

MALUS

International
Ornamental Crabapple Society
Bulletin

Summer 1986

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INTERNATIONAL
ORNAMENTAL CRABAPPLE SOCIETY
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LESTER P. NICHOLS
May 16, 1919 - May 21, 1986

On the 21st of May, 1986, Professor Emeritus, Lester P. Nichols died in Peace Dale, RI. Many of those working with crabapples knew Les or knew of his work. We now realize his significance to the nursery industry and his importance in the establishment of the Crabapple Society. Les will be dearly missed, but will never be forgotten. We dedicate this issue of Malus in Memory of Lester P. Nichols.

SECOND ANNUAL SYMPOSIUM TO BE HELD
AT SWARTHMORE

On August 8, 1986, the Second Annual Crabapple Symposium will be held at the Lang Music Building, Swarthmore College, Swarthmore, PA. The Symposium is being sponsored by the International Ornamental Crabapple Society and The Scott Arboretum of Swarthmore College. This summer's meeting will be hosted by Ms. Judith Zuk, Director of the Scott Arboretum.

I want to thank Ms. Zuk, Mr. Michael T. Scott, Propagator at Princeton Nurseries, Allentown, NJ and the late Professor Nichols for all the work they put forth in arranging and planning for the Crabapple Symposium.

Calling all authors! Did you ever want to see your name in print? Here's your chance. Just send your articles about Malus, or related genera to:

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Your article will be edited and remains the property of the publisher (so don't send the original). Final selection of articles is solely the responsibility of the Publisher.

Did you know that applewood is often used in the manufacture of furniture and sold as cherry wood?

Thanks to our friend down under U. R. Wallaby of Kangaroo Korners, Australia.

SECOND ANNUAL CRABAPPLE SYMPOSIUM

August 8, 1986

Lang Music Building

Swarthmore College

Sponsored by

The International Ornamental Crabapple Society and
The Scott Arboretum of Swarthmore College

PROGRAM

- 8:00 Registration (Coffee & Donuts)
9:00 Welcome to the Scott Arboretum
Judy Zuk, Director, Scott Arboretum,
Swarthmore, PA
9:30 New Crabapples for Hybridizing
Father John Fiala, Medina, OH
10:15 Break
10:30 Evaluating Crabapples for Their Aesthetic
Qualities by: Tom Green, Ph.D., The
Morton Arboretum, Lisle, IL
11:00 Plant Exploration in Korea
Paul Meyer, Director of Horticulture,
Morris Arboretum, Philadelphia, PA
11:45 IOCS Announcements
12:00 Box Lunch
1:00 Crabapple Propagation by: Michael T.
Scott, Princeton Nurseries, Allentown, NJ
1:30 New and Improved Crabapples For Landscape
Use
Dick Kaufman, London Grove Nursery,
Arondale, PA
2:00 Panel Discussion
Moderator: Dr. E.R. Hasselkus, Extension
Horticulturist, University of Wisconsin,
Madison, WI
(All speakers will be available for
questions and answers.)
2:45 Tour of the Scott Arboretum
4:30 Refreshments

For further information, contact:
The Scott Arboretum
Swarthmore College
Swarthmore, PA 19081
(212) 447-7025

WELCOME TO THE SCOTT ARBORETUM

The Scott Arboretum is devoted to evaluating and growing improved forms of woody plants. The arboretum covers more than 110 acres on the Swarthmore College campus, creating the college landscape and providing a display of the best ornamental plants recommended for gardens in the Delaware Valley.

Established in 1929 as the Scott Horticultural Foundation, the arboretum memorializes Arthur Hoyt Scott, and alumnus of the Swarthmore Class of 1895. It was his dream to create a public arboretum on the Swarthmore campus, where people could go for horticultural education and enjoyment. Today, the collections contain over 5,000 different kinds of plants selected for their outstanding ornamental qualities, ease of maintenance and resistance to disease.

Major plant collections include flowering cherry, winterhazel, crabapple, lilac, magnolia, rhododendron, rose, tree peony, viburnum and wisteria. Of special note is the James R. Frorer Holly Collection, with over 220 kinds of hollies. This planting has been designated an official holly arboretum by the Holly Society of America. Other collections of interest include the summer border, ornamental grasses, day lilies, ground covers and the garden surrounding the arboretum's office.

The arboretum participates in two major plant evaluation programs. It is the primary test site for the Pennsylvania Horticultural Society's Styer Award and is the east coast test site for the University of British Columbia Plant Introduction Scheme.

THE WORK OF THE LATE
PROFESSOR LESTER P. NICHOLS

Courtesy of: Norbert Kinnen

Professor Lester Nichols, Professor Emeritus of Plant Pathology at The Pennsylvania State University, was an internationally recognized authority on crab-apples.

