

Department of
Horticulture

MICHIGAN
STATE
UNIVERSITY

COMPACT FRUIT TREE

DWARF FRUIT TREE ASSOCIATION

Rootstock Behavior

Spur Types

Induced Dwarfing

Cultural Practices

Vol. 2 No. 21 August, 1968

Edited by: R.F. Carlson

PROGRAM

SUMMER MEETING - DWARF FRUIT TREE ASSOCIATION

Date: Saturday, August 24, 1968

Location: Michigan's Southwestern Fruit Area

Saturday Morning-Chairman: S. W. Carpenter, District Horticultural Agent
Cooperative Extension Service, Paw Paw, Michigan

8:30 A.M. --

Hill Top Orchards, Hartford, Michigan
(about 3 mi. S.E. of Hartford)

Visit to orchards which have been observed annually
during March meetings to see them in fruiting stage.

Some of the major interest items to be seen during the
morning tour: (bus transportation available)

1. Variety/rootstock combinations of various age groups.
2. Tree spacing systems including single, double and triple rows.
3. Variety plantings of early, mid-season and late maturing apples and of late maturing peaches and nectarines.
4. Nutrition, irrigation and cultural practices as related to varieties and rootstocks.
5. Pruning systems for growth control and adaptability to mechanical picking aids, including hedging on topping of trees.
6. Frost protection system for pome and stone fruits.

12:45 P.M. --

Lunch - on your own at Galotis Restaurant on Red Arrow
Highway just East of Hartford.

Saturday Afternoon-Orchard visits continued.

1:45 P.M. --

Depart for Dave Friday Orchard-South of Hartford. Transportation on your own or with a friend or neighbor. Some of the major interest items to be seen at the Friday Orchard:

1. Tree wall system of culture using standard and dwarfing rootstocks.
2. Cherry orchards-fruiting and growth control with the use of Alar and other compounds.

3. Mechanical harvesting machines, picking aids and pruning equipment.

3:00 P.M. --

Depart for Herbert Teichmans Orchard, Somner Road, East of Highway 140, Eau Claire. (approximately 10 mi. South of I-94 freeway).

Some major items of interest to be seen at this stop:

1. Pruning and shaping old apple trees for mechanical harvesting. New orchards with higher tree populations per acre being adapted for mechanical picking aids.
2. Equipment of all sorts to facilitate ease of culture, harvesting and handling the crop.
3. Also other neighboring orchards-providing time permits.

5:30 P.M. --

Adjourn

Friday Evening, August 23 - Problem Discussion Session
Holiday Inn, Benton Harbor.

8:00 - 10:00 P.M. -- This is planned as an informal "bull-session" bringing out new ideas, new and old problems, and stimulating new approaches to fruit growing conditions in the future. The session will give our out-of-state visitors a chance to participate in discussing trends and directions of the fruit industry. Local growers are invited to attend and to participate.

Reservations for lodging should be made immediately either at the Holiday Inn (Tel. Area Code: 616-925-3234) or other motels in the Benton Harbor, St. Joseph area.

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PROGRAM
1968 CA STORAGE CLINIC

Room 206, Horticulture Building
Michigan State University
East Lansing

Thursday, August 8th, 1968

9:30 A.M. --

Coffee and Introduction.

9:45 A.M. --

"Current recommendations: structures, fruit, temperatures and atmospheres"...D. H. Dewey, MSU.

10:00 A.M. --

"Selecting a suitable kind and amount of insulation for a storage building"...Dr. Burton F. Cargill, Dept. of Agri. Eng., MSU.

10:30 A.M. --

"Why we selected a pole building for our new fruit storage"...Mr. Sid Sytsma, Vroom Cold Co., Hart, Michigan.

11:00 A.M. --

"CA storage costs and compensations"...Mr. Owen R. Thomas, Atlantic Research Corporation, Alexandria, Virginia.

- 11:30 A.M. -- "The application of CA to other commodities, particularly in California"...Dr. R. C. Herner, Dept. of Hort., MSU.
- 12:00 Noon -- Lunch - on your own at the Union Building Cafeteria or other nearby restaurants.
- 1:15 P.M. -- "Current trends and ideas on CA apples handling and storage in New York State"...Dr. G. D. Blanpied, Prof. of Pomology, Cornell University, Ithaca, New York.
- 2:00 P.M. -- "CA generators - now and in the future". An informal panel discussion, and question and answer session.
- 2:45 P.M. -- "CA space and volume prospects"...Mr. Ole Pynnonen, Michigan Apple Committee, East Lansing.
- 3:00 P.M. -- "Optimum harvest dates for 1968 CA apples"...D. R. Dilley, MSU.
- 3:30 P.M. -- Items of interest: possible use of Alar; current status of hydrohandling systems; scald and decay control; Jonathan quality; etc. ...Staff.

PARKING: Use metered area on Circle Drive or gated lots south of Red Cedar River or near the Stadium. All are within easy walking distance.

NORTHEAST MECHANICAL FRUIT HARVESTING DEMONSTRATION DAYS, AUGUST 13 & 14
at Lewiston, New York

The N.Y.S. Horticultural Society and the N.Y.S. Extension Service are jointly sponsoring a two day show at which mechanical fruit harvesting equipment for tree fruits, vineyards, and berries will be exhibited and demonstrated. This will be held at the Chateau Winery and adjoining farms two miles east of Lewiston, New York on Route 104, and about eight miles north of Niagara Falls, on Tuesday and Wednesday August 13 and 14. Mechanical aids and closely related equipment such as tree toppers and hedgers also will be on display.

