

Department of
Horticulture

MICHIGAN
STATE
UNIVERSITY

COMPACT FRUIT TREE

ROOTSTOCK BEHAVIOR

SPUR TYPES

INDUCED DWARFING

CULTURAL PRACTICES

THE INTERNATIONAL DWARF FRUIT TREE ASSOCIATION

No. 3, July, 1981 - Prepared by Robert F. Carlson

1981 SUMMER ORCHARD STUDY TOUR A SUCCESS

Illinois and Wisconsin fruit growers rolled out the green carpet and showed about 300 members of the International Dwarf Fruit Tree Association how to grow and market fruit on the farm. In addition, they provided perfect sunny days with temperatures in the 70's. The accommodations and meals at the Trinity College, Deerfield, Illinois, were excellent.

The journey by buses to the Ten Eyck Orchards, Broadhead, Wisconsin, took us across rolling terrain with green cornfields "aplenty". Rob Ten Eyck narrated some of the successes and mistakes occurred in the fifth generation orcharding with father Albert chiming in now and then in answering many questions.

The Ten Eycks truly live "compact" apple trees and, therefore, most of their trees are on M. 9, M. 26 and M. 7A and holding them to about eight feet in height by a good program of heading back tops and sides as needed for the spacing. They also follow a regular summer pruning in June and August, which in turn reduces dormant pruning. Most of the fruit is sold at the farm for a fair price.

Noteworthy also is that they have not used any fertilizer for several years without any signs of nutrient deficiencies. According to Rob, they have had regular cropping with the use of permanent set sprinkler over-row irrigation which is also used for frost protection. Also, they have been able to control crown and root rot by heavy soil applications of copper and lime sulfur. Albert's idea of burning out fire blight canker with a blow torch has kept the infestation to a minimum.

The Quigs Orchard, Mundaline, Illinois, was purchased by Bob Quig in 1947, at which time there were sundry apple varieties poorly managed. Bob and Marion shaped the old trees by lowering them to about 10 feet and also began planting more trees on M. 26, M. 7A, MM 106 and MM 111.

Over the years they have developed a retail store and cold storages from where they retail the fruit. Several other culinary items, such as doughnuts, fudge and cider are made and sold at the store.

The Bell's Orchard, Barrington, Illinois, is situated in a rather high population area with shopping malls popping up all around their orchards and sales buildings. They are not far from O'Hare airport.

In 1934, John L. Bell, Sr. and a partner planted 100 acres of apples on the property immediately to the east of the present orchard. That original planting consisted of 10,800 trees, principally Jonathan, McIntosh, Red and Golden Delicious. Direct consumer sales, including U-pick, was begun in 1956 with upwards of 30,000 bushel annual pick-your-own sales in the 60's. The present apple plantings were begun in 1960 and consist of 53 acres on M. 7, M. 26, MM 106, M. 9, and MM 104. A double hedgerow system 22 x 15 x 7 has been employed on about half of the plantings. The entire acreage is under irrigation using both solid set overhead and trickle. Two farm ponds and a well supply the systems. About 60% of the planting is heated with natural gas heaters and a wind machine during spring frosts.

In 1965, a 25,000 bu. storage was constructed, 17,000 bu. of which was C.A. Additional storage was added in 1969. A large retail complex features many apple related products, including a vintage antique shop.

John Bell, Jr. and his wife Louise joined the business in 1956 and purchased part of the business in 1972. They are now responsible for all operations.

The Edward's Apple Orchard, Poplar Grove, Illinois, is unique because it is situated on a rise surrounded by corn fields. In fact, Bob and Betty planted their first trees on this former dairy farm location in 1964. Early planting consisted of McIntosh, Jonathan, Red and Golden Delicious on M. 2, MM 104, M. 7, MM 106 and seedling. Recent plantings with a total tree population of 6,000 plus have included M. 26, C 6 and C 52 interstems. The entire orchard is under trickle irrigation.

All apples are sold retail through Pic-ur-own and through the Apple Barn. A five acre parking area with wagon rides to the orchard is one of the features of the U-pick. The apple Barn is a converted dairy and grainery complex with a doughnut and pie kitchen, apple sales area and cider cellar. A farm museum and pet barn are also featured during the sales period from mid-September to mid-November.

In addition, daughter Mary has built a greenhouse where she grows several kinds of flowers both potted and spring bedding plants. The Edwards are another fine example of what a family working together can accomplish.

The Wauconda Orchards, Wauconda, Illinois, is a relatively young orchard, since it started only 30 years ago. Dick and Margie Breeden have built this 80 acre farm into a successful business. Being in the Chicago vicinity, they have developed the orchard into a pick-your-own fruit venture. Therefore, they have a range of varieties from Paulared, Vista Bella, Viking to later maturing Jonathan, Golden and Red Delicious and McIntosh.

Since most of the fruit is marketed on the farm, the Breedens have developed an interesting market with a walk-in cooler where fruit can be seen through a picture window. They also have a cheese store which is another added feature for city folks to browse and select.

Thank you! A special thanks is due the Edwards and Bell families who worked hard to make this another very successful and interesting orchard study tour. We also wish to thank the families of Quig, Breeden and Ten Eyck for letting us "browse" in their orchards and stores. All IDFTA members in attendance truly enjoyed what they saw and learned.

TWENTY-FIFTH IDFTA CONFERENCE

Amway Plaza and Convention facilities in Grand Rapids will be the site of the Silver Anniversary-25th Annual Conference of the Association. The dates are: Tuesday, March 2 to Friday, March 5, 1982. Several feature speakers from Europe, Canada and the states are being lined up to take part in this event.

BRIEF PROGRESS REPORTS-IDFTA SPONSORED RESEARCH

Graft unions of chip-bud and T-budded material of Nu-Red Winesap/MM 106; Granny Smith/M. 26; Jonnee/M. 9; Redchief on M. 7a, MM 106, M. 9, MM 111, and seedling; Granspur/M. 7a and MM 106; M. 9/MM 106; Granny Smith on M. 9, M. 7a, M. 26, and MM 106. These unions have been processed for morphological and anatomical studies by scanning electron microscopy and light microscopy in relation to graft-union failure. These are also being evaluated for potassium and calcium translocation across the graft union. A large portion of this material is being prepared for publication.

A full-time academic technician has been spending three days a week on this work since last November, making microscopic selections and related research, such as development of necrotic tissues causing tree decline.

Field tests are in progress comparing virus "clean vs. dirty" performance of M. 26, MM 106 and M. 7A. Oregon Rootstock, Inc., Hilltop and Stark nurseries are cooperating in this research by supplying plant material. Researcher: Dr. Roy Simons, University of Illinois, Urbana, Illinois.

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First Geneva Rootstock Selections go to Field Trials in Arkansas and Western New York.

The apple rootstock breeding program at Geneva, New York, started in 1968. Since that time, about 150,000 seedlings have been produced by controlled crosses, such as MM 111 x M. 27, Robusta 5 x M. 26, and Antonovka x M. 9. During the first year after seeds germinate, seedlings are subjected to a "chamber of horrors" that reduces the initial population by about 99% -- first they are inoculated with 13 races of the crown rot fungus, then repeatedly hit with fire blight bacteria, and finally infested three to five times with woolly apple aphids. The survivors -- 800 to 1,000 a year -- are taken to the nursery and trench-layered. From these, selection is made for freedom from spines, from burrknots, and from brittleness, for adequate rooting, and for other nursery attributes.