In 1961, Professor Nichols initiated and coordinated an effort to determine disease resistance of desirable crabapple varieties in the Northeastern United States. Crabapples in nurseries, public parks, gardens and arboreta were examined to determine their degree of resistance to four diseases that affect the genus - scab, cedar-apple rust, powdery mildew and fireblight. A fifth disease - frogeye leafspot - was also noted in the survey, although it was recognized as much less likely than the other diseases to affect crabs seriously.

Previous to Professor Nichols' coordinated efforts to compile this information, the majority of the crabapple selections available to the public in this country had achieved prominence in spite of their high susceptibility to one or more of the diseases mentioned. These crabs had been chosen for their ease of propagation and availability of supply and had been made popular by promotional campaigns that presented such features as the beauty of the bloom, without considering their propensity to disease. The failure of these promotional endeavors to take into consideration anything beyond superficial features often meant, in fact, that following an exceptional burst of flowers in the spring, the consumer had little more than a semi-defoliated tree the rest of the year. The general lack of knowledge about crabapples also resulted very often in the planting of trees with undesirable characteristics such as large fruit that dropped to the ground creating dirty and slippery conditions. The ultimate size and shape of the trees were also frequently unknown or ignored at planting time, and the cramped consequences revealed themselves much later.

Over the years, Professor Nichols dedicated more and more of his efforts to relieving these problems. He compiled and published an annual survey. The geographical area covered was gradually extended south and west with the cooperation of many distinguished plant pathologists, horticulturists and educators who contributed their time and efforts generously to determine which of the some 700 recognized cultivars were completely desirable. Not only were the quality and general characteristics of the tree and its habits considered, but for the first time, disease-resistance became a major criterion in determining excellence. As more states participated in the survey, trees could be observed in a variety of climates and soils, and the accuracy of the survey could be refined.

By 1965, a number of cultivars had shown great promise for resisting disease under varying climatic conditions and inoculum potential. A collection of specimens of these varieties began, and, by 1969, a sufficient quantity of them was available to establish a disease-resistance study plot at the Rock Springs Agricultural Research Center of Pennsylvania State University, under the supervision of Professor Nichols.

Planted along with the disease-resistant trees in the plot were susceptible varieties intended to provide inoculum sources. In addition, infected leaves were regularly brought from other locations and were placed and secured under each of the test trees to insure the presence of a disease source for spring infection.

To determine desirability of a variety, the form as well as the flowering and fruiting characteristics are rated. If a cultivar is found to be outstanding in these respects and also proves itself to be consistently free from all five diseases for a three year period, it is placed on an excellence list. If subsequently the tree should ever show susceptibility, its name is removed immediately from the list.

With the cooperation of a growing number of responsible pathologists and horticulturists, the accuracy of experimentation and of the annual survey has been refined to precision. The list of highly desirable disease-resistant varieties has been selected with the ever-present idea that consumers should never again have to accept trees that are less than ideal for their needs and circumstances. It is understandable that with such high standards of purpose and scientific research, the work of Professor Nichols received the grateful approval of scientists and crabapple lovers everywhere.

His contributions through writings and lectures, and the continuing research that occupied his life for twenty-two years has been recognized through several awards and merits.

- 1980 International Society of Arboriculture --- Author's Citation
- 1981 The Pennsylvania Horticultural Society --- Certificate of Merit
- 1982 The Pennsylvania Flower Growers --- Award of Merit
- 1982 Longwood Gardens --- Aware of Appreciation
- 1984 American Horticultural Society --- Citation for Outstanding Contributions to Scientific Horticulture.
- Honorary Member The Pennsylvania Flower Growers and the Rhode Island Nurserymen's Association

Professor Nichols worked together with Dr. Thomas Green, of the Morton Arboretum, and with Dr. Edward Hasselkus, of the University of Wisconsin, to develop a National Crabapple Evaluation Program. The purpose of this program is to provide further information, testing, standardization and guidance for crabapple lovers and for homeowners, architects, landscapers, nurseries and others. Eighteen test plots have been established throughout the United States, and a Malus Society was created in January of 1985 to coordinate educational efforts and promote only desirable cultivars.

LIST OF CRABAPPLE CODE NUMBERS AND CURRENT ACCEPTED NAMES FOR THESE CRABAPPLES

by:
The Late Les Nichols

It is often the practice of developers of new crabapples to assign code numbers to new selections. Selections of flowering crabapples that show promise and are released to the trade may later be named, and the code number is dropped. It is assumed that most people are aware of the naming of the new crabapple. However, it has been my experience in visiting large collections of crabapples in arboreta or nurseries to find that in some cases, the new selections are still labeled with the old code number. Some growers claim they were unaware of the new name, or in some cases the change was just overlooked. The following list of code numbers for crabapples and the names that have been assigned to these crabapples is of historical interest and also may assist growers in updating the labeling in nurseries and arboreta. Please note that these are only code numbers and are not synonyms.

