



COMPACT NEWS

A Periodic Newsletter of the International Dwarf Fruit Tree Association

No. 1 August 1989

Prepared by H.A. (Jack) Rollins, Jr.

A Message from the Educational Director

"This year has been an exciting and learning experience for me. The transition of the I.D.F.T.A. offices from Michigan to Virginia (Educational Director) and Pennsylvania (Business Director) is nearing completion.

"One of my objectives is to better communicate to I.D.F.T.A. members about program activities and educational topics by increasing the number and timeliness of the newsletters.

"I would appreciate any suggestions you may have to better fulfill the I.D.F.T.A.'s mission."

— H.A. (Jack) Rollins, Jr.

89 Conferences and Tours Generate Strong Interest

The 32nd Annual Conference is now history after a successful "Fresno" meeting.

Attendance at all of the educational sessions was very good and indicated a strong interest in the program topics. The two days of tours were also well attended and stimulated new ideas for those participating.

We want to express our special appreciation to Ron Perry for his leadership in the organization of an outstanding educational program.

The proceedings of this year's conference are in the advanced stages of preparation and will include the 45 papers submitted by the program speakers on a wide variety of subject matters.

The 1989 Summer Tour was headquartered at Shepherd College in Shepherdstown, West Virginia, June 25-27. More than 400 people registered and participated in tours that included orchard visits in Maryland, West Virginia and Virginia, as well as current research projects at the West Virginia University Experiment Farm in Kearneysville, W.Va. and the U.S.D.A. Laboratory in Bardane, W.Va. The diversity and transition of the Appalachian apple industry was featured.

I would like to express my personal appreciation to Tara Baugher for the leadership she provided in developing the local arrangements and the W.Va. tour stops. ■

1990 33rd Annual Conference Planned

Details for the 1990 33rd Annual Conference are developing rapidly. The meeting will be held in Penticton, British Columbia, March 4-8, 1990. Educational program speakers and tour stops are being scheduled. Pruning demonstrations by experienced managers of the French Ax and Slender spindle plantings will be included.

Details and highlights will be included in our next newsletter. ■

Don't miss this highly-informative conference—mark your calendar NOW!

1990 Summer Tour

Plans are moving forward in preparation for the 1990 summer tour which will be held in western New York June 24, 25 and 26. Headquarters will be the State University of New York in Brockport, N.Y., more frequently referred to as SUNY-Brockport.

A Sunday evening get-acquainted gathering is being scheduled. On Monday, orchard visits in Wayne County are planned followed by a tour of the research plot reviews and a cookout at the Geneva Experiment Station.

On Tuesday, the tour will head west of Rochester for orchard visits and a scenic drive.

Arrangements are being developed by Steve Hoying. Additional information on individual stops will be included in our next newsletter. ■

*Please be
sure to read
"Fruitful Insights"
on page 6
to learn important
information
about your NEW
membership
number!*

MEMBERSHIP SURVEY

The response to the membership survey conducted earlier was very good, and much better than expected.

We received 485 completed forms. The results have been summarized and provide a good picture of our membership

composition and program assessments. This information is proving very helpful in the development of future programs to better serve the needs and interests of I.D.F.T.A. members. The following is a summary of the survey results.

Source of Responses	Number	% of Total Respondents
Commercial tree fruit producers (includes 17 producer-nurserymen)	327	67.4
Tree fruit researchers	63	13.0
Extension educators	26	5.3
Tree fruit consultants	7	1.4
Nurserymen	14	2.9
Non-commercial tree fruit producers and others	48	10.0
TOTAL	485	100.0

MEMBERSHIP SURVEY

Commercial Tree Fruit Producers: Orchard Size Breakdown

1-58 acres	106
51-200 acres	128
200+ acres	91
No indication	2

TOTAL 327

MORE SURVEY RESULTS ON NEXT PAGE . . .

**MEMBERSHIP
SURVEY**

Benefits Evaluations

	Number of Responses	% of Total Assessments			
		Excellent	Good	Fair	Poor
Annual meeting programs	314	66.2	30.6	2.2	1.0
Annual meeting proceedings	327	53.2	41.3	5.2	0.3
Newsletters	340	32.7	56.4	6.8	4.1
Results – sponsored research	249	23.3	56.6	17.7	2.4
Personal contacts	274	44.1	44.9	7.7	3.3
Summer tours	182	44.0	48.3	6.6	1.1

**MEMBERSHIP
SURVEY**

Annual Meeting Program Preferences

	Number of Responses	% of Total Assessments			
		More	Less	As Is	None
Foreign speakers	270	45.6	33.7	20.7	0.0
Research reports	280	65.7	17.5	16.8	0.0
Producer experiences	280	82.1	6.1	11.4	0.4
Open discussion	260	72.3	13.8	13.1	0.8
Split sessions	223	40.4	31.4	17.0	11.2

Thanks to everyone who took time away from busy schedules to complete and return their membership survey forms. . . your participation and enthusiasm allows our organization to grow and continue to provide informative topics of interest through this newsletter and scheduled conferences and meetings.

MARK Rootstock Observations

The following comments were prepared by Dr. Dave Ferree, Pomologist at the Ohio Agricultural Research and Development Center, Wooster, Ohio and published in Buckeye Fruit Tips, Vol. XI, No. 1, January 1989.

Concerns about MARK rootstock:

Recently I attended the NC-140 rootstock meeting where the early performance of MARK was a major topic of discussion. Although many of the reports are preliminary, I wanted to share them and raise a caution about widespread planting of MARK before we know more.

Breakage of the Union:

Nurserymen are having problems with the newly developing shoots from the buds blowing out. The problem was more severe with Stayman and Granny Smith. In a planting at Wooster, two-year-old trees of Rome on MARK broke at the union. Similar problems with orchard planted trees were observed in Missouri. Prior to this problem, the trees had made excellent growth. The group at NC-140 now recommends staking trees on MARK just as you would on M.9. We have just staked our trees in the plantings at O.A.R.D.C.

Galls and Tumors:

Crown gall has been found on finished nursery trees causing many to be destroyed. Nurserymen are now treating nursery stock to prevent this problem. Large tumor-like growths have been observed at the soil line on trees planted in 1980 in Ontario, Washington and Ohio and I

suspect others will find these as well. We don't know what this disorganized growth does to tree growth, but suspect it could be involved in the senescent "spur-bound" condition observed on older trees on this rootstock.


"Although many of the reports are preliminary, I wanted to share them and raise a caution about widespread planting of MARK before we know more."


Fireblight:

Evidence keeps coming in about tree loss on MARK due to fireblight. In our planting at Ripley, we experienced loss, but not quite as severe as on M.9 and M.26. However, I think we must now consider fireblight a significant problem on this rootstock, particularly with a blight susceptible cultivar on top.

Burrknots:

MARK has a burrknot problem and care in planting should be taken so that the union is only an inch above the soil surface.

Any more exposure of the rootstock will result in significant burrknot development and the associated problems of borer or fireblight entry.

Conclusions to Date:

If trees on MARK as now suggested by NC-140 must be staked and are prone to fireblight problems, I cannot see any advantages over M.9 as a rootstock. Some of the other problems that are just not appearing in older trees raise concern about widespread planting of this rootstock before these problems are sorted out. We have quite a few trees in both experimental and commercial orchards in Ohio and we will do our best to keep you informed as we gain more experience."

— Dave Ferree/O.A.R.D.C.

*The pessimist complains about the wind;
 the optimist expects it to change;
 the realist adjusts the sails.*

. . . OUR ROOTS . . .

The first newsletter of the International Dwarf Fruit Tree Association was published in October 1958. Bob Carlson reported that "One day in March, 1958, a group of alert fruit growers and professional horticulturists sat on apple crates in the packing shed of Hill Top Orchards and discussed the past, present, and future status of growing dwarf fruit trees. In fact, nearly 300 persons from Michigan, Minnesota, Illinois, Indiana, Kentucky and Wisconsin were present at this Harford, Michigan meeting.

"The program of the meeting was of a general interest nature with brief talks demonstrated with slides and followed by an active discussion. From this sprung the idea of forming a *Dwarf Fruit Tree Association* with the purpose of promoting an understanding of the nature and use of dwarf fruit trees through research, education, and dissemination of "information". "

Included in this first newsletter the following article was prepared by Dr. H.B. Tukey.

A NEW ERA IN DWARF FRUIT TREES

"The test of the pudding is in the eating." This is the stage at which dwarf fruit trees have now arrived in this country. From here on, it is grower experience that will tell the story.

Experiment stations have already made a substantial contribution to our knowledge of dwarf trees. They have catalogued and named and introduced various dwarfing rootstocks. They have shown how to propagate them. They have shown the successful stock-scion combinations. They have determined winter hardiness and general adaptability. They have made suggestions on culture, yields, and fruit quality. They have eliminated much of the gamble and the big hazards.

But, just as with a new variety, there are many unknown factors. No single individual or experiment station can give all the answers. We need to get every little experience from every individual who has an interest in the problem. We need to pool this information and send it out to each other for review and comparison and discussion.

For example, dwarf fruit trees are promising, but are they going to be subject to spring frost injury on low ground because of their low-heading? Do they need to be located on special frost-free sites? Does the fruit of different varieties ripen a day or so earlier or later? Does this markedly affect marketability? How about finish?

Do fruits from dwarf trees keep in storage as well or better than from standard trees? What about mulching, irrigation, hand pollination, mechanical harvesting, thinning, insect and disease control, pruning, and harvesting?