Liners from these selections are budded with virus-free Delicious, Golden Delicious and Northern Spy. Usually a given selection is budded with Spy one year, Delicious the next, and Golden the third. For the past five years, IDFTA has been providing supplemental funding in support of the Geneva program. These funds (\$2,000/year) have been used to produce trees for the orchard testing phase. As a result, in May, 1980, we were able to plant 900 Northern Spy trees, representing 300 rootstock candidates, on Cornell's "Horn Farm" near Lake Ontario. In April, 1981, some 500 Golden Delicious trees on about 150 selections were planted on University of Arkansas' new experimental farm by Dr. Roy Rom, and at Geneva we planted 1,200 Northern Spy trees on 400 rootstock candidates. Growing in the nursery now are Delicious trees to be planted in the Cumberland-Shenandoah Valley, spring, 1982.

These orchard trials will furnish data for evaluating the rootstock selections for tree-size control (dwarfing), for induction of early and heavy production, for effects on fruit quality, on anchorage, suckering and soils adaptations. Being able to conduct similar trials at a number of locations means that evaluations can be accomplished much more rapidly than would have been possible by testing first at Geneva only. Researcher: Dr. James Cummins and Cooperators New York State Experiment Station, Geneva, New York.

NEW STRAWBERRY BOOK

We are aware that many tree fruit growers are diversified and also grow strawberries. Some even intercrop strawberries between the rows while establishing young fruit trees. Those growers who wish to obtain latest, up-to-date information on strawberry culture and cultivars should get a copy of "The Strawberry" book edited by Norman F. Childers. For information, write: Horticultural Publications, 3906 N.W. 31st Place, Gainesville, FL 32601.

'GRANNY SMITH' BULLETIN

Growers interested in knowing more about the Granny Smith variety can do so by writing for this new publication: Extension Bulletin 0814, Cooperative Extension, Washington State University, Pullman, WA 99164.

ADDITIONAL IDFTA SPONSORED RESEARCH PROGRESS REPORTS

Yield Potential and Tree Regeneration in Peach Meadow Orchards.

Five peach cultivars on 'Lovell' rootstocks were planted 50 cm x 203 cm in the spring of 1978. All cultivars had a heavy bloom in 1979 and set fruit that required thinning. All cultivars produced marketable yields equal to or greater than those of 8-year-old conventional orchards. At harvest the plants were cut approximately 13 cm from the soil surface. All stumps sprouted approximately 2 weeks following cutting; however, severe Ca deficiency caused a reduction in the number of live trees remaining 3 months later. The largest regrowth occurred from cultivars harvested in June, intermediate for those harvested in early July,

and smallest harvested in late July. Researcher: G. A. Couvillon, Department of Horticulture, University of Georgia, Athens, Georgia.

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Survival of Peach Semihardwood Cuttings.

Semihardwood peach cuttings of 13 cultivars of peach (Prunus persica (L.) Batsch) collected in 2 locations were successfully rooted and transplanted to the field. Rooting percentages in excess of 90% were obtained from cuttings taken in late July or August (after a terminal bud had set), wounded by removing the bark from two sides of the cutting base, and dipping the base for 5 seconds in 2500 ppm IBA. The cuttings were then placed under mist with a mist interval of 5 sec every 5 minutes except for the 24 hour period immediately following sticking during which the mist was allowed to run continuously.

The cuttings were planted to the field and after 1 year 96% had survived. Researcher: Dr. G. A. Couvillon, Department of Horticulture, University of Georgia, Athens, Georgia.

COMPACT FRUIT TREE, VOLUME 14, 1981

Volume 14 was mailed to IDFTA members June 15. The 181-page proceedings of the 24th Annual Conference contains 29 excellent research and grower reports. Additional copies of this report are available at \$12.00/volume. Money from back issues of these volumes goes to sponsor research projects. Other back volumes are also available as follows:

Vol. 7 @ \$2.00; Vols. 11 and 13 @ \$12.00 ea. Write: Room 301
Horticulture Building, Michigan State University, East Lansing,
MI 48824.

RESEARCH CONTRIBUTIONS - ILLINOIS AND WISCONSIN

During the Tuesday and Wednesday evening sessions of the Summer Meeting, \$500.00 each from Illinois and Wisconsin Horticultural Societies was accepted by the IDFTA President. The Massachusetts Horticultural Society gave a check for \$25.00. The research support from these societies, as well as individuals, certainly is a clear sign that the fruit industry is willing to back research to improve rootstocks, varieties and the industry as a unit.

Individual growers who have previously granted \$100.00 or more can continue to do so. Large or small grants are accepted. Results from these research projects are coming. See abstracts in this Newsletter.

IDFTA AWARDS

1974 -

Frank Green, Michigan
Eric Gunn, England
Aleck Hutchinson, Canada
Eugene Heuser, Michigan
Bill Luce, Washington
Jack Rollins, Ohio

1975 -

Pat Voght, Michigan
Frank Klackle, Michigan
Richard Norton, New York

1976 -

Fred Amberg, New York
John Bell, Sr., Illinois
Richard Meister, Ohio
Paul Stark, Jr., Missouri

1977 -

John Carew, Michigan
Eckert Orchards, Illinois
Morrison Orchards, Michigan
H. B. Tukey (late), Michigan

1978 -

Don Fisher, Canada
Dowd Orchards, Michigan
Brookdale Orchard, New Hampshire
Albert Ten Eyck, Wisconsin

1979 -

George Adrian, Indiana
Henry Bennett, New York
Cal Basch, Wisconsin
"Stu" W.S. Carpenter, Michigan

1980 -

George Foote, Canada
Vernon Bull, Michigan
Donald Dewey, Michigan

1981 -

Grady Auvil, Washington
C & O Nursery, Washington
Art Thompson, Maryland

IDFTA BOARD ACTION

The Board met Tuesday, June 16, 1981, at Deerfield, Illinois and took action on several items of interest to members.

The 25th Annual Conference at Amway Plaza, March 2-5, 1982, was discussed and it was agreed that at least three speakers from Europe will be feature program attractions. Current thinking is that attendance will reach the 1,000 mark for this silver anniversary. Tuesday afternoon will be devoted to registration, with a concurrent, informal gathering session where refreshments will be available - perhaps sampling of various fruit products. Wednesday and Thursday are devoted for formal discussions, with concurrent sessions Wednesday evening and banquet Thursday night. The Orchard Tour is scheduled for Friday. Discussed also was the formation of a Special Support Fund to be used for transportation of out-of-country speakers to Annual Conferences to which industry groups can contribute and at their choice be or not be recognized. This fund will then allow for more of the annual membership dues to go to rootstock research. Interested parties contact the IDFTA Secretary.

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No. 1, March 1981 - Prepared by Robert F. Carlson

BRIEF REPORT 24TH CONFERENCE 1981

The 24th annual conference of IDFTA, held in The Grand Traverse Hilton, Acme, MI, was attended by members from 27 states, four provinces of Canada, England, Poland, Switzerland and South Africa. We congratulate those members who came great distances to attend, and especially those who participated in the program.

Papers given at this gathering contained much useful and timely information which can be incorporated in orchards back home. These reports will be published in Vol. 14 and mailed to members who have paid 1981 annual dues.

The historic information about the Association presented in the Ray Klackle Memorial Lecture by Dr. Paul Larsen (Wenatchee, WA) was excellent and certainly the "high spot" of the 24th conference. The Board of Directors of the Association and Executive Secretary wish to extend a sincere thanks to all the speakers who came from near and far, and on their own time and expense, for their fine contributions to a most interesting program.

The weather cooperated in making the orchard tour on Friday a success. Sincere thanks goes to the five growers whose orchards we visited, and to Dr. Kesner and staff at the N.W. Horticultural Research Station.

ASSOCIATION AWARD RECIPIENTS - 1981

Congratulations to these three parties for this well deserved honor: Grady Auvil, WA; C & O Nursery, WA; and Arthur Thompson, MD.