<u>CODE NUMBER:</u>	<u>ACCEPTED NAME:</u>
AA 328-55A	cv. Red Barron
AA 5407	X. <u>dawsoniana</u>
AA 6639	cv. Blanche Ames
AA 17039	cv. Mary Potter
AA 10794	<u>coronaria</u> cv. Charlottae
AA 19039	cv. Henrietta Crosby
AA 33340	cv. Pink Pearl
<u>baccata siberica</u> No. 3201	cv. Snowcap
B.F. No. 4	cv. Alred
B.F. No. 6	cv. Jubilee
Cole NDBT	cv. Snowdrift
Cole No. 71-10	cv. Velvet Pillar
den Boer Seedling No. 54-lcv.	Guiding Star
den Boer No. 1396-41	<u>ioensis</u> (Red Seedling
No. 1)*	
Hopa Seedling No. 2	cv. Patricia

<u>ioensis</u>	cv. Plena Klehms
No. 8	cv. Brandywine
<u>ioensis</u> Seedling Red No. 2	cv. Lisa
Jay Darling Seedling No. 3	cv. Purple Wave
Jay Darkubg Seedling No. 166	cv. Irene
Kerr 63-1	cv. Dainty
Kerr 63-5	cv. Pygmy
Kerr 63-9	cv. Pink Cascade
L. B. No. 1	cv. Behrens
Milton Baron No. 2	cv. Sugartyme
Minn. 6C	cv. Radiant
Minn. 11AA	cv. Vanguard
Minn. 11AB	cv. Sparkler
Minn. 1472	cv. Centennial
Minn. 240	cv. Chestnut
Minn. 635	cv. Flame
Minn. 1423	cv. Northland
Morton Arboretum No. 447	cv. Kibebe
MR 352	cv. Kerr
MR 451	cv. Pink Beauty
MR 452	cv. Almey
MR 453	cv. Sundog
MR 454	cv. Spring Glory
MR 455	cv. Garry
MR 457	cv. Selkirk
Oekonomierat Echtermeyer Seedling No. 1	cv. Seafoam
OPS 825	cv. Prairie Rose
P.U. No. 15-56	cv. Ralph Shay
Simpson S-1	cv. Silver Moon
Simpson 4-17	cv. Burgundy
Simpson 4-28	cv. Ruth Ann
Simpson 4-53	cv. Yellow Jewel
Simpson 6-15	cv. White Candle
Simpson 7-62	cv. Jewelberry
Simpson 11-57	cv. Centurion
Simpson 11-58	cv. Indian Summer
Simpson 11-63	cv. Indian Magic
Simpson 12-77	cv. Sentinel
Simpson 14-13	cv. Ellen Gerhart
Sutherland No. 2	cv. Royalty

U.S.D.A. P.I. No. 64833	cv. Gorgeous
U.S.D.A. P.I. No. 88577	cv. Striped Beauty
U.S.D.A. P.I. No. 148707	cv. Namew
U.S.D.A. P.I. No. 256023	<u>purpurea</u> cv. Makowieckiana
U.S.D.A. P.I. No. 325156	<u>sieboldii</u> cv. Fuji
VC No. 3	cv. Leslie
XP - 177	<u>sargentii</u> cv. Rancho Ruby

* Indicates Not An Accepted Cultivar

GUIDE TO SOURCES OF CODE NUMBER:

AA = Arnold Arboreta, Jamaica Plain, Mass.
 B.F. = Provincial Horticultural Station, Brooks, Alberta, Canada
 Cole = Cole Nursery Co., Painesville, OH
 den Boer = The late Arie F. den Boer, founder of crabapple collection at Water Works Park, Des Moines, IA
 Kerr = W. L. Kerr, Experimental Farm, Canada Dept. of Agr., Morden, Manitoba, Canada
 L.B. = L. Berhens who discovered L.B. No. 1 the Berhens Crab
 Milton Baron = Former Landscape Architect at Michigan State University
 Minn. = University of Minnesota, St. Paul, MN
 Morton Arboretum = Morton Arboretum, Lisle, IL
 MR = Experimental Farm, Canada Dept. of Agr., Morden, Manitoba, Canada
 OPS = Agr. Experimental Station, University of Illinois, Urbana, IL
 P.U. = Purdue University, LaFayette, IN
 Simpson = Simpson Nursery Co., Vincennes, IN
 U.S.D.A. P.I. = United States Department of Agriculture Plant Introduction

FRAGRANCE OF FLOWERING CRABAPPLES

BY:

The Late Lester P. Nichols

"The names of many flowers are inseparably associated with their fragrance, such as lilacs, narcissus, heliotrope or roses. Unfortunately, this is only known in a negligible way with the apples and crabapples. They are generally accorded to have some scent, but not in the measure they deserve. All our native species and their varieties should be in higher esteem for all their fine qualities, including the delightful, subtle fragrance of their blossoms and the pleasing, spicy scent of their fruit." (1)

"All pear flowers contain amines which result in putrid odors, whereas apple species have pleasant smelling flowers characterized by certain volatile esters." (2)

There is still much truth to Arnie F. den Boer's statement made back in 1959, but, unfortunately, there is still little in crabapple literature to give a hint as to the most fragrant of the crabapple blossoms. Following is a list of fragrant crabapples that I have been able to find in my meager collection of literature. Readers are urged to submit their own lists to 'Malus' so that we may have more information on this fragrance feature of crabapples.

- Malus angustifolia.....Southern Crab
- Malus baccata.....Siberian Crab
- Malus coronaria dasycalix.....Wild Sweet Crab
-(Western Type)
- Malus ioensis fimbriata.....Fringe Petal Crab
- Malus ioensis 'Plena'.....Bechtel's Crab
- Malus hupehensis.....Tea Crab
- Malus lancifolia.....Allegheny Crab
- Malus coronaria 'Nieulandiana'.....Nieuland Crab
- Malus floribunda.....Japanese Crab
- Malus robusta.....Cherry Crab

- Malus sieboldii arborescens.....Tree Toringo Crab
- Malus sieboldii var. zumi 'Calocarpa.....Redbud Crab
- Malus sargentii.....Sargent Crab
- Malus arnoldiana.....Arnold Crab
- Malus 'Bob White'
- Malus 'Brandywine'
- Malus 'Burgundy' (Has a grape-like fragrance)
- Malus 'Dolgo'
- Malus 'Huron'
- Malus 'Lisa'
- Malus 'Prince Georges'
- Malus 'Sugar Tyme'
- Malus 'Tanner'

1. den Boer, Arnie F. 1959. Flowering crabapples p. 26. American Association of Nurserymen
2. Janick, J. 1976. The apple-pear pickle. Horticulture 54(9):2021.

Did you know that Malus 'Wolf River 1881' (an apple) is often 12 inches in diameter or more, and a whole pie can be made from each apple!

Thank you Bea Hyve of Mud Gap, Illinois

Did you know that the skin of apples is nearly impossible to digest, and therefore, provides excellent roughage to the diet?

Thank you Dr. I. M. Pricey of Snooter's Pocket, Arkansas

ROOTSTOCK SUCKERING - A COMMON MAINTENANCE PROBLEM

BY:

Professor Ed Hasselkus
Department of Horticulture
University of Wisconsin - Madison

Consider these landscape situations. A mass planting of Sargent crabapples with their low, horizontal branching habit planted in front of a medical clinic. Several years later these same plants are twice as tall with stiff, coarse-textured upright branches. Or a boulevard planting of refined pink-flowered crabapples that after several years are coarse-branched, bearing white flowers and large littering fruits.

In both cases, vigorous sucker shoots arising from the common apple rootstock went undetected and overwhelmed the desired cultivar. It is for this reason that prompt removal of rootstock suckers is the most important care that crabapples should receive.

Rootstock suckering has been observed to be most prevalent under these conditions:

1. Dwarf or slow-growing cultivars sucker more than large, vigorous cultivars.
2. Budded plants are more likely to sucker than bench-grafted plants.
3. Shallow planting enhances suckering and lessens the possibility that the scion will form roots to eventually reject the rootstock.
4. Some types of rootstocks are more prone to sucker production than others.
5. Pruning off suckers above ground will usually result in their immediate regrowth.

Other than cutting off suckers below ground level, there are several other ways of dealing with them. Application of naphthaleneacetic acid (NAA) - containing compounds to the cut-off suckers retards their redevelopment. 'Tre-Hold' in aerosol or paint-on preparations, manufactured by Union Carbide is one such product. A word of caution. Roundup should never be applied to suckers as it will be translocated into the parent plant to injure or kill it.

Bob Bickelhaupt of The Bickelhaupt Arboretum, Clinton, Iowa, has reported that polypropylene fabric, placed beneath a woodchip mulch, was effective in preventing rootstock suckering of crabapples in their collection. Care was taken to place the 'Typar' in close proximity to tree trunks.

The ultimate solution to the rootstock suckering problem is to propagate crabapples from softwood cuttings. Several wholesale nurseries are now offering 'own root' plants of some of the best crabapple cultivars. Own root propagation also facilitates the production of multi-trunked crabapples which are favored by many landscape architects.

Did you know that apples and crabapples can be eaten dried, fried, spiced, diced, minced, boiled, baked, staked, caked, candied, brandied, carmelled, sauced, juiced and raw?