Here is where and why the new Dwarf Fruit Tree Association is so badly needed. Let everyone make his observations and bring them to the Association for dissemination and discussion. In this way, we will shake the bugs out of the dwarf fruit tree, find where they belong, and how to handle them. The formation of the Dwarf Fruit Tree Association could well prove to be one of the important steps in the development of the fruit industry."

It is interesting to note that after more than 30 years the the thrust and direction of the organization continues and remains on the cutting edge of tree fruit production technology. ■



Fruitful Insights

... FROM THE DESK OF THE BUSINESS DIRECTOR.

More than 30 years ago, Dr. Robert Carlson had foresight as well as a dream. He was one of the few individuals who recognized that "dwarf" fruit trees were the future of fruit production. He also had sufficient vision to realize that there was a need for an organization dedicated to the dissemination of information on dwarf fruit trees to the growers. As a result of his vision, the I.D.F.T.A. had its first meeting in March 1958. For almost 30 years, Dr. Carlson so ably shepherded the organization that, at his retirement in 1986, it was international in scope. Dr. Carlson was responsible for newsletters, annual proceedings, and all related business matters. Of course, we all know that his wife, Shirley, was instrumental in keeping things organized and on track.

In 1986, Dr. Ron Perry and his wife Anne took over I.D.F.T.A. management. Ron recognized that, due to the number of members, the use of a computer was essential to efficient management. Ron organized the member information on a database and Anne was responsible for mailing, posting of dues, etc. Ron and Anne operated as a team and their final effort was organizing the outstanding annual meeting in Fresno, California in March 1989. However, due to ever-increasing responsibilities at Michigan State University, Ron resigned his position with I.D.F.T.A. in December,

1988. The Board of Directors then decided that, due to the size of the organization, the management position should be divided, and the positions of Educational Director and Business Director be created.

During the annual meeting in Hershey, PA. I was approached by Robert Hodge regarding the position of Business Director. This was done in the presence of my wife and, knowing how she felt about my taking on any more responsibility, I declined and we left the meeting. On the way home, much to my surprise, my wife said, "why not?" We had an additional meeting with the "search" committee and, after an understanding that my wife and I would work as a team, I accepted the position as Business Director, subject to approval of the Board of Directors.

PLEASE USE YOUR MEMBERSHIP NUMBER!

Upon taking over, I found that, although Ron Perry had created a database of member information, it was extremely difficult to locate a member within the database. As you know, computers are wonderful, but they are also dumb. Unless you request information exactly as it was placed in the computer, the computer can't find it. We spent innumerable hours trying to post dues and finally made the decision to upgrade the database and move to a faster computer.

I also decided to give each

member a membership number. All individuals have now been placed in the new database and each member, current or not, has an individual membership number. No member number will ever be reused. Now that this monumental task has been accomplished, I have a number of requests:

1. The mailing label on this newsletter contains your membership number. Place it in some spot that you won't forget where it is, like the mirror that you face every morning, on the door of one of your kitchen cupboards, or the front of your checkbook. Don't do what I normally do—put it someplace where I know I'll never forget and the first time I need it, I can't remember where I put it!
2. Put the number on any material you send to the business office or the Educational Director. Especially, place it on any checks, dues returns, and registrations for conferences.
3. Check the information we have on the label and, if it's incorrect, let us know immediately.
4. If your membership is handled through a subscription agency, notify them promptly of your membership number. One of the most difficult dues payment to post is one received from a subscription agency. Invariably, they have the member listed under a different name or address.

Continued on next page.

Fruitful Insights . . . Continued

Past due membership notices were mailed on August 31st. The mailing reflects all dues received as of August 27th. Although we have been extremely careful in redoing the database, there undoubtedly will be some errors. Please be patient. If we have mailed you a second notice and you have already paid, please send a copy of your cancelled check and your records will be updated immediately. This should be a one-time occurrence. If membership numbers are used on all correspondence and checks, posting will be simple and extremely accurate.

I.D.F.T.A. MEMBERSHIP VITAL TO SERIOUS GROWERS

This is the first newsletter that has been issued since the management reorganization. It has been mailed to all members listed in the database, regardless whether or not you are a current member. Unfortunately, this may be the last piece of information that you will receive if you are not a current member. If you are no longer a member, I would urge you to reconsider. The information contained in the *1989 Compact Fruit Tree* is vital to anyone seriously interested in dwarfing rootstocks as well as the new varieties of fruit.

The 1989 edition of the *Compact Fruit Tree* is being compiled by Dr. "Jack" Rollins and I expect it to be ready for publication in the near future. Accordingly, September 30th will be the cut-off date to determine the number of members and how many

copies will be ordered. In the past, a substantial number of extra copies were printed and available for purchase by members who paid their dues late. Due to the costs of publishing, this is no longer possible. Only a limited number of extra copies will be ordered, primarily for members joining near the end of the year.

Another document that the I.D.F.T.A. plans to publish is an index of all the materials contained in the *Compact Fruit Tree* from 1968 through 1988. This information has been compiled by Dr. Ron Perry and one of his associates and is an outstanding resource publication. The articles will be indexed by title, author, subject, and key word. Publication is expected by early 1990 and the index will be mailed to all current members.

As you are all aware, the I.D.F.T.A. is vitally interested in rootstock research and has, in the past, funded a variety of research projects. In 1989 more than \$19,000.00 was distributed for various projects. These projects will be briefly summarized in an upcoming newsletter.

If you need to contact the business office, the hours are Monday, Tuesday, Thursday, Friday, 9:00am - 5:00pm EST and Wednesday 9:00am - 12noon. The phone number is (717) 837-1551 and an answering machine (lovable things aren't they?) is on 24 hours a day.

Finally, for your information, I have listed the names and addresses of all the directors of the I.D.F.T.A. (See page 8.) ■

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The wife of a Pennsylvania fruit grower has an effective way of dealing with those unsolicited sales pitches one often gets on the telephone. Just as the salesperson gets to the spiel, the lady responds, "Oh, thank heaven! (Big sigh of relief.) "You want to sell me something. I thought you were another collection agency."

BOARD OF DIRECTORS

International Dwarf Fruit Tree Association

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Terms of Office

	Date Appt.	Present Term	Max. Term
DENNIS COURTIER	3/87	3/90	3/96
JIM ECKERT	3/86	3/92	3/95
WALTER KRAUSE	3/87	3/90	3/96
ARTHUR LISTER	3/89	3/92	3/98
MITCHELL LYND	3/86	3/92	3/95
TIM MERCIER	3/87	3/90	3/96
EVAN B. MILBURN	3/83	3/89	3/92
DARREL OAKES	3/88	3/91	3/97
JACK PEARSON	3/84	3/90	3/93
JACK PHEASANT	3/85	3/91	3/94
PIERRE PHILION	3/85	3/91	3/94
PAUL ROOD	3/84	3/90	3/93
HAROLD SCHOOLEY	3/85	3/91	3/94
HAROLD THOME	3/88	3/91	3/97
JOSEPH WENTZLER	3/89	3/92	3/98



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No. 3 December 1989

Prepared by H.A. (Jack) Rollins, Jr.

A MESSAGE FROM THE EDUCATIONAL DIRECTOR . . . *The IDFTA Board of Directors held a very positive and productive meeting in Grand Rapids, Michigan on December 4. One item reviewed was the effort to establish a research foundation that would provide tax exempt status for research gifts to further increase monies available for research project funding.*

Check your calendars. The dates for the annual summer tour to be held in Western New York have been advanced one week to June 17, 18 and 19, 1990.

H.A. (Jack) Rollins, Jr.

Ferree to Present First Annual Robert F. Carlson Lecture

Dr. David C. Ferree will present the first Robert F. Carlson Distinguished Lecture at the 33rd Annual Conference. David Ferree is a graduate of Penn State University and earned M.S. and Ph.D. degrees from the University of Maryland. After serving two years in the U.S. Army, he joined the faculty of The Ohio State University in 1971 and has been located at the Ohio Agricultural Research and Development Center since that time. Dave has been involved in rootstock evaluations with the N.C.-140 national apple rootstock trials, as well as others with G7 rootstocks under evaluation at various locations throughout the state of Ohio.

Dave has also been responsible for the evaluation of various apple orchard systems involving continuous replicated trials since 1973. In addition to long term production, he has

attempted to evaluate canopy light distribution and relate it to spur quality and system efficiency. In cooperation with colleagues, he has attempted to also compare the economic implications of orchard systems.

Dr. Ferree has studied the influence of summer pruning, mechanical shearing, and root pruning as to their impact on growth and production as well as attempting to understand the physiological basis for the response.

Dave Ferree's experience includes a 6-month study leave at East Malling Research Station in England studying light relations in new raspberry training systems and the role of spurs on fruit growth.

In 1986 he took another six-month study leave at the Horticultural Research Institute in Victoria, Australia where he studied the impact of eight different apple training systems on canopy light penetration, photosynthesis, leaf angle, and

canopy development.

Dr. Ferree will share with us the conclusions of his studies and practical observations in his two conference lectures.

It is also significant that Dave Ferree has served as major adviser for a number of Ph.D. graduate students that are now working in pomology research and extension positions. Included in this group are Drs. Rob Crassweller, Pennsylvania State University; Stephen Myers, University of Georgia; Curt Rom, University of Arkansas; Jim Schupp, University of Maine; and Brad Taylor, Southern Illinois University.

IN THIS ISSUE!!

- FERREE TO PRESENT DISTINGUISHED LECTURE
- 33RD ANNUAL IDFTA CONFERENCE SCHEDULE
- CONFERENCE SPEAKERS
- FROM OVERSEAS

■ **TUKEY: Matching the Rootstock with the Training System for the Production of Apples**

plus much more!!!