BOARD ACTION

The Board welcomes Jack Pearson from New York who was nominated and elected to the Board for a three-year term. Jack will be in a position to represent the industry from his state and the northeastern fruit region. The

Board and members also congratulate and welcome Tom Chudleigh as the new President of the International Dwarf Fruit Tree Association for the next two years. Tom, living in Canada, will continue to carry on the important international aspects of the association.

In other action the Board approved the rootstock research committee's recommendation to grant \$37,175.00 to 28 research stations in order to continue or initiate new rootstock research. These are funds received from voluntary contributions and 70 percent of annual member's dues. In other words, this is grower support of quality research to keep the fruit industry alive. We must add that this money is "seed money" with the aim that experiment stations and universities will match and/or fully support this important research.

The Association was presented with checks of \$500.00 from the Minnesota Fruit Growers Association and \$1000.00 from the Indiana Horticulture Society. This money will go directly into rootstock research. The IDFTA expresses their sincere thanks to the states for supporting practical research to improve the fruit industry.

The Board also agreed to hold the 25th (silver anniversary) conference at the Amway Plaza (Old Pantlind) in Grand Rapids on March 3-6, 1982.

Personally, I wish to thank our past president, Jerry Sietsema, for so willingly serving for two years. Being only 65 miles away from my office, he has been of tremendous help and guidance in planning meetings and serving the Board and members.

Further, the Board discussed meeting places for the future. Since most motels, hotels, etc. book group meetings a year or more in advance, facilities and programs have to be planned a year or more prior to meetings. In selecting adequate facilities, the following must be available:

1. A central location (as much as possible) with adequate air service.
2. Near commercial fruit area for orchard tour.
3. Adequate lodging and large meeting rooms with high ceilings for visual aids.
4. Available support (extension) personnel for planning orchard tour, and local arrangements.

With these points in mind, the president appointed Board members to check into possible facilities outside the state of Michigan for the 26th conference in 1983.

Twenty-fifth anniversary plans are well under way for the 1982 conference in Grand Rapids. Details of the plans will be included in each newsletter during the year. Tentatively, at least two foreign guest speakers will be invited. One of them will give the Second Ray Klackle Memorial Lecture. A wide range of papers will deal with rootstocks, variety combinations, pruning (dormant vs. summer) and varied cultural orchard practices. We are still open to suggestions.

ORCHARD SITE SELECTION

Often the choice of where to plant does not exist. If different types of land are available, a careful study should be made of the sites for various fruit crops, since planting is a semi-permanent arrangement as far as time is concerned. However, in recent years, orchard life span has been reduced by some 25 years because the trend of density plantings is toward closer rotation systems. In the future, new growing systems, cultivars, rootstocks, etc. will come to fore more rapidly than in the past.

Planting site covers several items such as climate, topography, soil types, drainage, water supply, nearness to markets, etc. Selection of the site also depends on what fruit crop is to be planted. In general, the stone fruits go on the best sites; however, the apple and pear also will do better on "the best" sites compared to a mediocre location.

The climate for stone and pome fruit can be varied from the hot climate of San Joaquin Valley, California to that of colder Minnesota, and with this the varied rainfall. The peach, nectarine and apricot prefer a warmer climate than apple, for example.

In the warmer climates, much fruit is grown on level land and under irrigation, but in more temperate, cooler areas, fruit is found on slopes or rolling land. Constant air flow is important in cooler climates with frosty springs.

The soil of the site is difficult to change, but its condition can be improved to conform or suit a particular fruit crop. What is important is to not plant on land that is totally unfit for fruit crops, such as heavy, poorly drained clay soils. To improve clay loam soils, subsoiling in two directions and draining it certainly should be considered prior to planting.

R. J. GARNER -- AWARDED GOLD MEDAL

Mr. R. J. Garner, who worked at East Malling Research Station for 46 years, was presented with the Royal Horticultural Society's Veitch Gold Medal by the Society's President, Lord Aberconway, at the Annual General Meeting on Tuesday, February 17, 1981. The medal is awarded to "those who have helped in the advancement and improvement of the science and practice of horticulture."

Robert Garner is particularly noted for his research on propagation, and his work in collaboration with the physiologists at East Malling led to the exciting modern developments of multiplying rootstocks by the hardwood cutting technique. In addition, Mr. Garner became an expert on cherry varieties and culture, as well as their rootstocks.

UTILITY OF WILD FRUIT A PROBABILITY

Many of our improved fruit cultivars originated in out-of-the-way places in several parts or regions of the world. These were found by plant explorers and put to work in breeding programs to obtain better cultivars and rootstocks. A report by R. P. Srivastava et. al. (1976), Chaubattia, India, describes some of the wild peach, crab apple, apricot, walnut, pomegranate, aonla and cherry found in the Himalayan region. A brief summary of the report follows:

"Dense forests of timber and fruit trees can be seen growing extensively in the Himalayan region of India. These plants have been observed to be resistant to various diseases, pests and natural disorders.

Trials conducted have shown that the wild fruit trees can be successfully improved by budding and grafting. Here the authors have described the utility of the fruit trees growing wild in the Himalayan region of India.

Possibility of successful utilization of crab-apple, wild pear, wild peach, wild apricot, wild cherry as rootstock for apple; pear; peach; plum and apricot and cherry respectively has been indicated. The fruit of wild walnut, wild aonla, wild pomegranate, 'Hinsalu' (R. ellipticus), 'Kafal' (Myrica nagi), wild mulberry and wild fig can be consumed as such or after processing. The plants of wild aonla and wild cherry can also be converted into commercial varieties by top-working. The important horticultural description of the above wild plants has also been given here."

NUTRITION - "HUNGER IN STRAWBERRIES"

Many members know Frank Johanson, 2703 Fifth Street, Everett, Washington 98201. He has published a colorful bulletin with the above title showing various nutritional symptoms. For more details, contact Frank directly.

BALSGÅRD, SWEDEN

The Balsgård research station is located at Fjalkstad, near Kristianstad in Southern Sweden and is devoted to fruit breeding. Several hybrids with the Malling rootstocks and hardy cultivars are now in the testing phase as well as many seedling populations of apple and cherries. Forty-seven IDFTA members will have the opportunity to view some of this in July when visiting this station.

FURTHER FROM EAST MALLING

Brian Self sent me this note.

"I am sorry to pass on sad news but you may like to know that Dr. Tubbs died suddenly just before Christmas. I enclose an obituary in case you wish to put a note in the COMPACT FRUIT TREE."

Part of the obituary follows:

"Dr. Francis (Frank) Ralph Tubbs, CBE, VMH, Director of East Malling Research Station, Kent, 1949-69, died on December 21, aged 73.

Tubbs was educated at Hackney Downs School and the Royal College of Science where he was Forbes Medallist. After undertaking postgraduate research at Rothamsted Experimental Station, he took the post of plant physiologist at the Tea Research Institute, Ceylon, in 1930. He introduced clonal selections of tea which revolutionized the tea industry of that country."

APPLE STORAGE QUALITY INFLUENCED BY ROOTSTOCKS

Since rootstocks have an influence on cultivars, such as precocity, fruit maturity and quality, etc., it is conceivable that fruit storage is also influenced. Dr. John Barden, V.P.I., is researching rootstock influence on maturity and physiological disorders of apples. He was granted some money from the IDFTA in support of this important research.

Research in this area has also been done by Mullins and Coffey at the University of Tennessee. They published data on some of their initial work in 1973, which is summarized as follows:

"Results of this study indicate that rootstocks influenced the weight, firmness, and sugar content of their fruits. These differences were generally not consistent for both years of the study and probably were influenced somewhat by fruit yields which varied considerably between test years. At harvest and after 3 months' storage, the size and quality of fruit from both cultivars on all rootstocks were commercially acceptable. To get more conclusive information on the post-harvest behavior of fruits and trees on size-controlling rootstocks under Tennessee conditions, quality evaluations on fruits from consecutive harvest dates are being made over many years."

