Disease Cycle: *Botryosphaeria obtusa* overwinters in the bark cankers and mummified fruit. Spores (ascospores) are released by rainfall but are carried by the wind. Most spores are released during the 4- to 6- week period following petal fall. There is a summer stage of the fungus (Fungi Imperfecti *Sphaeropsis malorum* Berk.). Spore (conidium) release is initiated by rainfall, and spores are transported by water. In the southern United States the summer spores are released throughout the growing season.

There are several apple cultivars that are susceptible to Black Rot. The incidence of Black Rot in edible crabapples is not known. Its occurrence in the fruit of the small-fruited cultivars has not been studied. No control is recommended for Black Rot in crabapples.

Frogeye Leaf Spot is one of the diseases reported during fall evaluations. During several years of crabapple evaluations, Frogeye Leaf Spot has not been considered an important plant

pathogen. By careful examination, almost every tree will have a few leaves with single or few lesions, that is, a rating of 1 (disease barely detectable). The only cultivar that consistently rates higher at 2 (many leaves showing symptoms) or 3 (most leaves with one or few lesions or several leaves with multiple lesions) is 'Professor Sprenger'. However, this disease has not been observed to cause defoliation in any crabapple, and 'Professor Sprenger' rates as one of the best crabapples (2nd of 49 cultivars rated in 1990, '91, & '92) for fall aesthetics. Of the 22 cooperating stations in the National Crabapple Evaluation Program (NCEP), the Sand Hill Experiment Station near Columbia, South Carolina is the only test plot where Frogeye Leaf Spot is common, at low levels, on most cultivars. No control is recommended for Frogeye Leaf Spot.

Bot Canker is a consequence of poor plant vigor. Most canker pathogens attack and colonize stressed bark tissue. Cankers are common in crabapples that have been moisture stressed (deficit or excess); subjected to nutritional imbalances (deficit or excess); subjected to adverse environmental extremes (e.g., sudden temperature fluctuation, abnormally low winter temperature); treated with herbicides; or pruned improperly. Dead branches should be pruned during the winter to remove the inoculum before spores are produced during the first moist weather in spring. Cankered twigs and branches have tiny black protuberances (bumos) which generate thousands of spores when conditions are favorable. Removed branches should be chipped for mulch, burned, or removed from the site. If branches are pruned and dropped to the ground, the spores are still viable and released where they can cause new infection. Pruning during the late summer is not recommended. Wounds are more likely to be infected at this time. Chemical control is not recommended for Bot Canker. Sanitation (removal of dead branches), fertilization, watering during dry periods, and other treatments to alleviate stress are the best control of the canker fungi.

For additional information on this or other crabapple diseases, the Compendium of Apple and Pear Diseases, 1990, Edited by A. L. Jones and H. S. Aldwinckle, APS Press, St. Paul, MN is an excellent reference. It is available for \$25.00 from: The American Phytopathological Society, 3340 Pilot Knob Road, St. Paul, MN 55121-2097.

Editorial Policy

The Board of Directors, in their January 1993 meeting, approved the Editorial Policy as follows:

MALUS is the official journal of IOCS. Its purpose is partial fulfillment of the objectives of the Society: To foster interest in and appreciation of the ornamental trees in the genus *Malus* and related genera; to provide a forum for the exchange and dissemination of knowledge and ideas among such interests; to promote and appreciation of the virtues of crabapple trees and to educate the public on the most desirable cultivars; and to serve the members of the Society and the general public to the extent that the resources of the Society permit.

MALUS is a semi-annual publication that contains scientific and other information related to crabapples. Such information may be on taxonomic descriptions, on pests and physiological problems, on improved introductions or on other horticultural considerations about crabapples. Other types of subject matter related to crabapples will be considered.

Articles may be accepted from both members and non-members. Non-members who provide articles that are published in **MALUS** will be offered one year of free membership in the Society. The Editor reserves the right to accept or reject any article submitted to him for publication in **MALUS**.

Thorough descriptions should be provided about new crabapples. Nurseries submitting articles must be objective about the plants described and should provide comparative information to existing plants. Submitted articles should be typed or else be very legible.

The Editor reserves the right to suggest changes to the authors, or to make minor changes with the author's approval. Titles or headings may be changed or added. In order to provide clarity, spelling and punctuation may be changed. The authors will be provided with the opportunity to make a final review of the article for correctness. Major changes in the article at that time may not be permitted.

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