1990 PENTICTON CONFERENCE SPECIAL ISSUE!!

Penticton, British Columbia

Sparked by its reputation for growing delicious, mouth-watering peaches, Penticton welcomes IDFTA members to enjoy the beauty and hospitality of this Canadian city of 25,000.

Seasonally mild temperatures and an unlimited choice of cultural and recreational activities will make your conference stay in Penticton a very enjoyable experience. The Delta Lakeside (IDFTA conference headquarters) also offers many comforts and conveniences.

For more information about The Delta Lakeside conference headquarters and the city of Penticton, write or call:

THE DELTA LAKESIDE
21 Lakeshore Drive West
Penticton, B.C., V2A 7M5
(604) 493-8221

**PENTICTON CHAMBER OF
COMMERCE AND VISITOR'S
INFORMATION CENTRE**
185 Lakeshore Drive
Penticton, B.C. V2A 1B7
(604) 492-4103

Airfare Information: Make your reservations early.

The IDFTA Business Office has arranged for convention rates through Air Canada. All you have to do is call Air Canada's Toll Free Number (1-800-361-7585), give them the IDFTA event number (90-501), and they will assist you in making reservations.

Convention rates are as follows:

1. 25% off Full Coach Fare – no advance reservations, no minimum number of days and no maximum number of days.
2. 35% off Full Coach with a minimum of seven (7) days advance booking, a stay of at least two (2) nights and a maximum of fifteen (15) days.

The above rates are for US citizens.

Canadian residents will get a fifteen percent (15%) discount and must make their reservations seven (7) days in advance, stay a minimum of two (2) nights and a maximum of fifteen (15) days.

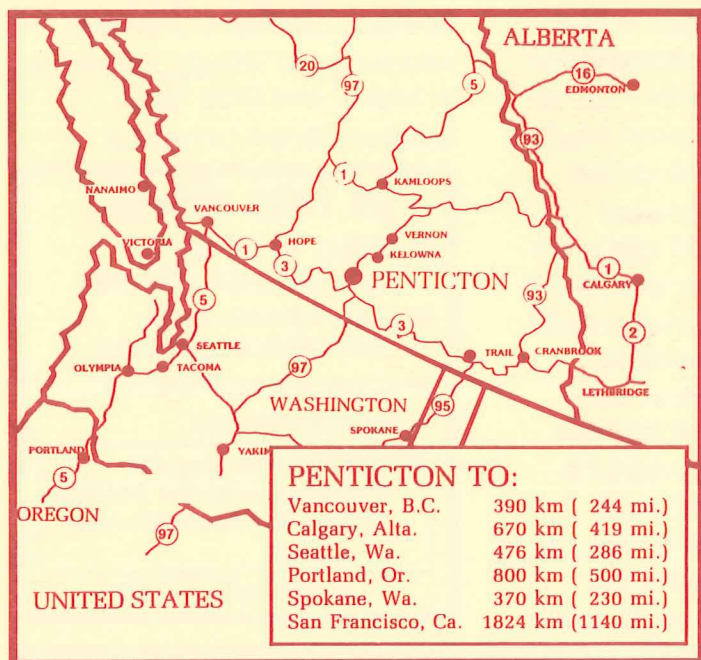
In either case you can make changes with no extra costs and may cancel with only a twenty (\$20.00) dollar fee.

In addition to the above, excursion and seat sale rates may be available. These will be less expensive and the earlier you make the reservations the better the discount. Again, call the toll free number and give them the event number.

IDFTA does not guarantee that Air Canada's rates are the lowest. We have obtained the IDFTA number for your traveling convenience.

Also, we understand that Air Canada has only a limited number of flights from Vancouver to Penticton and the plane has very limited capacity. If Air Canada informs you that no seats are available, ask if they will book you on Pacific Air, Canadian Airlines International, or United Airlines.

See page 10 for a listing of motel accommodations.



*It's easy to spot
people who can't count
to ten. They're in front
of you in the
supermarket
express lane.*

MATCHING THE ROOTSTOCK WITH THE TRAINING SYSTEM FOR THE PRODUCTION OF APPLES

Dr. Loren D. Tukey

Department of Horticulture • The Pennsylvania State University

**Paper at the Regional Fruit Grower's School on The Soil Environment in Fruit Trees' Cultivation: Rootstocks, Fertility, Water Management, and Pests, November 8, 1989, Middleway, West Virginia.*

INTRODUCTION

Apple production is the business of growing fruit. As in any business, the goal is to obtain a favorable return on investment. Profitability is based mainly on the choice of cultivar, regular cropping, and percentage of the crop having a premium value for the market being served. However, over the past 40 years, changes have occurred which affect costs and returns. Production costs have increased while returns have remained relatively stable or increased slightly. That is, the margin between costs and returns has decreased.

The general approach to increasing profits has been through increasing acreage, replanting old orchards, concentrating on fewer and more profitable cultivars, and increasing tree density. The industry has changed from seedling rootstocks to clonally-propagated rootstocks. The use of East Malling tree size controlling rootstocks and later the Malling Merton series not only enabled an increase in tree density but also introduced the concept of regulation and control of tree growth and cropping.

M.2 was the first clonal rootstock used commercially in the U.S., but later this was replaced

with M.7, producing a smaller size tree with earlier and heavier cropping. However, because of the anchorage problem with M.7 and a need for trunk support, MM106 and double-worked M.9 on MM111 became popular for a freestanding tree. MM106 lost favor with many orchardists because of the collar rot problem, even though cultivars on this rootstock cropped well. M.26 produced a very desirable tree for spur types and vigorous cultivars, but trees often needed trunk support under certain climatic conditions if the central leader was not headed back to stiffen the central axis. M.9 has not been widely accepted in the U.S. because of its small size and need for complete support. However, the intensive orchard systems developed in Europe have renewed interest in M.9, and even in the more dwarfing clonal rootstocks.

LAND BEARING POTENTIAL

An orchard is 3-dimensional, having height, length and width. It consists of two parts, a bearing portion and a support portion. The bearing portion is the tree's occupied space, while the support portion is the clear alleyway between trees for equipment and labor movement. By reducing or eliminating the tree's clear alleyway and narrowing the row's clear alleyway, tree density is increased, enhancing orchard bearing efficiency through a greater number of trees.

Likewise, a fruit tree has a

bearing portion (foliage and fruiting buds) and a support portion, (trunk and scaffold limbs). The smaller the size of the tree the greater is the amount of the bearing portion to the support portion. Thus, with a dwarfed tree, more of the space occupied by a tree in a planting is devoted to bearing and less to support (non-bearing functions). This aspect enhances orchard efficiency still further when combined with plant density. Consequently, the tree size controlling rootstocks, especially the more dwarfing types, have an important role in developing potential land productivity.

On closer examination, potential productivity is directly related to the total volume of bearing wood developed in a planting, and less to plant density. That is, cropping is directly related to the volume of bearing wood designed into an orchard, and is not always associated with the number of trees. Bearing volume is related to the form of a tree or a group of trees.

At a given tree spread, an orchard with tall trees has a larger bearing portion than one with low trees. However, in a computer study of tree forms and orchard design based on tree bearing volume, optimum spread for tall trees was found to be relatively narrow, while that for low trees relatively broad. The spread for tall trees was about 10 to 12 ft., while for trees 6 ft. in height, optimum spread was nearly 40 ft.

Continued on NEXT PAGE.

Matching the Rootstock . . . Continued

(Tree density with tall and narrow trees is greater than that for low and wide trees.) Since it is not practical economically to develop a single tree 40 ft. broad and low in height, many trees on very dwarfing rootstocks can be used to fill the single tree's area. The resulting form could be either a bed or a trellis hedgerow. Filling the space occupied by a broad tree with many small trees significantly increases production because of the increased bearing capacity from many small trees (large total bearing volume).

INTENSIVE SYSTEMS

Intensive systems utilize the very dwarfing rootstocks. Although M.9 mainly is used, M.26 is used with spur type cultivars in some intensive training systems. Recently, M.27 and some of the Russian (Bud.) and Polish (P) rootstocks in the M.9-M.27 size group have been evaluated. Most intensive systems use some form of tree support or training aid in developing and maintaining tree form, such as poles, posts and wire, special wire support frames, etc. Conversely, traditional systems utilize freestanding trees handled as individuals. These may be on seedling rootstocks, semi-vigorous clonal rootstocks, or semi-dwarfing clonal rootstocks. The former consists of smaller trees and denser plantings than the latter.

Training forms for intensive systems include the Dutch slender spindle and its variations as low central-axis tree forms, the French AXE or vertical axis tree, The Solen, and the vertical trellis or espalier, once widely used in France. The trellis has been re-introduced in the U.S. as the

Penn State low trellis hedgerow. The Solen uses a modified wire and post system. The slender spindle, low central-axis, and French AXE are forms consisting of individual trees supported by and trained against a pole.

Intensive systems should be termed "M.9 systems" because they are largely based on the tree size controlling effects from M.9. Since trees are small in size, plant density is naturally high. However, the trellis systems in France initially used a more vigorous rootstock such as M.2. Here, "intense" referred to the intense training needed to contain each row of trees within its specified allotted space and to regulate cropping by detailed pruning.

Conversely, "intensive" can be applied to conventional systems where plant density has been increased by the use of certain rootstocks to produce smaller trees. The increased use of spur type cultivars, especially Delicious, and semi-dwarfing rootstocks, such as M.26 and M.7, were factors bringing about greater plant densities than previously with seedling or vigorous clonal rootstocks.