THE ANNUAL SUMMER ORCHARD TOUR

What can you see and learn from an Orchard Study Tour that you haven't already seen or experienced? For example, you will see different tree management systems of fruit trees on various clonal and seedling roots; yes, even old Clark dwarf trees still producing but not spaced for maximum yields. You will see how different climate and soil effects tree growth and rootstock and cultivar adaptability to these conditions. Each of the five growers we will visit can show members how he markets his fruit a little different than his neighbor. Some even have bakeries (apple pie fresh out of the oven and doughnuts!), cheese factories, antiques and other "nick-nacks". You will have a chance to view the beautiful countryside from luxury air-conditioned buses (10 of them) while you visit and exchange "shop tree talk" with your counterparts. More details will be in the May Newsletter, but in the meantime, be sure to pre-register by filling in the back page of this Newsletter while it is in your hands. Bob Edwards and John Bell, Jr. and their families are working hard to make this a most successful Study Tour. The dates are Tuesday to Friday, June 16-19, 1981. Make plans to attend - bring your family and make a vacation out of it.

1981 SUMMER TOUR

Northern Illinois - Southern Wisconsin

This year's Summer Tour will take us to the gently rolling hills of Northern Illinois and Southern Wisconsin. Growers, researchers and extension personnel have organized a very interesting and informative Summer Tour for the International Dwarf Fruit Tree Association, IDFTA.

Tour headquarters and lodging will be at Trinity College, north of Deerfield, Illinois, located at the Junction of Interstate 94 and Route 22, north of Chicago and about 20 minutes from O'Hare International Airport. Hourly shuttle service will be available from O'Hare to Trinity College, starting at 2:00 P.M., June 16. (Fare, \$5.00/person.) Five orchards, each with their own unique retail and wholesale marketing systems and dwarf, semi-dwarf plantings will be visited during the two day Tour. Also a tram tour of the Chicago Horticulture Society Botanical Gardens is scheduled. For those with campers, limited space is available on Trinity College campus.

Dates: Tuesday, June 16 - Afternoon registration at Trinity College, evening meal, discussion and entertainment.

Wednesday, June 17 - Orchard tours

Thursday, June 18 - Orchard tours

Friday, June 19 - Breakfast and check out.

ADVANCE REGISTRATION

To accommodate a tour group of this size and make the necessary arrangements, we must have advance registration. A fee of \$85.00/person, based on double accommodations will include three nights lodging, eight meals, bus transportation for Orchard Tours, and entertainment. (Deduct \$20.00/person if you are bringing a camper.) Deadline for advance registration is May 20. Registration after May 20 will be \$95.00/person. Please sign up early! Further information will be forwarded upon receipt of advance registration payment. Hope you can join us for a relaxing, fun time!

Name _____

Address _____

Number in party _____ Enclosed payment (\$85.00/person) \$ _____
(make checks payable to: IDFTA Summer Tour)

Send reservations and payment to: Bob Edwards
7061 Centerville Road
Poplar Grove, IL 61065

If applicable give:

Flight # _____ Arriving _____; Flight # _____ Departing _____

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No. 2, May, 1981 - Prepared by Robert F. Carlson

1981-IDFTA ORCHARD STUDY TOUR

June 16-19

Headquarters - Trinity College, Deerfield, Illinois

The plans and arrangements for the 1981 Orchard Tour in Northern Illinois and Southern Wisconsin are now complete. It promises to be an extremely interesting Tour along with evening informal discussions. The orchards we will visit have many features that are unique and different due to varying management and marketing situations. As usual, some of these orchards are located on high-price land so that much skill and ingenuity must be practiced to give a margin of profit to stay in business. The trend is to manage trees (pruning, nutrition, spraying, etc.) for production of quality fruit rather than quantity.

Detailed plans of the three-day Summer Tour will be discussed Tuesday evening; however, a detailed schedule follows here for your pre-arrival information.

Tuesday, June 16

2:00 P.M. - Start of check-in - Trinity College

5:30 P.M. - 7:00 P.M. - Open buffet - Trinity Cafeteria

8:00 P.M. - Briefing and Welcome - University Staff and Host Orchardists

Wednesday, June 17

7:00 A.M. - Breakfast - Trinity Cafeteria

8:30 A.M. - Board buses for Orchard Tours --

- Buses 1-5 -- Bell's Orchard, Barrington, Illinois, Breeden's Orchard, Wauconda, Illinois, Quig's Orchard, Mundoline, Illinois, and Botanical Garden.
Lunch at one of the orchards.

- Buses 6-10 - Edward's Orchard, Poplar Grove, Illinois and Ten Eyck's Orchard, Brodhead, Wisconsin.
Lunch at one of the orchards.

- Return to Trinity College by 5:30 P.M.

6:00 P.M. - Evening meal

7:30 P.M. - Entertainment - Question/Answer Period

Thursday, June 18

7:00 A.M. - Breakfast - Trinity Cafeteria

8:30 A.M. - Board buses for Orchard Tours

- Bus routes will be the reverse of Wednesday schedule

6:00 P.M. - Evening meal. Rest of evening on your own for visiting, etc.

Friday, June 19

7:00 A.M. - Breakfast and check-out

PRE-REGISTRATION FOR THE TOUR

The pre-registration form in the March Newsletter will appear here again on the last page. Since you may have misplaced the March letter and did not send your pre-registration to Bob Edwards by May 20, we have extended the deadline to Friday, May 29. You will save \$10.00 by having pre-payment in the mail by midnight May 29. Late registration is \$95.00 per person.

NEW PRUNING BULLETINS

Two new bulletins on methods to prune apple and peach trees have recently been published at Rutgers - The State University of New Jersey, New Brunswick, New Jersey 08903. These are excellent publications because the descriptions and photos give a clear understanding of tree training and pruning both young and old trees. The titles and bulletin numbers are: Extension Bulletin 377-C- "Pruning and Training Young and Bearing Apple Trees" and Extension Bulletin 259-B- "Pruning Peach Trees in New Jersey".

RECENT ACHIEVEMENT AWARDS

Dr. Norman Childers, Rutgers University, was honored at the National Peach Council Meeting in Phoenix, Arizona, by being presented with the 1981 NPC Achievement Award for his contributions to the peach industry.

The Grower and Packer recently presented Dr. Robert Carlson with the 1980 National Award for Excellence in Research.

"NURSERY MANAGEMENT" - A NEW BOOK

This book was written by Dr. Harold Davidson, Professor at Michigan State University, and Dr. Roy Mecklenburg, formerly MSU Professor and now Director of the Chicago Botanical Garden. This book can be obtained for \$19.95 from Prentice-Hall, Inc., Route 59, Brook Hill Drive, West Nyack, New York 10995.

VISIT TO CHICAGO BOTANICAL GARDENS

An added feature of the 1981 Summer Tour to Illinois and Wisconsin will be a visit to this famous and beautiful garden. The group will board a tram that takes them through the ornate parts of this large, 400 acre, garden.

RAIN, FROST, AND ADVANCED BLOOM

An early spring and above average rain in some areas have caused some problems, but how much is too early to assess. Tart cherries in some areas of Michigan were severely damaged from low April temperatures that dipped to 16° F. Apple flower buds have also been injured, but this will also vary with varieties and location, so we will wait for the final crop estimates in June.

FROM POLAND - INTERNATIONAL

In a 1979 research report from Skierniewice, Poland, we see that Budagowski-9 (B. 9) rootstock is very resistant to frost and well suited to a climate similar to Poland. B. 9 with commercial cultivars (McIntosh, Spartan and Macoun) is more vigorous than M. 26 but also more productive according to their data. It does not propagate readily in layering beds, but has shown good resistance to Phytophthora cactorum, collar rot.