Thank you Osborn Lucky of Rock Slide, Montana

TYPAR SOLVES WEED AND ROOT SPROUT PROBLEMS

By: Bob Bickelhaupt

The Bickelhaupt Arboretum, of Clinton, Iowa, was made aware of Typar by one of its Board of Directors, Dr. Ed Hasselkus, of the University of Wisconsin-Madison. Through friends at the local DuPont plant, we received samples of various grades of Typar thought to be applicable for landscaping. Typar is pervious, spunbonded polypropylene which allows air and water to penetrate, neither of which is true of black plastic. In the past Typar was used in construction of highways, erosion control, soil stabilization and drainage application, as a filter fabric. It will only deteriorate if exposed to sunlight.

All of our pendulous conifers had been mulched with two to four inch washed river rock, four to six inches deep. This is necessary to keep bottom foliage from rotting; hand weeding is most time consuming. Therefore, we felt that this was an excellent place to test Typar.

DuPont sent us four, large samples, style No. 3201, 9 mils thick; No. 3341, 13 mils thick; No. 3401, 15 mils thick and No. 3601, 18 mils thick. In August, 1981, these Typar samples were installed under mulch in the pendulous conifer collection. To date, we have had no weed grow through this material. The only weeds in the mulched areas are from seeds blown in or those dropped by birds. Of course, these are readily removed.

Root sprouts in mulched areas are always a problem. We have many ornamental Malus varieties and cultivars where this is true. Mulch must be raked back and the sprouts cut off at ground level at least twice each year. In 1982, we did not cut the root sprouts on four plants, in preparation for the Typar test. All orientation at The Arboretum is done on a basis of 12 o'clock being due north. In May, 1983, No. 3201 was placed in a different half moon under each plant, so that sun light could not affect the test.

Malus x arnoldian.....6 to 12 o'clock
Malus x atrosanguinea.....12 to 6 o'clock
Malus hupehensis.....3 to 9 o'clock
Malus sargentii.....9 to 3 o'clock

The Typar was covered with four to six-inches of wood chips, and the other half of the circle, as a control, had an equal amount of wood chips on the bare soil.

We are so convinced of the value of Typar that we have purchases more than 1,500 square yards of style No. 3401. This material comes in rolls of 151 inches wide and 100 yards long. We cut it with a small chain saw into three and four-foot rolls, laying it under rock and wood chips throughout the 13-acre Arboretum, except where we want groundcovers to spread by stolons, self-seeding or self-layering (where it would inhibit the plant's growth). We found No. 3601 a good product, but it is heavier than needed. Typar No. 3201 is now called their landscape grade and is fine for the homeowner, but we feel No. 3401 is best suited for an arboretum's use, where foot traffic on the mulched areas is a problem. Typar No. 3401 is \$.70 per square yard and No. 3201 is \$.58 per square yard.

Did you know that crabapples are the most soil and climate adaptable fruit trees in the world?

Thank you Helga Gramite of Fly Tickle, Oregon

SUMMARY OF 1985 ORNAMENTAL CRABAPPLE SYMPOSIUM

By: Peter W. Bristol

Under beautiful sunny skies on August 8, 1985, Fred Buscher, District Specialist, Landscape Horticulture, Ohio Cooperative Extension Service, welcomes 85 enthusiasts to an Ornamental Crabapple Symposium at the Ohio Agricultural Research Development Center. This day-long meeting featured five speakers and a business meeting of the International Ornamental Crabapple Society and a wagon tour of nearby Secrest Arboretum.

Lester P. Nichols, Professor Emeritus, Pennsylvania State University, began the educational session with 'Crabapple Diseases and Their Control'. He noted that there are over 700 different crabapples with a variety of bud color, flower size and color, fruit size and color and foliage, except there are no yellow-flowered crabs. For those that grow and admire a variety of crabapples, diseases are a common concern.

A major disease is apple scab, which is a fungus that over winters on twigs and fallen leaves. It affects the appearance of fruit and leaves and can be found on terminal twigs. Nichols recommended Benomyl * and Folpet *, as preventative fungicides.

Cedar apple rust, a fungus, needs an alternate host for the continuation of its life cycle. Severe infestation can cause defoliation. Usually, however, the foliage and fruit are only defaced. Removal of adjacent eastern red cedar or spraying with the fungicide Zineb * will help control the disease.

A killing disease is fire blight, which is a bacteria that is spread during periods of high humidity as the leaves and flowers are actively growing. Bees are also known as vectors for fire blight. Over fertilization with nitrogen or promoting lush growth will make a plant more susceptible. Frequent sprays with Streptomycin* will help as a preventative.

Two other less severe diseases that affect crabapples are powdery mildew and frog eye leaf spot. Nichols has observed crabapples for over 20 years and publishes a list of resistant and partially resistant crabapples each year based on his observations.