"Intensive" also refers to intensive cropping, an economic force or pressure toward the development of more productive tree forms and orchard designs. Economic reasons were probably the basis for the development of the *Dutch slender spindle* with M.9 and for the loss of popularity of certain non-dwarf trellis tree forms in France. The development of the Dutch slender spindle with M.9 and its wide acceptance have come about largely because of research, the fruit advisory service, and the grower himself.

The Dutch are still leading in tree training ideas and planting designs for the slender spindle. Single rows have developed into multi-row or bed systems. The first 3-row orchard was developed by a Dutch grower with the middle row apparently planned to serve as an interplant row in a single row system. Techniques often employed in training include bending, arching, heading back, tying up, and tying down with string or concrete weights. (Papers by Dr. S. J. Wertheim at the Fruit Research Station at Wilhelminadorp adequately describe the training of a slender spindle-type tree.)

A recent bed design and pruning system is the *New North Holland 3-Row System*. This design arranges trees for improved sunlight exposure and better utilization of orchard floor space for apple production. Pruning is done to maintain a small tree, and to bring the fruiting wood closer to the tree's central axis. In training, both June and summer pruning are done. Dormant pruning is looked upon as "correcting" last year's mistakes in growth and training. The system was developed by J. Houter and J. Flierman, fruit grower advisors in North Holland, and W. J. Rooijen, station superintendent at the Oosthuizen fruit trials near Hoorn.

The *French AXE* was developed by J. M. Lespinasse at the INRA Station near Bordeaux. He describes the form as "a free flowing tree," which reaches a height limited by cropping in the top of the tree. Numerous lateral branches are formed along the central axis from axillary shoots. After bearing a crop the lateral

Continued on NEXT PAGE.

Matching the Rootstock . . . Continued

branch is pruned back to allow for renewed shoot growth and the formation of a new fruiting branch or wood. The vigor of the rootstock influences the renewal of growth. Where M.9 may be a little low in vigor, M.26 and MM106 may be used. However, at Penn State, M.26 has been too vigorous in the formative years, producing too vigorous and tall a tree with the absence of adequate lateral branching in the lower part of the tree. Conversely, M.9 has been very satisfactory, producing a 9 ft. tree in 3 to 4 growing seasons. M.27 has been quite acceptable to date, provided the scion is started from a single bud and the leader is kept tied up to the vertical support pole to enhance extension of terminal or leader growth. Three-year old "AXE" trees have reached 7 to 8 ft. The system has been widely accepted in the warmer regions of France. There is a question, however, if the system will do well in cooler climates, especially if the area has a short growing season. Nevertheless, the concept has horticultural interest.

The central-axis system used in Quebec, Canada, appears to be a hybrid between the slender spindle and the French AXE. Trees with M.9 apparently were too vigorous for handling as a slender spindle tree, according to Dr. R. L. Granger at the Research Station at St. Jean. The excessive vigor of trees with M.9 necessitated the development of a taller central-axis tree. Training combined that for a spindle bush and a French AXE. This hybrid might be named the *Quebec System*.

In the trellis, trees are trained to four wires strung between posts. Scaffold limbs from adjacent trees are trained to overlap or cross

each other. Each row is handled as a solid hedgerow. Of the various trellis forms, the Delbard Tri-Crossarm is possibly the most advanced in utilizing horticultural training technology. Tree spacing is determined by the angle of the scaffold limbs based on scion vigor (rootstock-scion vigor). However, in terms of simplicity, the oblique palmette tree form appears most satisfactory, and is the form used in the *Penn State low trellis hedgerow system*. Other support systems include the Ebro, Lincoln Canopy, Tatura Trellis, double T, V form, and various grower approaches to increasing land and labor efficiency.

Recently, in France, a new trellis system has been developed by J. M. Lespinasse at the INRA Station near Bordeaux. The system is named *The Solen*, and is used for cultivars on M.9. It is a low "T" form with two main scaffolds oriented in the row plane. A modified trellis with posts and two vertically spaced wires (4 inches) is used in developing and supporting the main scaffold limbs, one in each direction. Lateral growth from the main scaffolds becomes the fruiting wood, and is renewed in the summer by bending new shoots with narrow crotch angles. Concrete weights (about 100 grams) are used in bending. Each row has a total tree spread of 80 inches, 40 inches on each side of the row.

CULTIVARS

The success or failure of a training or orchard system is largely due to the growth habit of the cultivar. Terminal bearers like Rome Beauty do not do well. Spur sorts may be

a problem in some systems. However, spurs are very satisfactory as a low-trellis hedgerow, based on research experience at Penn State. Spur Delicious sorts have required very little attention when mature, much less than as a free-standing tree. Spurs might do well as a slender spindle, but training may have to be modified because of their general tendency to produce vertical shoot growth and to grow more slowly than non-spurs. Redchief (a spur) can be trained as a slender spindle on M.27 if tree growth is stimulated during the formative years and trees are not allowed to fruit in the first 2 to 3 years. Trees would be 2.5 to 3 ft. apart in the row, and could even be closer. However, M.9 should produce a better slender spindle tree for a spur than M.27.

Cultivars which appear to be best suited for intensive systems are the non-spurs with a spur-type bearing habit. These would include Empire, McIntosh, Jonagold, Spartan, Gala, Jersey Mac, Wealthy, Golden Delicious, Melrose, Mutsu, and Stayman. The success of the Dutch slender spindle in Europe appears to be related to the cultivars used with it. With the exception of Golden Delicious, cultivars are much different from those grown in the U.S. Besides its fresh eating quality, Jonagold does well as a slender spindle because of its growth and fruiting habit. Thus, the success or failure of a training system depends, to a large extent, upon the growth of the cultivar under local conditions.

ROOTSTOCKS

The most widely accepted root-

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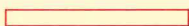
Matching the Rootstock. . . Continued

stock cultivar for intensive orchards is M.9. Regular M.9 in many situations is preferred over virus free M.9 (EMLA). In Europe, M.27 is being tried on a large scale in commercial orchards. At Penn State, M.27 is doing well with both the French AXE and Dutch slender spindle and shows promise with the Penn State low trellis hedgerow system. Other very dwarfing rootstocks which should be considered are Bud. 491, Bud. 146, P 2, P 22, Lancep (Pajam 1), and Cepiland (Pajam 2). (Until the problem of growth proliferation developing below the graft union is solved, rootstock Mark is not recommended at the present time.)

In trellis hedgerow systems, M.26 has been satisfactory for spur cultivars. Although more vigorous rootstocks are a possibility, tree training is more labor consuming. At one time M.2 was used in France, but M.2 is too vigorous where current cultural methods are followed. The most satisfactory rootstocks to date are M.9, for medium to low vigor cultivars or under vigorous growing conditions and soils, and M.27, for high vigor cultivars or vigorous growing conditions and soils. However, P22 and Lancep should do well: P22 for high vigor situations, and Lancep for medium to low vigor situations. Research at Penn State has indicated good tree efficiency with P22, Lancep, and M.9. Showing promise are Bud. 491, CG 10, Bud 146, and Cepiland. Tree efficiency is the level of cropping in relation to tree size or canopy volume, expressed as trunk cross-sectional area (TCSA). Because M.26 is better suited to lighter or sandy soils than M.9 and related rootstocks, double working M.26 with either M.27 or

P22 is suggested for trial in order to produce a small size tree with M.26. On light or sandy soils, M.9 and related rootstocks require mulching and irrigation.

If trees on the more vigorous rootstocks or conventional double-worked trees are being considered, they are best handled as a free-standing central leader tree. The very dwarfing rootstocks are best suited for intensive systems.



SPACINGS

There are no set dimensions for tree spacing in the row or between rows. In general, trees are spaced as close as equipment, labor functions and shading will allow, and trees can be trained. Workers can reach about 3 ft. conveniently, and need about 1.5 ft. in which to operate. Equipment width varies, but an overall width of 36 to 42 inches seems ideal. The acceptance of a bed system is not only because a greater percentage of the orchard flow is involved in bearing, but also because the drive row (clear alleyway) can be a little wider. Both the Dutch slender spindle and low trellis hedgerow will allow the use of over-row equipment, provided the land is relatively level. It is generally accepted that the width of the clear alleyway between rows of trees should be no less than 1.8 to 2 times greater than the height of the trees.

In general, for a single-row Dutch slender spindle, trees on M.9 should be about 5 to 6 ft. apart in the row, with rows about 10 to 12 ft. Where M.27 is to be tried, spacing should be from 2 to 4 ft. for non-spurs with four feet suggested for vigorous cultivars. In bed systems, trees in adjacent

rows are staggered, or offset, with additional space added between trees in the row to allow for labor access to the bed. The bed appears as diagonal strips of trees. The basic tree spacing used depends upon cultivar-rootstock vigor and tree shading when trees are mature.

In the New North Holland 3-Row System, rows are again offset, but the distance between rows of trees is based on the spread of the tree in the diagonal across the bed rather than at a right angle to the row's axis (e.g. 3, 4, or 5 ft). The spacing in the row is figured as tree spread plus 1.5 ft. This is to provide access to the middle row and to reduce shading. If vigor is such that managed tree spread would be in excess of 5 ft., the system loses its advantage in maximizing the amount of orchard floor area devoted to cropping. The width of the clear alleyway would depend upon equipment width, but should be about 5 ft. or even a little less (e.g., $5 + 3 = 8$ ft. between adjacent bed, outer tree rows).

In the French AXE, trees are 3 to 5 ft. apart in the row, and each row is about 13 to 15 ft. apart. Trees are grown vertically and reach 9 ft or more in height. Final tree height is controlled naturally by cropping in the top of the tree and not by pruning. A picking and pruning platform generally is needed.