JUNE PRUNING

In case the dormant pruning was not totally finished with apple and peach trees, there is still hope. Often it is better to do some more pruning at this time than to allow trees to become too vigorous and dense. In some cases, this may involve only random tipping of young shoots and also removal of scaffolds or sub-scaffolds. Peach trees need removal to encourage new fruiting branches, and often this can be done by heading back of "gangly" scaffolds. Caution - if there are signs of fire blight in apple and pear trees, it is best not to prune.

GOLDEN DELICIOUS CLONES

Four virus free clones of Golden Delicious were compared with respect to pomological characteristics in three trials in several locations. Clone B was included in each trial. Trees of clone B were the most vigorous and had the highest production. Clone T. 17 was comparable in all respects except that the fruit skin was much more russeted than that of clone B fruits. Clone A showed a lower level of growth and production than clone B and the fruits were usually slightly smaller and more russeted. The clone "Smoothee" was quite interesting: the trees of this clone were more slender than those of the other clones and although growth and production were roughly the same as for clone A, the fruit size and smoothness were much better than for clones A and B. . . . H. J. van Oosten, The Netherlands.

TREE QUALITY

It was shown that the thickness of the stem and the number of lateral branches (feathers) on one-year-old fruit trees are important factors for early production in the orchards. This was found with the varieties Cox's Orange Pippin, Golden Delicious and Schone van Boskoop. . . . H. J. van Oosten, The Netherlands.

1981 SUMMER TOUR

Northern Illinois - Southern Wisconsin

This year's Summer Tour will take us to the gently rolling hills of Northern Illinois and Southern Wisconsin. Growers, researchers and extension personnel have organized a very interesting and informative Summer Tour for the International Dwarf Fruit Tree Association, IDFTA.

Tour headquarters and lodging will be at Trinity College, north of Deerfield, Illinois, located at the Junction of Interstate 94 and Route 22, north of Chicago and about 20 minutes from O'Hare International Airport. Hourly shuttle service will be available from O'Hare to Trinity College, starting at 2:00 P.M., June 16. (Fare, \$5.00/person.) Five orchards, each with their own unique retail and wholesale marketing systems and dwarf, semi-dwarf plantings will be visited during the two day Tour. Also a tram tour of the Chicago Horticulture Society Botanical Gardens is scheduled. For those with campers, limited space is available on Trinity College campus.

Dates: Tuesday, June 16 - Afternoon registration at Trinity College, evening meal, discussion and entertainment.

Wednesday, June 17 - Orchard tours

Thursday, June 18 - Orchard tours

Friday, June 19 - Breakfast and check out.

ADVANCE REGISTRATION

To accommodate a tour group of this size and make the necessary arrangements, we must have advance registration. A fee of \$85.00/person, based on double accommodations will include three nights lodging, eight meals, bus transportation for Orchard Tours, and entertainment. (Deduct \$20.00/person if you are bringing a camper.) Deadline for advance registration is May 29. Registration after May 29 will be \$95.00/person. Please sign up early! Further information will be forwarded upon receipt of advance registration payment. Hope you can join us for a relaxing and educational Tour.

Name _____

Address _____

Number in party _____ Enclosed payment (\$85.00/person) \$ _____
(make checks payable to: IDFTA Summer Tour)

Send reservations and payment to: Bob Edwards
7061 Centerville Road
Poplar Grove, IL 61065

If applicable give:
Flight # _____ Arriving _____; Flight # _____ Departing _____

Department of
Horticulture

MICHIGAN
STATE
UNIVERSITY

COMPACT FRUIT TREE

ROOTSTOCK BEHAVIOR

SPUR TYPES

INDUCED DWARFING

CULTURAL PRACTICES

THE INTERNATIONAL DWARF FRUIT TREE ASSOCIATION

No. 5, November, 1981 - Prepared by Robert F. Carlson

SILVER ANNIVERSARY
INTERNATIONAL DWARF FRUIT TREE ASSOCIATION

Amway Plaza Hotel, Grand Rapids, Michigan
March 2-5, 1982

The 25th conference program is falling into place. Several features are planned to match the slogan or conference theme, "Look Ahead to the Future in Fruit Growing--Not Back". Indeed, the future is bright, especially to those who attend annual meetings and find out what is new in rootstocks, cultivars, tree planting and training systems, and general experiences in orchard management.

Ten past presidents of the IDFTA, all experienced fruit growers, will present their thoughts on where the fruit industry is heading and how the International Dwarf Fruit Tree Association can play a major role in getting practical information to growers and in stimulating funding programs for research to solve production and marketing problems in the fruit industry.

Features in the program will be three out-of-country speakers: Dr. P. Delver, from Holland; Dr. Jim Quinlan, from East Malling; and Mr. Alan Todd, a leading nurseryman and fruit grower, also from England. Each of these men will present two papers. Dr. Quinlan is sponsored by the IDFTA Klackle Speaker Fund. We owe Elsie Klackle a vote of thanks and appreciation for initiating this fund. These speakers will cover a range of topics, from tree nutrition to growth regulators, dwarfing, and nursery and orchard tree management for healthy and productive orchards.

Beside many other informative speakers, a "silver anniversary" banquet with a feature speaker will be held Thursday evening. The program will close Friday morning with an orchard tour in the Grand Rapids vicinity. Plan now to attend this conference and get a look at current and future ideas of fruit production.

Notes, Quotes, and Announcements

From Albert Ten Eyck, Wisconsin, we note that he is not using copper to control crown and root diseases, as we reported in the July, No. 3 newsletter.

He writes:

"We were about to lose our M. 26 trees when, in desperation, we applied through our overhead irrigation system forty gallons of lime sulfur per acre, or approximately one gallon per 1000 square feet. All diseases were eliminated and trees which appeared dead, developed new roots at ground level and stayed alive. The lime sulphur was applied November 1. We find that re-infection will occur, so we make an application every other year--annually would be better.

Later on, we tried copper on some younger trees, and lime sulphur on some, using a hand gun and just covering the base of the tree and the area around it. The copper severely damaged some trees. This type of application, while helpful, was only effective for about thirty days. In other words, the entire orchard floor must be covered for lasting results.

We believe that the infection becomes established in areas damaged by winter weather because the rootstock hardens off last or perhaps not at all; although, any damage will provide an area for infection to become established. Consequently, we do not believe in having the ground completely bare around the base of the tree."

From Pierre Phillion, Canada, we learn that they are making great plans for hosting the IDFTA Summer Orchard Study Tour in the province of Quebec, June 15-17, 1982. The headquarters, lodging, meals, and informal meetings will be at McDonald College campus, in Sainte-Anne de Bellevue, Quebec, about fifteen miles southwest of Montreal on Route 20. Camping facilities and hotels also are available nearby. So is Dorval International Airport.

In November, the billing for the 1982 IDFTA membership dues will be mailed. The 1981 dues expire in December. We will appreciate receiving these dues on time so that we do not have to charge you a late remittance fee for dues received after February 1. Also, members from Canada and other countries, please make the check for US dollars. This was much improved this year. The Board of the IDFTA also reminds us that the billing has a place for voluntary research contributions. This can be returned with the dues by adding it to the dues check or by writing a separate check. The investment in this rootstock research is starting to show in some of the reports from funded stations.

A little late, but, Dr. Mel Westwood was the 1980 recipient of the Wilder Medal Award. Congratulations!