Dr. Thomas Green, Research Plant Pathologist, Morton Arboretum, continued the discussion on crabapple evaluation with his talk Evaluating Crabapples for Aesthetic Qualities. He chose a scale of 0-5 for a fall evaluation of fruit and foliage at Morton Arboretum. A scale of '0' is for a perfect specimen having leaves whole and healthy with no scab injury. The form of the plant is good and there is an abundance of fruit with good color. Examples are 'Donald Wyman' and 'Ormiston Roy'. Number '1' is not quite perfect; a little scab is present on foliage, which is otherwise dark green and the fruit has good color. Examples are 'Red Jewel', 'Professor Sprenger', robusta 'Persicifolia' and 'Mary Potter'. The other classifications include No. 2 which is an acceptable tree; however, the leaves have some evidence of disease in insect damage. No. 3 is barely acceptable; the overall color of the foliage is green; there is moderate disease, and fruit is lacking, messy or ugly. The fruit size may be too large or color not good. No. 4 is not acceptable; there is some die back or defoliation. Fruit and form are poor. No. 5 is totally unacceptable.

Dr. Green is coordinating a regional testing program to evaluate over 50 varieties at 18 locations coast-to-coast. The results will give data for a better understanding of how the same variety will respond to different growing conditions. Observation will include disease symptoms, fruiting characteristics, flowering characteristics and insect susceptibility.

Dr. Edward R. Hasselkus, Professor, University of Wisconsin, continued discussion of crabapple evaluations with his talk, Evaluations/Selection of Ornamental Crabapples or Kick The Hops Habit. His recommendations from observations at Madison, Wisconsin, were broken down into several categories, based on flower, fruit and form. Some of his recommended plants are:

White flowers, red fruit - 'Donald Wyman', 'Red Jewel', zumi 'Calocarpa', and for the larger fruit - 'Sugar Tyme', and 'Dolgo'.

White flowers, yellow fruit - 'Bob White', 'Harvest Gold', and 'Ormiston Roy'.

Rose red flowers, red fruit - 'Adams', 'Indian Summer', 'Profusion'.

Colummar - 'Red Baron', 'Candied Apple', and 'White Cascade'.

Shrub - 'Jewelberry', sargentii and sargentii 'Tina'.

Keith Warren, Horticulturist, J. Frank Schmidt & Son Nursery, presented a paper on propagation and production of ornamental crabapples, based on his experience at Schmidt Nursery. Plants are budded on domestic understock grown from seed. They use a T-bud and sometimes a chip-bud. Budwood is selected from a stock block. They also root crabapples using mid-summer softwood cuttings treated with either liquid or powder IBA at 5,000 ppm under intermittent mist. Experiments are being conducted with tissue culture micro-propagation. They are developing a product line of crabs that are on virus free EMLA 106 understock. The plants will be 60% of mature size.

Tom Evans, Landscape Architect, Hoag-Wismar Partnership, Cleveland, Ohio, completed the education session with Design Aspects of Crabapples for the Landscape. He noted that coordination and communication is crucial between designers who create outdoor spaces and use plant materials as visual enhancements and growers and developers of new plants. Designers are overwhelmed by the variety available and rely on any information about each crabapple. In selecting trees, 25 factors are considered, such as form, height, flower and fruit characteristics. Several illustrations were given on the best use of crabs in the landscape. Most landscape architects will use only those plants that have a proven record of performance and usually will not experiment with new plants. Landscape architects prefer crabapples that: have small persistent fruit, are disease resistant, are consistent performers, and are readily available. Any information about crabapples, especially photographs and promotional literature with shape, flower, fruit, etc., is needed.

After a snack of M. 'John Downie' fruit, the meeting closed with the participants touring the planting of Crabapple and Shade Tree Plots.

*Chemicals are mentioned with the understanding that no endoresement by IOCS is implied. No liability for recommendations can be assumed!.

Did you know that double flowered crabs produce very little fruit?

Thank you Elke Hownd of Spider's Breath, Idaho

MALUS 'OBSCURUS'

A continuing series to familiarize our readers with unfamiliar crabs. This month's feature is *Malus formosana*.

By: John Martens

Quite possibly the most rarely cultivated species of crabapple is the Formosa Crab, *Malus formosana*, like most crab enthusiasts I have never seen a Formosa Crab. My interest derived from a brief account by Arie den Boer of his efforts to raise this tree from seed obtained in Taiwan (Formosa) via the Japanese. Den Boer was not successful; he did manage to grow seedlings, but they were killed on November 11, 1940, by a cold snap with a terrific temperature drop of 42 degrees F. (22 degrees in one hour). It is my belief that no other living specimens of Formosa Crab existed in North America.