In The Solen, trees are 6 to 7 ft. apart in the row, and rows are about 10 to 13 ft. apart. After planting, trees are headed at 12 inches below the bottom wire, around 38 to 43 inches from the ground. Two vigorous growing laterals are selected to become the 2 main scaffolds. These are

Continued on NEXT PAGE.

Matching the Rootstock . . . *Continued*

trained on 2 vertically spaced wires (4 inches apart) strung between wooden posts. Laterals developing from the scaffolds become the fruiting wood. New and renewal growth is bent, if necessary, using weights. A row of Solen trees resembles a long, elevated bush.

In the Penn State low trellis hedgerow, spacing between rows should be 10 to 12 ft., with a tree height about 6 ft. and a bottom tree spread of 3 to 4 ft. In-row spacing is a function of tree vigor. Cultivars on M.9 should be at 6 ft., and on M.26, at 7 to 8 ft. Spur sorts on M.26 should be at 6 ft., being about equivalent to a non-spur on M.9. Where M.27 is to be tried, spacing should be from 3 to 4 ft. for non-spurs.

When spacings are being considered, it should be remembered that each cultivar-rootstock combination has a certain natural spread which is manageable. This does not mean that the natural spread of the tree should be used, but rather the spread that can be controlled or managed. Also, soils and climatic conditions vary, affecting what spacings are feasible. What a grower is able to manage also influences the spacing in a particular system. However, each system has basic rules which need to be followed if that system is to work. Any wider spacing may defeat the purpose of intensification.

LIFE OF THE ORCHARD

In the Netherlands, farm advisors feel that a Dutch slender spindle should be replaced in 10 to 15 years. In West Germany, trellising with M.9 has a life of about 15 to 18 years. The French AXE is too young to set an age limit. At Penn

State, some low trellis hedgerows planted in 1968 and 1969 are still doing well in 1989, but others are less productive and certainly carry a smaller crop today than 3 years ago. The cut-off point is usually visible with the loss of suitable wood to renew bearing wood, smaller sized fruits than previously, missing or weak trees, loss of cultivar value, weakening soils, advancements in technology and equipment design, and a general need for change.

COMPARISONS OF SYSTEMS

Large to medium size freestanding trees have the advantage of not requiring a support system. Their disadvantage is that harvesting efficiency is less than for small trees where pickers are at the ground level. Most important, however, is that land productivity is not at its maximum in terms of early production, and early and regular optimum production. Bearing volume per unit of land is less, even with an increase in tree density. Also, large to medium size trees are more difficult to manage than the small trees in intensive plantings. Further, larger size equipment is needed than that for plantings with small trees.

The French AXE, even with its high density, is not as productive as intensive systems with small trees. Further, large equipment is needed, including a manpositioner, and the support system is expensive. The Solen system was developed in France to overcome these problems.

Systems with various low central axis trees, such as the slender spindle, spindle bush, hoop skirt, low central leader, and similar or modified tree forms, require a tree

support system, an added cost. Tree density is high, from 600 to 1,000 per acre. Multi-row or bed systems with these tree forms can present problems in weed control, cultivation, fruit thinning and harvesting. However, all labor operations are at the ground level. Initial and optimum production is early, with fruits of uniform high quality. Small size equipment fits nicely with these low height plantings. With present concerns about pesticide usage and the environment, chemical usage is less than for conventional size trees.

Trellis forms which create a solid vertical hedgerow provide the greatest bearing volume per unit of land with less tree density than in plantings with low central axis tree forms. They also have the potential for the greatest efficiency in pest control because of their small and controlled target form. Spraying may even be done within a closed structure. The trellis support and training system is less costly than that for either high or low central axis trees. Trellis forms with horizontal or wing hedgerows lack bearing volume per unit of land. However, The Solen is too new to make an evaluation at the present time. The main disadvantage of the trellis hedgerow is that this system requires knowledge of training much different from that for central axis tree forms and systems.

CHOICE OF ROOTSTOCK

No single rootstock cultivar fits every situation or meets all needs. The choice of rootstock is limited to or varies with the system of production, as influenced by the training form, the vigor of the

Continued on NEXT PAGE.

33RD ANNUAL IDFTA CONFERENCE

Overseas Speakers

Dr. Stuart Tustin—Dr. Tustin is Pipfruit Physiologist/Pomologist based at Havelock North Research Station, Hawkes Bay, New Zealand and is employed by the Department of Scientific and Industrial Research, Division of Fruit and Trees. He received a Ph.D. from Massey University, Palmerston North, New Zealand.

Stuart's professional experience has included Research Officer for New Zealand Nursery Research Centre, Massey University; consultant to UNDP/FAO Deciduous Fruit Development Program, Baluchistan, Pakistan; and commercial fruit growing consultant to UN Development Advisory Team to the Pacific Basin.

In his current position, his specialty areas include the physiological basis for the production of high quality fruit and the development of production management technologies to meet the strategic requirements for the NZ pipfruit industry. He has had extensive practical experience in the development of the Slender Pyramid apple tree training system and is an authority in the production and training of the Gala cultivar. His talks are sure to stimulate the thinking of growers in the development of high density apple plantings.

H. Wiedenhoff—H. Wiedenhoff was born in Batavia, Indonesia. After his secondary schooling in the Netherlands, he became a horticulture teacher and later a specialist in horticultural mechanization. For the past three years he has worked closely with the National Research Institute of Mechanization, Labor Management and Buildings at Wageningen.

H. Wiedenhoff has had much experience in the development and refinement of equipment for the establishment and management of intensive production systems. He recently wrote a well illustrated publication with a 14 page section on the construction and mechanization of an intensive fruit farm.

His two talks should provide many new concepts and ideas that will prove to be a very valuable asset to the total program of the 33rd Annual Conference.

1990 IDFTA Annual Conference

Motel Accommodations

OFFICIAL HEADQUARTERS: *Up to 175 rooms available for IDFTA.*

- **DELTA LAKESIDE (604) 493-8221**
Regular rooms with double occupancy \$58/night + 8% tax

OTHER MOTELS: *Over 200 rooms available for IDFTA.*

- **THE SANDMAN (604) 493-7151** 75-100 rooms no problem. Located 176 steps from Convention Center!
Regular rooms with double occupancy \$40/night
- **TRAVELODGE (604) 492-0225** 25 rooms available. Within walking distance from Convention Center.
Regular rooms with double occupancy \$40/night
- **PILGRIM HOUSE (604) 492-8926** 30 to 35 rooms available. Located 3 blocks from Convention Center.
Room with 1 bed \$40/night
Room with 2 beds \$45/night
- **RIVERSIDE MOTEL (604) 492-2615** 20 to 25 rooms available. Located 4 blocks from Convention Center.
Price range from Bachelor room \$22/night
to Semi-executive room \$45/night
- **BEST WESTERN - TELSTAR (604) 493-0311** Best for those providing own transportation.
1 Queen bed \$42/night
2 Queen beds \$48/night

"Industry in Transition"

33RD ANNUAL IDFTA CONFERENCE

**Penticton Trade and Convention Center • Penticton, British Columbia, Canada
March 4-8, 1990**

Sunday evening Chairperson: WALTER KRAUSE, IDFTA board member, Fresno, CA

7:30 ROBERT CARLSON – East Lansing, MI

"A view of current fruit growing in Russia and Hungary – problems and trends, the system and its people"

Bob led his 14th overseas tour visiting fruit growing countries. The 1989 tour of fruit growers and pomologists visited the USSR with two days in Moscow city and some of the horticulture institutes there. The group also spent several days to study major fruit areas north of the Black Sea. They also visited fruit regions and research areas in Hungary and Belgium. Bob and representatives from the tour group will share their slides and experiences with us.

8:15 GEORGE ING – White Salmon, WA *"A look at European country's programs in the development of Pyrus rootstocks"*

George spent three weeks this past fall "trekking" around Europe looking at and for rootstocks for pears. He will share his slides and observations with us.

Monday morning Chairperson: JACK PHEASANT, IDFTA board member, E. Wenatchee, WA

8:45 JACK PEARSON – President, IDFTA, North Greece, NY *"Welcome to the 33rd IDFTA conference"*

9:00 GERALD GEEN – President, B.C. Fruit Growers Association, Penticton, B.C. *"Welcome to British Columbia"*

9:15 MIKE SANDERS – Penticton, B.C. *"The fruit industry of the Okanagan Valley"*

9:35 STUART TUSTIN – DSIR Havelock North, N2
"The principals and practices of training slender pyramid trees for high intensity production"

10:15 Robert F. Carlson Distinguished Lecture: DR. DAVID FERREE – O.S.U., Wooster, OH

"Management concerns in mature high density apple systems"

The Robert F. Carlson distinguished lecture will be the first to honor the dedicated contributions Bob has made to the IDFTA. Dave Ferree will make this first presentation.

10:45 BRUCE BARRITT, W.S.U., Tree Fruit Research Center, Wenatchee, WA
"Potential new apple rootstocks producing M9 size trees"

11:15 Questions and answers

11:45 Lunch

Monday afternoon Chairperson – DENNIS COURTIER – IDFTA board member, Lake City, MN

1:00 H. WIEDENHOFF – Wageningen, The Netherlands *"An introduction to machinery for densely planted fruit trees"*

1:40 KATHY WILLIAMS – W.S.U. Tree Fruit Research Center, Wenatchee, WA *"Evaporative cooling"*

2:00 TOM DAVISON – Vernon, B.C. *"Our orchards evolution"*

2:20 GARTH KUNZ – Osoyoos, B.C. *"The transition of our orchards to meet the challenge"*

2:40 BRUCE BARRITT – W.S.U. Tree Fruit Research Center, Wenatchee, WA
"Producing quality nursery trees for high density orchards"

3:10 Break

3:30 GEORGE GELDART – Vernon, B.C., Canada *"Economics – Financial aspects of high density orchard establishment"*
George is a Farm Management Specialist with the British Columbia Ministry of Agriculture and has devoted his talents to the assessment of economic considerations in the development and management of high intensity apple systems. He will provide his concepts for our consideration.