In September, I visited the Sturgeon Bay Peninsula Experiment Station, Wisconsin, and was impressed with the difference in tree growth responses in that location to shallow soil, more sunshine, and day length variation. It is comparable to the Traverse City area in latitude. Dr. Frank Gilbert, who supervises the research there, pointed out striking differences in rootstock and cultivar responses, which varied from southern Michigan. For example, MAC-24, with a spreading root system, had a vigor and precocity of 'Mark'. Both growth and precocity were different. The NC-140 project reports, comparing these differences from state to state, no doubt will bring out these variations in tree behavior, longevity, and productivity.

During our visit to Spain, we observed several rootstock study plantings. The French prunus clone, GF-677, was very tolerant of the high calcium soil condition prevailing in many parts of Europe.

At Balsgård, Sweden, we saw some of their recent rootstock series, and some of these apple clones look promising. The series is known as the BM-series. A semi-dwarfing clone was named 'Bemali' and another one, BM-427, looks good. More on this series later.

1981 Tour Reports, continued

Norway - Land of Pleasant Surprises

Franklin A. Gilbert
University of Wisconsin

A "first time" visitor to southern Norway very soon realizes that any visions he has of Norway do not even begin to do justice to the actual experience of seeing it all for himself. Everywhere one travels he is awed by the rugged country, the snowcapped mountains, the beautiful forests, waterfalls from the snow melt, and the tremendous amount of water everywhere. A look at the map of Norway points out the fact that these large bodies of water are indeed the Fjords of Norway, which reportedly are as deep as the mountains are high, and, surprisingly, are brackish even seventy miles from the sea.

Travelling in Norway gives one an opportunity to appreciate all the beauty plus the "excitement" of winding down the mountain roads that have no straight sections longer than one hundred yards and horseshoe like you wouldn't believe (if there is any doubt about the "hair-raising experience" of riding down these roads which only seem wide enough for a car and a half, check with Shirley Carlson).

I could continue on discussing the beautiful old hotels, the central cities, the excellent food, and the "Fish Market" of Bergen, but perhaps I should include the primary purpose of our visit to Norway--horticulture.

It was rather amazing to see all of the sweet cherry orchards and the beautiful rose gardens at 60° N. Latitude, which, by the way, would be the same latitude as the southern borders of the Yukon Territory in Canada (by no stretch of imagination would you expect an extensive fruit area in an area this far north).

The fruit plantings, by U.S. standards, were small (one of the largest had approximately 75 acres of fruit) and the growers were well versed on the latest information regarding the culture of their crops.

The fact that fruit can be grown so far north is due to the influence of the gulf stream plus the fact that the Fjords do not freeze over. The fruit plantings, in general, are adjacent to the Fjords and the rows literally go almost straight up. Everyone was amazed at the degree of slope plus the fact that the rows went up and down rather than across the slope. The reason for this is the fact that the land is so steep that it is not possible to drive equipment across the slopes. Going up the hill to spray didn't appear to be

too serious (if you could make it up), but not too many of our growers volunteered to drive a tractor and sprayer down the hill.

Fruits produced in Norway include apples, plums, pears, Morelly cherries, strawberries, red and black currants, and raspberries.

The major fruit plantings are apples and the principal varieties are Ingrid Marie, Aroma, Gravenstein, with considerable interest in Summered (Canadian), which appears to be quite adapted to the area.

It was interesting to learn that Norway allows no importation of apples during the period that their own apples are available.

Many of the problems include root freezing during open winters, pollination weather, hail, and continued increase in the cost of growing and harvesting fruit.

The area around Bahlstrand is the principal pear growing region with the primary interest in cultivars which would produce crops earlier (perhaps rootstock influence) and higher quality varieties.

Space is rather limited to discuss all the aspects of agriculture that we saw. Perhaps a good summation would be that the Norwegian growers are excellent orchardists, using the latest techniques, with very good personnel in their research institutions, and they are definitely in the business to stay.

If you haven't been to Norway and have the opportunity to go, be sure to make the trip. If you do plan such a trip, have the IDFTA schedule it for you, as they seem to know when the sun will shine in Norway. Also, if you should get a little chilly, have a "very small glass" of their schnaaps and you'll never be cold again.

Stone Fruit Observations in Spain

Paul Rood
Covert, Michigan

One of the most surprising things we learned was that Spanish consumers prefer cling peaches for fresh consumption. They eat the early American varieties like Dixired, Springtime, and Garnet Beauty until their native non-melting cling peaches mature, then they switch to them. Peaches grow well in Spain and they are one of the earliest areas in the European Economic Community. Most of the peaches we saw were irrigated and the trees show little cytospora canker, compared to peaches grown in the north, midwestern United States.

Fruit trees with the chlorotic yellow leaves, caused by iron deficiency, which is common in areas with calcareous soils, are very noticeable. The fruit from these trees can be of good quality, the trees do not die, but yields and growth are not the best possible.

Almonds were the most common stone fruit we observed. At an experiment station near Zaragoza, we saw a peach orchard of mature trees with peach-almond hybrid roots doing well on a heavier soil. We saw peaches and plums on Brompton plum roots.

St. Julien A was a very good rootstock for plums. Marianna 2624, a clonal selection from California, was also under test as a plum rootstock. There were good orchards in Spain and the country has come a long way since the revolution.

First-Year Pruning Effects on Four Apple
Rootstock/Interstem Combinations

Eric Young
North Carolina State University
Raleigh, North Carolina

This past spring, a study was conducted, with the help of the IDFTA Rootstock Research Fund, to determine the effects of early shoot and root pruning on growth of newly planted apple trees on four rootstocks. 'Smoother Golden Delicious' on M. 9, MM 106/M. 9, MM 106, and seedlings were either left unpruned, shoot pruned, root pruned, or both shoot and root pruned at planting. Measurements of shoot and root growth were taken by sampling trees at first leaf and at thirty and sixty days after that date.

No pruning and root pruning alone resulted in root dry weight increases from the first to second sampling dates and the greatest root dry weights at the final sample for all rootstocks. Trees that were shoot pruned or root and shoot pruned had no increase in root dry weight between the first and second sample dates, indicating competition from the pruned shoots.

Surprisingly, root pruning alone and no pruning resulted in the greatest shoot dry weight by the final sample date, even though there was very little difference between treatments at the first sample date. This may have been due to increased root growth soon after planting. Root and shoot pruning together resulted in the lowest dry weight in roots and shoots. However, root pruning alone or together with shoot pruning yielded the best overall root rating, based on the ratio of active, white, versus suberized, roots.

All pruning treatments resulted in a shift in the root to shoot ratio toward more shoot. The extent this ratio shifted varied with rootstock, with M. 9 being affected most, particularly by shoot pruning. The less dwarfing the rootstock, the less drastic was the shift in root to shoot ratio caused by pruning, with seedling having no significant change due to any pruning treatment.

These results may have implications as to the extent newly planted trees on different rootstocks should be shoot and/or root pruned in the first season. Plans are being made for a study to examine the second and third season effects from shoot and root pruning at planting on different sized rootstocks.

PRE-REGISTRATION FOR THE 25TH ANNUAL CONFERENCE

It is time to pre-register for the 25th Annual Conference in order to make arrangements for adequate lodging, meals, meeting rooms, bus transportation, and to expedite registration during the conference.

Pre-registration forms with check should be returned to:

Dr. Robert F. Carlson
Department of Horticulture
Michigan State University
East Lansing, MI 48824

no later than February 1, 1982. Checks should be in U.S. dollars and made payable to the International Dwarf Fruit Tree Association.

Lodging reservations are to be made directly to:

Amway Plaza Hotel
Monroe Avenue, N.W.
Grand Rapids, MI 49503
(616)774-2000

These reservations should be made by January 20, 1982, or sooner.