Dr. Tom Green and I wondered if any such specimens existed now. We knew there were none in the Morton Arboretum, so we checked the few lists we have of holdings at other arboreta: none. Then we checked the printout of Prof. Nichols extensive study of crabapple diseases at many sites: again no *M. formosana*. Finally, Dr. Green called the Germ Plasm Repository in Geneva, New York, which is endeavoring to collect living plasm specimens of every type of crabapple. Success! The repository has one *Malus formosana* tree growing afield and a supply of seeds held in cold storage. Dr. Phil Forsline said that he had obtained both the plant and the seeds in 1983 from Dr. Mel Westwood of the Germ Plasm Repository in Corvallis, Oregon. Dr. Westwood told us by phone that he had obtained his specimens from Taiwan. He had, in fact, gone to Taiwan into the mountains where he marked specific crabs from which he desired seed. When the fruit ripened, his Chinese friends harvested the seed

and sent them to him. From these, he grew the plant that he sent to Dr. Forsline. Dr. Westwood also has a few such plants in his fields at Corvallis, but to date he has not distributed plants or seed to anyone other than Dr. Forsline. Thus, it may well be that the two germ plasm repositories have the only living specimens of this crab on the continent.

Back in 1940, obtaining seed from *M. formosana* was no easy matter. Den Boer, in his book *Ornamental Crab Apples*, stated on page 19, that this crab grows in the high regions of the mountains in central Taiwan in a limited area at altitudes of 7,000 to 8,000 feet in the vicinity of Mount Ali. He also relates that the Japanese had to send an armed expedition into the mountains to collect the small amount of seed (about 15 grams) that they were able to send to him.

The Japanese occupied Formosa for about 50 years prior to the end of World War II and throughout these years, the Aborigines who lived in the mountains vigorously resisted the occupation. I, therefore, assume that the armed expedition was for protection against the Aborigines in case they did not take kindly to the collection operation.

Following World War II, the Nationalist Chinese replaced the Japanese on Taiwan, and since 1949 the island has been the home of the Republic of China. This change brought about a tremendous increase in land use; every bit of tillable land is put to cultivation. However, the mountain Aborigines have an intense appreciation of their native crab trees and are determined to protect them.

In 1967, I visited Taiwan and journeyed to the Toroko Gorge in the mountains. Although I had no interest in crabapples at the time and did not know enough of the language to speak to any of the local people, I do recall that the people I saw were very friendly. I remember well the brightly attired children playing near the entrance to the Gorge and the rugged looking men.

Although it appears that M. formosana also exists from the southern mainland of China to Hainan, it is from the Taiwan trees maintained by the Aborigines that the West is now obtaining specimens.

Dr. Westwood said that some of the trees he saw in the mountains appeared to be a hundred or more years old. If true, such a life span would make M. formosana a very unusual crab. According to den Boer, M. formosana is the species that grows closest to the equator. Dr. Westwood, like Arie den Boer, has lost plants to cold weather.

Perhaps we can obtain a technical article about the Formosa Crab before long, one that will be helpful to taxonomists, breeders, etc. Meanwhile the cover of this issue presents part of a drawing taken from a book containing a description of M. formosana.

The taxonomy for M. formosana is unclear. A Malus melliana (Hand. -Mezz. Rehder) is described in the Taxonomy of Chinese Pomology by unknown authors, and it is distributed in southeast China and on the island of Formosa. Some taxonomists believe the correct name for this crabapple is M. doumeri (Bois) A. Chev. Hopefully, its true taxonomy can be sorted out.

The following taxonomic description of M. formosana is compiled from the books, Woody Flora of Taiwan, and Flora of Taiwan.

Malus formosana (Kawakami & Koidz.) Kawakami & Koidz in Bot. Mag. Tokyo 25:146. f. 4. 1911; Li, Woody Fl. Taiwan 274. f. 102. 1963.