4:00 GENE HOGUE & HARVEY QUAMME – Agriculture Canada, Summerland, B.C. *"Plastic mulch for a home nursery"*

4:20 Questions and answers

5:00 Adjourn

Continued on NEXT PAGE.

Conference Schedule. . . Continued

Monday evening Chairperson – HAROLD D. SCHOOLEY – IDFTA board member, Windham Centre, Ontario, Canada

8:00 RON PERRY – M.S.U., East Lansing, MI *“Cherry rootstocks”*

8:30 FRANK KAPPLE – Agriculture Canada, Summerland, B.C. *“Pear and sweet cherry rootstocks”*

8:50 G. TEHRANI – Horticultural Research Institute, Ontario, Canada

“Preliminary report on performance of pear cultivars on seedlings and Old Home X Farmingdale clonal rootstocks”

Gus will be reporting on his IDFTA research supported project.

Adjourn

Tuesday

8:30 Orchard tour of the area, Tour Committee

Tuesday evening Chairperson – JIM ECKERT – IDFTA board member, Belleville, IL

8:00 Poster session and individual discussions with presenters

This poster session will be a new effort of the IDFTA and will consist of a series of posters stressing highlights of research and other related developments. The poster presenters will be available to discuss the details with those that have interest.

Wednesday morning Chairperson – EVAN MILBURN – IDFTA board member and past president, Elkton, MD

8:30 Panel: *“Mark Rootstock experiences and update”*

Mark rootstocks are being widely planted throughout apple regions of the world. The panel comprised of researchers, nurserymen, and growers will discuss their observations and experiences.

9:45 Questions and answers

10:00 Break

Chairperson – HAROLD THOME – IDFTA board member, Comstock Park, MI

10:15 HARVEY QUAMME – Agriculture Canada, Summerland, B.C. *“Cold hardiness of apple rootstocks”*

10:40 JUGERAN HANSEN – Agriculture Canada, Summerland, B.C. *“Virus free future?”*

11:15 G. H. NEILSEN, E. J. HOGUE & P. PARCHOMCHUK – Agriculture Canada, Summerland, B.C.

“Effects of Phosphorous on the establishment and early fruiting of apples on dwarfing rootstocks”

11:45 Lunch

1:00 Orchard tour of the area, Tour Committee

6:00 Time on own

7:30 Banquet

Thursday morning Chairperson – DARREL OAKES – IDFTA board member, Lyndonville, NY

8:30 E. J. HOGUE & D. NEILSEN – Agriculture Canada, Summerland, B.C.

“Rapid propagation of new apple cultivars on dwarfing rootstocks.”

8:50 STUART TUSTIN – D.S.I.R., Havelock North, N.Z. *“The production and training of Gala”*

9:15 DAVID FERREE – OSU, Wooster, OH *“The pros and cons of root pruning”*

9:40 H. WIEDENHOFF – Wageningen, The Netherlands

“Optimallization of spraying techniques with reduced use of chemicals”

10:10 DON ELFVING – Simcoe Station, Ontario, Canada *“Rootstock effects on apple yield and pruning requirements”*

10:40 BOB STEBBINS – O.S.U., Corvallis, OR *“Observations of new apple orchard designs in N.W. Europe”*

11:10 STEVE HOYING – Alton, N.Y. *“Western New York fruit industry developments”*

11:30 Questions, answers and open discussion

12:00 Adjourn

**Your attendance at each of these informative events
not only shows your support of IDFTA; it also helps you maintain
up-to-the-minute knowledge necessary for successful fruit production.**



COMPACT NEWS

A Periodic Newsletter of the International Dwarf Fruit Tree Association

No. 2 November 1989

Prepared by H.A. (Jack) Rollins, Jr.

A MESSAGE FROM THE EDUCATIONAL DIRECTOR . . . *"The International Dwarf Fruit Tree Association is comprised of fruit growers and professional pomologists sharing research findings and practical experiences relating to smaller than standard trees in high density orchards. The theme of the 33rd Annual Meeting will focus on "An Industry in Transition." H.A. (Jack) Rollins, Jr.*

1990 Annual Conference Program Highlights

Mark your calendar and plan to join us at the 1990 Annual Conference of the International Dwarf Fruit Tree Association to be held March 4-8, 1990 in Penticton, British Columbia. This year's conference will feature two world respected speakers — Dr. Stuart Tustin from New Zealand and H. Wiedenhoff of the Netherlands. Stuart Tustin will present two lectures. One will be "The production and training of Gala." He has had a wealth of experience with this variety and his experiences will be very helpful. His other lecture will be "The principals and practices of training Slender Pyramid trees in high density plantings." This system is a practical modification of Ax training and in computer terminology has been referred to as "grower friendly." H. Wiedenhoff will also make two presentations relating to the mechanization and harvesting of fruit production and handling of fruit in high density orchards. He is an engineer with considerable experience in the development and use of small

equipment in high density plantings. Both of these speakers will stretch your imagination and stimulate your thinking as you plan the development of future plantings.

Other highlights of the conference will include Dr. David Ferree of Ohio who will share his observations and concepts relating to the horticultural management of bearing trees in high density orchards — with emphasis on light efficiency in the mature canopy. He will also share with us his pro and con experiences with root pruning for tree size control.

The Sunday evening program will feature Dr. Bob Carlson who will review experiences gained on his USSR-Hungary tour. This presentation will include a panel discussion with colored slides on a "View of current fruit growing in Russia and Hungary — problems and trends — the systems and its people." This presentation will also include comments and input from two growers who were also on the tour.

Also included on the program will be presentations by a number

of researchers and extension personnel from Canada and the U.S. The total program will be heavily oriented toward grower experiences during the transition from large trees toward small trees on size controlling rootstocks.

Tours of the Penticton region orchards have been scheduled with emphasis placed on experienced grower pruning demonstrations with French Ax and Slender Spindle training systems. The open discussions in the orchards should be very exciting and thought provoking.

The final details of the program are approaching completion and will be included in the December Newsletter. ■ **A Listing of Motel Accommodations appears on PAGE 8.**

IN THIS ISSUE!!

- 1990 ANNUAL CONFERENCE HIGHLIGHTS
 - VA OBSERVATIONS ON WIND DAMAGE - 1989
 - ROOT PRUNING
 - IMPROVING SHIPPING AND HANDLING QUALITY OF STONE FRUIT
 - FRUITFUL INSIGHTS
- plus much more!!!

NC-140 Meeting

The Cooperative State Research Service Regional Research Project NC 140 "Rootstock and Interstem Effects on Pome and Stone Fruit Trees" involves cooperators in 26 states and 4 Canadian provinces. Similar plantings have been established in all of the regions to evaluate scion-rootstock responses under a variety of environmental conditions. Researchers involved in this program get together each fall to review observations and compare results. This year's meeting of researchers and involved extension workers was held in Ontario, Canada October 25-27 with over 40 participants in attendance. The meeting was hosted by Gus Tehrani and Don Elfving and also included tours of the rootstock research plantings at Simcoe and Vineland. Over the past 10 years, research grants provided by IDFTA have contributed to research programs throughout the U.S. and Canada. ■

?!?

*Fruit grower to
bank-loan officer:*

*"If I'm such a
poor risk,
how did I get
so far in debt?"*

!?!

VA OBSERVATIONS ON WIND DAMAGE – 1989

John Barden
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Virginia Tech • Blacksburg, VA 24061

ON SEPTEMBER 22, 1989 Southwestern Virginia was brushed by Hurricane Hugo. We experienced wind gusts in the estimated range of 55-65 miles per hour. Although the storm only brought about 2 inches of rain, the ground was completely saturated by rains during the previous week. A somewhat unusual and apparently critical factor was that many of the wind gusts came from the southeast; our prevailing winds are from the west/southwest.

*"Perhaps the most
interesting and significant
observation has been
a strong interaction
between rootstock and
scion cultivar."*

After the storm was over we evaluated tree anchorage in several plantings at the Virginia Tech Horticulture Research Farm. Some are rootstock trials under Regional Research Project NC-140; others are general purpose blocks.

Perhaps the most interesting and significant observation has been a strong interaction between rootstock and scion cultivar. In one block, 88% of Standard Delicious/M.7A blew over ($>45^\circ$ from vertical) whereas no Golden Delicious/M.7A or Empire/M.7A in the same block leaned after the storm.

These differences were supported by data from the 1984 NC-140 planting. This trial had been completely harvested so there were no fruit on any trees in the plot. Whereas 10% or less of the spur type McIntosh/EMLA 26 and spur Golden Delicious/EMLA 26 leaned, 40% of the spur Delicious/EMLA 26 blew down. Also noteworthy in this trial is that all 10 trees of spur Delicious on C.6 blew over as did 80% of those on M.4. Leaning of spur Delicious on other rootstocks ranged from a high of 60% on MAC 39 to a low 10% on Bud 490.

As noted above, most of the trees which blew over lean into the direction of our prevailing westerly winds. It seems likely that trees' resistance to winds from the normal direction might have been much greater than to winds from the opposite direction.