REGISTRATION FOR THE 25TH ANNUAL CONFERENCE

(all persons attending must register)

_____ Registration fee	\$ 10.00
_____ Spouse and family members.	5.00
_____ Banquet (all inclusive tax and gratuity)	16.75
_____ Bus ticket (orchard tour).	6.00
_____ Ladies' luncheon	6.00
_____ Voluntary Rootstock Research contribution.	_____
TOTAL. \$ _____	

Back issues of IDFTA Proceedings will be available at the registration desk.

Name(s): _____

Address: _____

City: _____ State: _____ Zip: _____

Department of
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MICHIGAN
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COMPACT FRUIT TREE

ROOTSTOCK BEHAVIOR

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THE INTERNATIONAL DWARF FRUIT TREE ASSOCIATION

No. 4, September, 1981 - Prepared by Robert F. Carlson

TWENTY-FIFTH ANNIVERSARY CONFERENCE

March 2-5, 1982 Grand Rapids, Michigan

The Plaza Hotel (formerly Pantlind Hotel) will be the headquarters for the twenty-fifth conference of the International Dwarf Fruit Tree Association. The theme: "Looking ahead, not back" will help in developing a program covering ideas, thoughts and leads on how to increase the Association's efforts in supporting rootstock research and fruit tree culture for a better fruit industry.

To aid in this theme, we have invited a fruit tree nutrition researcher from Holland where intensive fruit tree culture is tied into scarcity of land and labor. The role of tree nutrition (especially N) changes with increased number of trees per acre -- more trees, more roots, less soil. The gentleman, Dr. D. Delver, comes to us with twelve years of data on the effect of nitrogen on tree growth and fruiting conditions. He will also get into trickle irrigation efficiency.

Also on the speaker program will be a researcher from East Malling who has years of data on the effects of growth regulators on branching of young fruit trees to position adequate branch and leaf volume for early fruit bud formation and to establish early production in smaller trees. He will bring us up to date on latest practical developments in both new and old rootstocks at that well known research station.

Last, but not least, we have asked one of England's leading nurserymen and fruit growers to be part of the conference program. He is also a member of the Governing Board of East Malling Station. As Tony Preston says, "This man knows how to get young trees into production fast." These latter foreign speakers have not yet responded to our invitation so we will withhold names until our next newsletter. IDFTA past presidents will relate their thoughts to the audience on their past grower experience and supply suggestions for the future.

Also on the speaker list are fruit growers and researchers and nurserymen from several states and Canada.

The Anway Grand Plaza hotel is newly "re-done" into a spacious hotel with several excellent restaurants, and is conveniently located next to the meeting room facilities at the convention center.

More to come in the next newsletter, but for now, mark your calendar with "Look ahead, not back."

IDFTA INTERNATIONAL SPONSORED ORCHARD TOUR

The following are reports written by members who participated in the June 28 - July 19, 1981 study tour to Spain, Austria, and Scandinavia.

Fruit Culture in Austria

Norman Childers, Fruit Crops Dept.
University of Florida, Gainesville, Florida 32611

In regard to Bob Carlson's Tours one comment should be made. The Tours are a great improvement (as far as we are concerned) over the standard foreign travel-agency tours. Bob's Tours usually consist of 35-45 people all interested in the same subject - fruit growing. We all communicate well and one does not get bored with excess historical visits with absolutely no agriculture of any kind. On Bob's Tours we do have a day of rest and shopping occasionally and we do see some historical sites and buildings. We learn a lot about fruit growing, get new ideas with a broad training. Let's hope Dr. Bob continues to plan and hold these tours with his good wife Shirley. Some mention has been made of a tour to Israel and this likely would include several other countries in the general area.

Graz was our second stop last July which is in the northeast corner of Austria. All Austrian countryside is beautiful, the soil is generally fertile, good rainfall - real farming country. Homes are generally well kept and the ladies tell us they are "perfect" inside, at least the ones they saw and without warning, dropped in. Dr. Rudolf Novak from Styria was our guide and a dandy.

Hail is a perennial problem with the growers in this region which is the main fruit growing area of Austria. We visited two growers who had constructed elaborate poly mesh wire on posts covering the entire plantings of several hectares each. Trees were largely on dwarfing stock of M26 and 9 with some MM 106 and M7. After harvest the mesh is rolled up on support wires for the winter and not rolled down the next year until the grower is reasonably sure there will be no more snow which causes a weight problem on the mesh. They have been "caught" with a late unexpected snow on occasion and work fast to get the mesh rolled back up. Yield and particularly quality of the protected crops seemed to justify the rather high cost of the construction. Apples were bringing a good price in Austria and tended to be in short supply - good quality at least.

One grower, who mainly was an importer-exporter of fruit, had installed a hail dispenser gun in special housing in the center of his orchard. The gun shot "bombs" into the air which caused air waves that supposedly reduced or prevented hail when signs and forecast indicated hail. The equipment came from France at substantial cost, but the grower had not as yet encountered hail to test it.

Another stop that caught our eye was a substantial experimental planting of elderberry near Vienna. We think of elderberry as a bush-grown fruit, but they had trained it to trees with trunks 8-10 inches in diameter and 3 feet high. The trees were around 10 years old and flowering heavily with a good fruit set. We were told that pruning, fertilization and spraying were minimal. The trees were growing on poor pebbly upland soil. This crop shows possibilities for the U.S.A., actually we in research have had little experience with elderberries. Dr. Marshall Ritter of Pennsylvania State University, University Park, PA 16801, prepared a university bulletin on elderberries a few years back. The crop is prized mainly for wine and juice. Dr. Ritter may be able to supply you with a copy. There are about four good varieties available from limited nurseries and Dr. Ritter may have a listing.

I have been on a number of Dr. Carlson's tours and also on a world tour by myself, and it is interesting to note that all countries growing apples are shifting to the dwarfing stocks. We were told on this tour that it was difficult for us to find the old standard size trees as we travelled the countryside.

Horticulture in Norway

Raymond A. Schroeder

Professor, Department of Horticulture
University of Missouri-Columbia

The most lasting impression of commercial horticulture in Norway is that of the people who are engaged in producing the crops. They are excellent horticulturists. They are also extremely friendly and forthright in discussing their business enterprises.

To appreciate the accomplishments of the Norwegian horticulturists, one must remember that their fruit growing areas are located 60°N (North) of the equator. The northern border of the Canadian provinces of Alberta, Saskatchewan and Manitoba are 60°N (South Haven, Michigan and Boston, Massachusetts, 42.4°N; Morgantown, West Virginia, 39.7°N; San Francisco, California, 37.5°N; Yakima, Washington, 46.5°N).

In addition to cool summers and cold winters, 60°N means many potential hours of sun during the summer months and, conversely, many hours of darkness each day during the winter months. Shortly before leaving on the IDFTA study tour, I ran across an article dealing with "The Albedo Effect" upon atmospheric conditions. This had to do with the heating and cooling influence of the reflective power of the earth's surfaces (surface albedo). I read that between the equator and 35°N the average surface albedo is low and that it leads to a net cooling effect of the atmosphere. At latitudes north of 55°N there is a net heating effect since the average surface albedo is high. I wondered if this might have some effect upon horticultural crops say the frequency incidence of hail storms. I don't know if there is any relationship but my feeling is that the apple producers in Norway are less concerned about hail than are those in Austria and Spain. To pick and eat luscious sweet cherries in an orchard on the south slope and look across the fjord, while doing so, to the north slope and see a glacier-like area of snow down to the water's edge is an interesting horticultural experience.

It is not much of an exaggeration to state that the term "level-land" is an expression found in textbooks but not associated with the growing of horticultural crops in Norway. To grow an excellent crop of apples, pears, peaches, sweet cherries, red raspberries, or strawberries on a site possessing slope of fifty percent is what is accomplished by Norwegian growers. The rows are always up and down the slope and especially modified equipment and cultural techniques are mandatory.