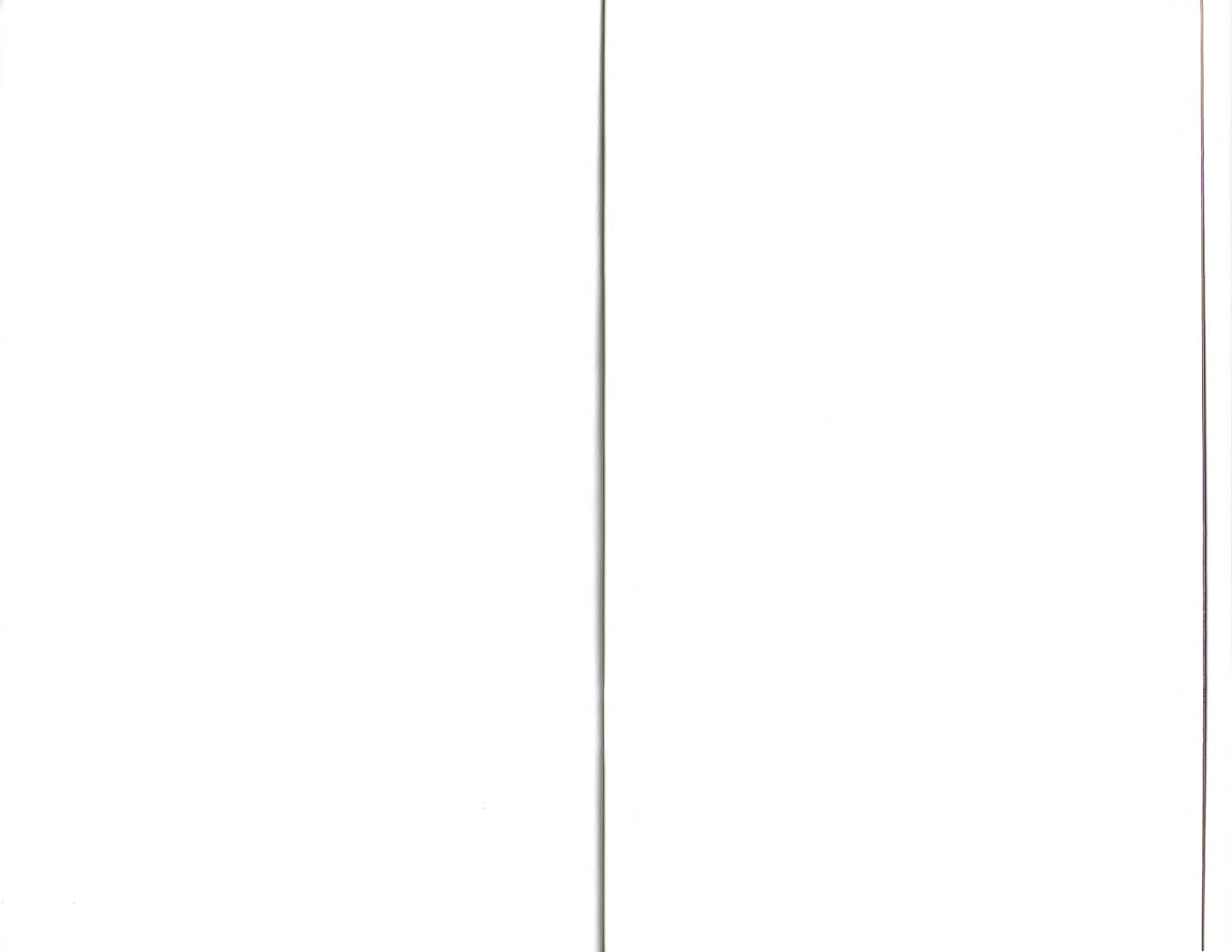
Pirus formosana (Kawakami & Koidz.), List Pl. Form. 471. 1910, Nom. nud.

A deciduous tree, over 30m tall; stems often spiny when young; buds glabrous; branchlets grayish pubescent. Leaves chartaceous, (yellowish green, editor) pubescent when young, soon glabrous, oblong or elliptic to ovate, 7-15cm long, 2.5-6cm wide, apex acute, base rounded or obtuse, irregularly serrate, 8-11 lateral veins per side and slightly tinged with rose; petioles to 3.5cm long. Flowers 3-6 in a terminal corymb; pedicels 1-2.5cm long; calyx 5-lobed, the lobes ovate-lanceolate, 6-7mm long, 2.5-3.5cm wide, white-grey pubescence on both surfaces; petals 5, white tinged with yellow, obovate, 1-1.3cm long, 7-9mm wide, the apex emarginate or rounded; stamens numerous; ovary 5-celled, each with 2-ovules, 4-5 styles. Pome globose, 4-5cm dia, crowned with persistent calyx, yellowish-red.

Southern mainland China, Hainan, Taiwan, in broad-leaved forests at 1000 to 2000 meters.

Our members stretch from Sea to Shining Sea and three countries. Below are the states and their respective member count.

Alaska - 2	Montana - 1
Arkansas - 1	North Carolina - 1
California - 3	Nebraska - 5
Colorado - 3	New Hampshire - 1
Connecticut - 2	New Jersey - 6
Delaware - 1	New York - 10
District of Columbia - 1	Ohio - 27
Florida - 1	Oklahoma - 1
Idaho - 1	Oregon - 15
Illinois - 49	Pennsylvania - 10
Indiana - 8	Rhode Island - 2
Iowa - 8	Tennessee - 2
Kansas - 2	Texas - 1
Kentucky - 3	Virginia - 3
Louisiana - 1	Utah - 1
Maine - 1	Washington - 16
Massachusetts - 4	AUSTRALIA - 1
Michigan - 15	CANADA - 5
Minnesota - 3	GREAT BRITAIN - 2
Missouri - 6	



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