In these plantings, all trees leaning more than 45° from vertical were pulled up and wired to a post driven beside the tree. We plan to observe these trees in the future to evaluate damage which may not be reflected until next year. ■

ROOT PRUNING

Dr. Jim Schupp
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 Highmoor Farm • Monmouth, ME 04259

IN 1989, the public furor over Alar effectively eliminated the use of that chemical by apple growers. This left a substantial number of growers looking for alternatives to Alar as a means of reducing tree growth, reducing preharvest drop and improving fruit color and fruit quality. Mechanical root pruning is one option that some growers considered.

Root pruning has been studied in some detail at the Ohio Agricultural Research and Development Center since 1982 and at the University of Maine since 1988. The results of these research efforts are summarized here and used to make the recommendations that follow.

EFFECTS ON BEARING TREES

The table to the right contains a list of the effects of root pruning. To summarize, root pruning bearing apple trees reduces the total growth of the tree. This growth suppression is season-long thus pruning time is reduced. Fruit set is not affected, so the net effect is a smaller tree with just as many apples. Fruit size is reduced, while fruit color, firmness and sugar content are increased. Preharvest drop is reduced.

EFFECTS ON NON-BEARING TREES

The effects reported above are for bearing trees. If the trees have little or no crop, either from frost damage or because of alternate bearing, the effects will be much less dramatic. For example, in one of our studies in Ohio, root pruning reduced vegetative growth in bearing trees by over 40%, while

the reduction in growth in non-bearing trees was only 14%. Studies with young potted trees showed that such trees needed root pruning twice in one season to achieve season-long reductions in growth, even when the pruning was severe. Pruning the roots of non-bearing trees in the orchard more than once in a single season has not been tried and the possible benefits, as well as the possible problems are not known.

WHEN AND HOW

All these effects are dependent on timing. The best time to root prune is from bloom until two weeks later. Pruning too late will increase preharvest drop instead of reducing it and will not reduce the growth of the tree in that season.

Root pruning is done with a sharpened subsoiling blade mounted on a tool bar such that it extends out beyond the right rear tire of the tractor. The 3-point hitch, attachment pins, and tool bar should be heavy-duty. A chain or cable extending to the front axle lends stability to the offset blade. Tractors in the 40 to 50 horsepower class have proven satisfactory, however the blade cutting through the soil has a tendency to pull the tractor into the tree row, particularly the first season the treatment is applied, and especially if the cutting depth is greater than 12 inches. Our studies have shown that pruning to a 12 inch depth is adequate to produce the desired

Continued on NEXT PAGE.

EFFECTS OF ROOT PRUNING ON APPLE TREE GROWTH AND YIELD*

	Increase	Decrease	No Change
Trunk Growth		X	
Shoot Length		X	
Shoot Number		X	
Spur/Shoot Ratio	X		
Shoot Leaf Size		X	
Spur Quality	X		
Pruning Time		X	
Canopy Light Penetration	X		
Return Bloom	X?		
Fruit Set			X
Fruit Yield (#Fruit)			X
Fruit Size		X	
Preharvest Drop		X	
Fruit Color and Quality	X		
Tree Yield Efficiency	X		

*Increased return bloom from root pruning has been widely reported, but has not been noted in studies conducted by this author.

Root Pruning . . . Continued

effect, but if a grower wants to prune deeper, or if the going is tough even at a foot, the steering problem can be corrected by:

a) running two tractors in tandem; or b) pruning the roots once at a shallow setting. Root pruning in heavy sod is much more difficult than in a herbicide strip and almost always will require a second pass to finish the job.

In order to take effect, root pruning must be done on both sides of the row, to a depth of 12 inches. The amount of vegetative growth control can be adjusted somewhat by adjusting the distance from the cuts to the trunk. Root pruning overly-vigorous Melrose/M.26 trees at 24 or 32 inches from the trunk produced dramatic reductions in growth. In Maine, I have obtained satisfactory results on McIntosh/MM.111 trees pruned on 2 sides at 40 inches from the trunk and to a depth of 12 inches.

WHAT CAN GO WRONG?

In addition to the problems of the blade pulling the tractor into the tree row and the difficulty in root pruning through thick sod, there are some things that can go wrong. Low hanging limbs get scraped up badly, and if they are large, present an effective barrier to progress down the row. Long overhanging limbs that stick out into the drive row can make the tractor driver feel as persecuted by apple trees as was Dorothy in the Wizard of Oz.

If there are large roots just under the surface, occasionally one will catch on the blade instead of cutting cleanly. When this happens the root will be pulled off the tree and often a good chunk of the bark on the tree will be stripped

away with it. Dave Ferree and I first observed this in an orchard with sandy soil. Apparently the sand yielded to the pulling effect when cutting thick roots, because we damaged two trees in such a way out of the several hundred that we pruned that day. Large rocks directly in the path of the blade must be negotiated over or around, much as is the case when planting trees with a tree planter.

"*. . . The reduction in pruning time, improved fruit color and quality and reduced preharvest drop are the benefits. The reduced fruit size is the cost. . .*"

SHOULD YOU ROOT PRUNE?

Growers get paid better for growing big apples than for smaller apples. Not only does a box of big apples command a higher price, but you don't have to give over as many fruit. To a researcher who has worked on root pruning as long as I have, this system seems dreadfully unfair, nevertheless, it is a reality. On the other hand, if the big apple can't make grade because it can't meet the minimum standard for color or if it loses its firmness and storability hanging on the tree while its owner waits for color, or it falls to the ground before it can be picked, then root pruning might have a place. The savings in pruning time can be significant, as in my research plots where root pruned trees took 12 minutes each while trees that were not root pruned required 20 minutes each. The reduction in pruning

time, improved fruit color and quality and reduced preharvest drop are the benefits. The reduced fruit size is the cost. The economics of each situation needs to be considered carefully.

Often apple growers have three kinds of trees on their land: blocks of large trees on seedling rootstocks, mature blocks of semi-dwarf trees and more recent blocks of small trees. The small trees are coming into production, the seedling trees are scheduled to come out next and the semi-dwarf trees are going to have to stick around for another 10 years to provide some cash flow and pay the bills. If the fruit quality and preharvest drop in part of the semi-dwarf blocks are unacceptable and the trees are too vigorous, then the costs and benefits of root pruning should be weighed. If the tree spacing is too close and hard containment pruning is necessary, then root pruning may be a real boon. On the other hand, if tree vigor is moderate and a little summer pruning is all it takes to get red apples, then root pruning is overkill.

If an apple grower has blocks of trees with excessive tree size and vigor and can afford to replace them right now with dwarf trees, then root pruning is a step backward.

Root pruning is a highly effective method of controlling tree growth and improving fruit quality. Before root pruning acres of apples, talk things over with your local fruit specialists and researchers. If it is possible, take the long-term solution—replant with trees on the appropriate size-controlling rootstocks at the appropriate spacing. ■

IMPROVING SHIPPING AND HANDLING QUALITY OF STONE FRUIT*

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MANY DIFFERENT CHARACTERISTICS of a fruit contribute to overall quality. It is important to separate these characteristics into two aspects of quality that play different roles in the marketplace. The first aspect has to do with the visual quality of the fruit and includes such characteristics as color (amount and intensity), shape, size, and lack of pubescence and defects. The second aspect is the eating quality and includes flavor, aroma, sweetness, acidity, astringency, and texture. Visual quality stimulates first-time buying of fruit, but the eating quality brings about repeat sales. The greatest emphasis by breeders and horticulturists in the past has been on visual quality. This emphasis should not be slackened but greater attention needs to be paid to the eating quality of the fruit. This holds the greatest potential for expanding the demand and increasing the market for stone fruits.

A grower can influence the quality of his fruit in many different ways. One of the most critical decisions comes at the time of variety selection. Eating quality should receive greater emphasis.

Good cultural and harvesting practices can have some effect on eating quality but they cannot change a poor tasting peach into a flavorful fruit.

Cultural practices that can affect visual and eating quality of stone fruit include summer pruning, nitrogen nutrition, and thinning. Summer pruning (mostly removal of vigorous inside shoots in open-vase trees) has been shown to improve fruit size, percent red blush and soluble solids of fruit in the lower part or the canopy (Day et al., 1989). Various nutrition studies have shown that both nitrogen deficiency (Proebsting et al., 1956) and excess nitrogen (Stembridge et al., 1962) adversely affect flavor ratings of peaches. The best eating quality occurred in both experiments at about 3 percent nitrogen in the leaves. Other quality characteristics are also affected by nitrogen nutrition. Nitrogen deficiency decreases fruit

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*"Good cultural and
 harvesting practices can
 have some effect on eating
 quality but they cannot
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 into a flavorful fruit."*
 —————

size and yields while nitrogen excess decreases percent red blush on the fruit. Heavy fruit thinning in peaches not only increases fruit size, but also increases soluble solids and thus improves eating quality (Johnson and Handley, 1989; Moon et al., 1941).

Harvesting practices can have a substantial effect on many different quality characteristics of the fruit. By aiming for tree ripened product rather than picking at minimum maturity, quality can be greatly improved. Greater percent red blush, less green in the ground color, higher soluble solids, larger fruit size, greater tonnage, and better overall eating quality can be achieved by leaving the fruit on the tree for just a few more days. Of course, fruit are also somewhat softer and must be handled more gently. Instead of picking into large bins, field buckets or boxes must be used.

The fruit are then directly hand-packed from these boxes or buckets and rapidly cooled. It may also be necessary to make more passes through the orchard and over a longer period of time in order to insure that each fruit is picked at its optimum maturity level. With greater consumer interest in tree ripened fruit and with many newer varieties that are better able to maintain firmness, this type of approach is well worth considering.