Judging from what was seen in Farmer's Markets, the floricultural crops grown for sale are principally cool-season and either long-day or day-neutral plants. Begonias and petunias were the plants most commonly seen with different cultivars providing a great diversity of color and blossom characteristics in both crops.

The vegetable crops that we observed in the Farmer's Markets included cabbage, cauliflower, broccoli, kohlrabi, kale, turnips, Irish potatoes, onions, and peas. All of these are cool-season crops. One very successful greenhouse operation growing a succession of four crops of Bibb lettuce during the year was observed. Bibb lettuce is a relatively low light-intensity and cool-season crop. The greenhouse production of "English cucumbers", tomatoes and melons all of which are relatively high light-intensity and warm-season crops was also observed. The production of such warm-season crops is, however, quite limited in Norway.

Home gardens are quite common. Each farm home that we visited had an adjacent well-tended vegetable and flower garden. The crops being grown were those mentioned previously as being those more abundant in the Farmer's Markets. Gardens were also quite common in the rural villages and towns. Window, porch and balcony pots and boxes for both flowers and vegetables were the rule for apartments in the cities.

Apples, pears, peaches, sweet cherries, and red raspberries are not indigenous to Norway. Yet all are being commercially grown because a micro-environment favorable for their production does exist in some locations in Norway, even though it is at a latitude of 60°N. The Norwegian commercial horticulturist is successful because he understands and integrates the environmental growth factors (sunlight, length-of-day, temperature, soil moisture, relative humidity, soil fertility) with all of the cultural management factors which are applicable for the prevailing local micro-habitats. One must actually see apples, pears, peaches, sweet cherries, red raspberries and strawberries being grown at a latitude of 60°N on sites with a slope of as great as 50 percent to fully appreciate the accomplishments of Norwegian horticulturists.

Fruit Research and Production in Sweden Today

Arthur H. Thompson
University of Maryland

The recent IDFTA study tour of Sweden began at the Alnarp Research Station where we were hosted by their capable director, Dr. Ingevald Fernquist. Famous for the hardy apple rootstocks long known in the northern states and in Canada, Alnarp is active in a range of other research activities as well; in tree

ination, quality evaluation, and storage. Interestingly enough Sweden also has a replant problem, and this is being addressed with laboratory and field studies. In small fruits, the research program at Alnarp is directed to domestication of the mountain cranberry (*V. vitis-idaea*) and the lowbush blueberry (*V. angustifolium*), micropropagation, flower bud initiation and nutrition of the strawberry, and the cytogenetics of raspberries.

The fruit breeding division of the Department of Pomology at Alnarp is located at Balsgard, some miles to the northeast. Active breeding projects at Balsgard include several tree fruits (apples, pear, plum and cherry), strawberry, black currant, and raspberry. Besides the usual objective of creating better horticultural varieties, the breeding program here is focused as well on disease resistance in all fruits being considered. Further, in tree fruits they are also looking for spur type characteristics in progeny. Among the apple varieties introduced here, we observed both Kim and Aroma in later visits to Swedish and Norwegian orchards.

The leading fruit crop of Sweden is apples; current annual production is about 1 $\frac{1}{4}$ million bushels. Cox and Ingrid Marie (a Danish variety) make up 40 percent of the total crop, while other important varieties include Lobo, Gravenstein, and James Grieve. Coming up rapidly in Swedish estimates is the variety Summerred, a short season red apple introduced by the Canadians at Summerland, B.C. The greatest appeal of this interesting new variety is the characteristic of very early bearing in the orchard, and heavy bearing in subsequent years.

Swedish orchards are tidy and as well managed as any we have seen elsewhere in the world. Tree and small fruits are usually planted up and down the hills, something Americans never adjust to. While Alnarp stocks predominate in older plantings, Swedish growers are getting more interested in smaller trees, especially those on M 9 and M 26 stocks. Older standard orchards are usually on Alnarp stocks, of trees trained to open centers, kept quite low in silhouette by pruning practices, and are planted at medium densities. Second in fruit production in the nation, the strawberry now occupies some 3,000 acres in Sweden. Many of these acres are planted for pick-your-own, and all looked very good even up to surprising ages. One apple grower we visited near Jonkoping had a large field (running down hill, or course) of good looking strawberries in a 6 year old bed, this beside equally goodlooking 10 year old black currants yielding regularly at 3,100 pounds/acre.

Swedish fruit growers are small; as such they face the same dilemma as others in Europe when trying to mechanize. Perhaps the most impressive figure we learned on this tour was the cost now of \$9/hour to hire fruit pickers. About 40% of that figure goes for taxes of one kind or another which are levied to support the social welfare system. At this cost, there is little incentive to expand beyond what family members can handle. Clearly it appears that the social welfare system has clamped a ceiling on the options open to the Swedish fruit grower.

This account would be incomplete without mention of the coveted opportunity to see and visit the home of Carl von Linne (1707-1778). Linne spent his life south of Jonkoping studying and classifying plants in the world around him, and stands out as the father of modern plant classification, or taxonomy. The design and appointments of this fascinating old Swedish farmstead were of interest to all.

The Apples of Spain
Dr. Steve Blizzard
West Virginia University

The old verse "The rain in Spain falls mainly on the plain", unbeknownst to many people, is true. Also, another truth which takes many pomologists by surprise is that Spain is a very accomplished producer of pome fruit. With an annual production of nearly 100 million metric tons of apples Spain ranks high among the major fruit producers of Europe.

During a recent IDFTA international tour, nearly 50 growers and researchers were treated to visits of some of the finest fruit producing areas of the world. Traveling from Spain's second largest city of Barcelona, northwestward up the fruit laden valley of the Ebro River, to the 2,000 year old city of Zaragoza, many of Spain's traditional as well as modern growing systems can be seen. The average rainfall along Spain's longest and largest river, the Ebro, is approximately 13 inches per year, occurring mainly in the spring. For this reason the extremely rich soils must be irrigated. Although very fertile, the soils are calcareous in nature. At PH values ranging from 7.8 to 8.4, iron becomes less available, producing a chlorosis which is quite severe and necessitating the routine use of chelated iron sprays.

Suffering from nearly all the common diseases and insect problems, the pome fruit industry of Spain has been blessed with the absence of fireblight. Spain's northern neighbor, France, suffers from the bacteria but it has not managed to cross the Pyrenees Mountains. The majority of apples produced in Spain are Golden Delicious at nearly 50 million metric tons followed by Starking at nearly 25 million metric tons. The remainder of the production is made up of numerous local varieties. With the exception of a few early green Golden Delicious, which are exported, the bulk of the Spanish crop is consumed internally. With the tremendous competition for fruit in Europe by the Economic Common Market members of France and Italy, Spain's fruit producers have "tough sledding" in the absence of impeccable quality. One unique problem which hinders Spain's fruit production is snails, which are prevalent in most orchards. Although snails injure leaves and fruit, they serve as a tasty snacks or even a main meal for orchard employees.

Many trellis systems, using French Drapeau, Marchand or Italian Palmette training, can be seen in production in Spain. Spanish orchardists depend quite heavily on the M 9 rootstock, with which they seem very pleased and report yields of 45 to 70 metric tons per hectare. Spanish horticulturists are utilizing growth controlling rootstocks to a large extent to more effectively utilize their valuable irrigated area.

Spain offers much to the horticulturally oriented traveler. But to the average traveler Spain does not fall into the somewhat depressed light it is often portrayed. The Spaniard is a city dweller. In the major cities of Madrid and Barcelona, the average citizen lives seven stories above the ground in a modern apartment complex. The highways are efficient and in excellent repair. The people are extremely friendly and gracious hosts. A visitor, regardless of his discipline, would find Spain exciting and educational.