In conclusion, a grower can have some impact on fruit quality through cultural practices, but the greatest impact, especially on eating quality will be in variety selection and by harvesting practices that allow for the maximum possible ripening of the fruit on the tree.

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*This paper was presented at the 32nd Annual Conference of IDFTA held in Fresno, California.



Fruitful Insights

... FROM THE DESK OF THE BUSINESS DIRECTOR.

Not long ago, when preparing to write a document, one took pencil in hand, placed it on a piece of paper and implored one's brain to engage. Next came the typewriter. Mine was an old Underwood Standard with no letters on the keys, a discarded school relic. Again, it was difficult to produce anything on the paper. I had to have my brain functioning (not an easy task) as well as try to type with no letters on the keys. Well, the age of hi-tech hasn't made creativity any more forthcoming. Today, I begin by looking at a blank computer screen and, as when using a pencil or a typewriter, hope that an informative document will appear.

MANY THANKS to all of you who remembered to use your membership number when contacting the business office. You saved me a significant amount of time and demonstrated that converting to membership numbers was appropriate.

Conversion is a common process. Time can be converted into money, food into energy, trees into newspapers — and computer databases can be modified to expand their usefulness. That's what we did with the IDFTA database; modified it to save time in posting records. In fact, since the last issue of *Compact News*, I have further modified the database so that, once I have entered the membership number and press one key, the member's record appears

instantly on the screen. This is why it is vitally important to use your membership number on all correspondence **including your checks**. As an illustration, let me relate a minor IDFTA business office horror story.

I recently received a check from a foreign bank for \$60.00 US. Nowhere on the check is there an indication of what it is for, who it should be credited to, or from

*"It is vitally important
to use your membership
number on all
correspondence."*

what country it was issued. Obviously, a foreign member thinks he has paid his dues, and he has — I just don't know who he is! Also, there are many times that membership dues are paid by a business with a name totally unrelated to the member's name. If the check happens to get separated from the returned dues notice and there is no corresponding membership number on the check, getting them reunited can be time-consuming if not impossible.

THE CHANGE to membership numbers raised a number of questions and comments. The most common question was concerning how membership numbers were assigned. One individual who has been a member since the IDFTA was founded

questioned why he received a very high number.

To a first grader, the numbering was scientifically accomplished. To anyone else, it was simple — I used an alphabetical list. Those at the beginning of the alphabet got low numbers and those at the end got high numbers. So . . . for those of you who in school were assigned a seat near the front of the room and, no matter how hard you tried to hide, got called on first, you have been rewarded — a low membership number in the IDFTA. For those of you who, because of your name, always got a seat in the back of the room and could slide down in your chair to hide and avoid being called upon, you got your just reward — a high membership number. For those of you whose names were not in alphabetical order, ie. newer members; well . . . you just got numbered. The exception was Dr. Robert Carlson. He was assigned membership number 1.

EVERYONE KNOWS that members are the lifeblood of any organization. Without members, the organization ceases to exist. I believe it is in the IDFTA's best interest to increase our membership. For one thing, the cost of operating an organization does not increase proportionately with an increase in the number of members; it decreases. For instance, a computer costs the same whether we maintain 1,000 records or 2,000 records. Also, when *Compact Fruit Tree* is

Continued on NEXT PAGE.

Fruitful Insights . . . Continued

produced, it costs the same to get ready for printing whether we print 1,000 or 2,000 copies. With the attractive quantity breaks for actual production, the only major expense for additional copies is mailing.

I have thought long and hard about the best way to go about obtaining new members and have concluded that you, our loyal members, are my best resource.

Being a member of IDFTA indicates that you are a progressive grower, a dedicated researcher, vitally interested in keeping abreast of the latest information and techniques regarding dwarfing rootstocks. You readily admit that you don't know everything . . . something many growers do not. You also recognize that, without up-to-date information, you will cease to be a viable force in the fruit industry.

There are a great number of growers and researchers who have a similar thirst for knowledge but are unaware of the IDFTA. These are the people we are trying to reach. Undoubtedly, each of you know a number of these individuals. Accordingly, I have a request. Think of individuals you know that fit this category and send me their names and addresses and I will send them a courtesy copy of one of our newsletters, an application for membership, and extend an invitation to join. With your permission, I will indicate that you suggested sending the information because, in your opinion, they fit the category of an IDFTA member. Or I will contact them without mentioning your name, only that an IDFTA member suggested that they receive an invitation. It's your

choice. I've even made it easy for you by enclosing a return envelope for your use. Simply forward some names and addresses on a piece of paper. By doing so, you will be helping the IDFTA become a stronger organization. Please do it now — before it turns into something you intended to do, but never got around to doing it. Also, don't worry about a neighbor member who might also give the same name; we will eliminate duplicates.

THE 1989 ISSUE of *Compact Fruit Tree* will be mailed November 27th. I believe the 1989 issue to be one of the best. The technical papers presented are of high-quality and extremely informative. The layout of the book has been substantially revised. Throughout the entire publication the same, very legible type font has been used. All pages are arranged in split column with justified type and upgraded graphs. Finally, the large tree on the cover is in full color. We think you will be pleased. To save postage, the books will be mailed "book rate" and may take some time to arrive. . . especially to foreign countries. Please allow a reasonable amount of time for receipt. If you do not eventually receive your copy, let us know.

WHILE I AM ON THE SUBJECT of the *Compact Fruit Tree*, perhaps some insight as to how it is produced is in order.

Sometime in June or July Dr. "Jack" Rollins conceives the theme for the annual meeting to be held the following year. Based

on the theme he formulates various topics to be presented. He then contacts leading researchers and growers as possible speakers. Incidentally, none of the speakers are paid. Furthermore, with the exception of speakers coming from countries other than the North American continent, all speakers pay their own travel, lodging, and other associated expenses. Once the speakers have accepted, they are given a set of guidelines as to format of the paper for publication in the *Compact Fruit Tree*. The speakers are requested to file their papers with the Education Director as soon as possible after the annual meeting. However, this does not always occur and can delay publication of the proceedings.

After Jack has received all papers from the speakers, they are forwarded to my office. The papers are scanned with an optical character reader (OCR). This machine, together with the appropriate computer software, actually reads the typed documents and enters them into a database in the computer. The database is then converted to a particular word processing format (I use Word-Perfect) and transferred to computer disks. As simple as this may seem, it caused us a great many problems and what we perceived to be a relatively easy job turned into a monumental task. However, we do learn from experience. Our guidelines to the 1990 speakers will be very specific as to type style and format. If followed, the proceedings should be published more promptly.

Once Jack receives the computer disks from me, they are loaded into

Fruitful Insights . . . Continued

his computer and each paper is reviewed, corrected, and modified when necessary. As Education Director, Jack is charged with producing the annual proceedings and therefore has a certain amount of literary license.

After all corrections are made, the documents are again placed on computer disks and returned to the business office. They are converted to an ASCII format and given to the graphics people who do the design layout. Considering the number of graphs and charts that accompany the papers, the layout and design is no easy task.

The final layout is then reviewed, approved, and sent to the printer.

Once printed, the books are returned to the business office. Labels are prepared and affixed to envelopes, postage is affixed and the envelopes are stuffed. My entire family is called upon

to assist in this chore. This is accomplished via pleas, promises, and a certain amount of duress. The trip to Penticton (or loss thereof) will be most effective.

NOW. . . . some good news and some bad news. The good news is that there will be no dues increase in 1990. The bad news is that the 1990 dues notices will be mailed shortly. In fact, they will be mailed on December 1, 1989 and are due upon receipt.

Accordingly, some items to remember:

1. Return the WHITE copy (containing your mailing label and member number) to the business office. A return envelope is provided.

2. Send your payment in US Dollars and include your MEMBER NUMBER ON YOUR CHECK.

3. Where necessary, correct the mailing label in order that your records can be updated.

4. Retain the YELLOW copy for your records.

5. If you are paying a student rate, please enclose a copy of your current student ID or suitable substitute information indicating your status as a student.

6. Return your payment as quickly as your economic situation permits. We will begin working on conference materials in January and I would like to have as many memberships posted as possible.

One last bit of information. Shortly after the Board of Directors meeting in early December, we will be mailing a preliminary packet on the Penticton meeting — hotel information, sightseeing information, etc. Conference registration forms will be mailed mid-January.

Have a good holiday! ■

IDFTA Annual Conference Motel Accommodations

OFFICIAL HEADQUARTERS: Up to 175 rooms available for IDFTA.

• **DELTA LAKESIDE (604) 493-8221**

Regular rooms with double occupancy \$58/night + 8% tax

OTHER MOTELS: Over 200 rooms available for IDFTA.

• **THE SANDMAN (604) 493-7151** 75-100 rooms no problem. Located 176 steps from Convention Center!
Regular rooms with double occupancy \$40/night

• **TRAVELODGE (604) 492-0225** 25 rooms available. Within walking distance from Convention Center.
Regular rooms with double occupancy \$40/night

• **PILGRIM HOUSE (604) 492-8926** 30 to 35 rooms available. Located 3 blocks from Convention Center.
Room with 1 bed \$40/night Room with 2 beds \$45/night

• **RIVERSIDE MOTEL (604) 492-2615** 20 to 25 rooms available. Located 4 blocks from Convention Center.
Price range from Bachelor room \$22/night to Semi-executive room \$45/night

• **BEST WESTERN - TELSTAR (604) 493-0311** Best for those providing own transportation.
1 Queen bed \$42/night 2 Queen beds \$48/night

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Where else but in Washington, D.C. would they call
the department that's in charge of everything outdoors
the Department of Interior?

!?!?