This is the first meeting of its kind for fruit growers in the East, and will be of interest to all growers to help them move into this new area of mechanical harvesting. The Perry Apple Harvester, manufactured by C.J. Perry & Son, Gasport, New York, will be shown and demonstrated. This machine will handle cherries and other fruits. The Gould Harvester, manufactured by Gould Bros. of Milpitas, California, will be shown and demonstrated by Harry Smith of Ontario, New York.

For cherries the Friday and Homelite Harvesters will be shown and demonstrated along with the Ace machine made by Plummer Bros. of Hastings, Michigan. Hydro-coolers, both ice and refrigerator models, will also be exhibited.

Both the Gerrans limb shaker and the Shockwave trunk shaker will be shown and demonstrated.

Tree toppers will be shown by two local growers. These are heavy-duty mowing machines mounted on fork lifts for changing the height and angle of cut.

An over-the-row harvester for raspberries, blackberries, low bush berries and currants will be shown by the Blueberry Equipment Company of South Haven, Michigan.

Any manufacturer of mechanical fruit harvesting equipment or mechanical aids, who has not been contacted, and wishes to exhibit, should write to Thomas E. LaMont, Secretary of the N.Y.S. Horticultural Society, Albion, New York 14411. Persons wanting booklets on the things to see or a list of motels in the Niagara Falls area should write to the Chamber of Commerce, Niagara Falls, New York 14302.

EUROPEAN FRUIT STUDY TOUR - FIRST REPORT

Some General Impressions: Thirty persons took part in this intensive 21-day study tour (June 18-July 9, 1968) which lead them to commercial orchards and research stations in Belgium, Holland, Germany, Switzerland, France, Denmark and England. This group composed of energetic study-minded horticulturists from eight states and Canada, came back very pleased, not too tired, and most gratified in having had the opportunity to see so much of Europe's fruit industry, and of having had the chance to meet so many friendly folks in these countries.

What most impresses the visitors to many of the orchards in these countries is the intensity of culture. The orchards are well manicured, whether small or large. Although some of the work is done by hand of a still fairly large supply of labor, much of it is done by well engineered equipment for mowing, spraying (pest and herbicide), pruning and handling of the fruit. For example, the grass cover between the closely spaced tree rows is similar to a well grown grass lawn. (Some of us wished we had lawns that good.) The grass is cut often to prevent moisture loss, and to keep the grass roots shallow.

The tree training and pruning is much more detailed than we are use to and requires considerable time, good knowledge of tree growth and fruiting and of an understanding of variety and rootstock characteristics. The tying down of branches to a 45° angle of one- and two-year-old trees is standard practice in commercial grower's orchards in Holland and England. The "spindle-bush" tree shape is coming into practice in favor of pure espalier type of training. However, many systems of tree growing are in practice in different locations. One of these is the Groosbeck system - a modification of the McLean system in which the bearing branches are removed every third year and new ones established in their places. Using this system requires up to 1200 trees per acre in order to give high production per unit of land.

The spacing of trees per acre varies with the system of tree training - some as close as 3x9 feet. Some tree spacing standards seem to settle on 3x4 meters or about 9x12 feet. The yields reported were high starting at a young age of the trees (400 bu./A) and as much as 1500 bu./A at maturity or more.

The next issue of the Compact Fruit Tree will have detailed reports of culture and economics of fruit production in Europe from other members of the group. So, a reminder here to the group to mail their "stories" to me soon. Items of interest from other members of the DFTA would also be appreciated. We are always looking for material to make the Newsletter most interesting and useful...R. F. Carlson.
303 Horticulture Building, MSU

IDARED/MM 106 IN N.Y. TESTS

During the first 8 years in the experiment station orchard at Geneva, trees of Idared on MM 106 were highly productive. Other stocks in the test, in decreasing order of production efficiency, were MM 104, MM 109, MM 111, & EM II.

The trial planting is on a heavy but well-drained clay loam. Trees were headed low at planting and were pruned sparingly thereafter. They were allowed to begin fruiting their second season in the orchard, which presumably held down both tree size and total yields.

Table 1. Data of tree size, yield, and tree efficiency of Idared on different rootstocks.

Stock	No. of trees	Ave. ht. (ft.)	Ave. Spread (ft.)	Ave. circum. (in.)	Ave. Cumul. Yield (lbs.)	Fruit Wood (lb/sq in)	Est. Spacing (ft.)	Est. cwt/A
MM106	17	6	7½	24.8	306	7.3	14x22	432
MM111	12	6½	8½	27.7	370	6.0	16x24	422
MM104	12	8½	10	31.1	409	5.3	18x26	315
EM II	11	6½	8½	27.7	304	4.9	16x24	377
MM109	12	9½	11	31.8	428	4.9	20x28	240

The Efficiency Rating: Traditionally, the "bushels-per-tree" measure has been our expression of efficiency. The advent of the compact tree has altered our trust in this index. "Tons-per-acre" is perhaps more in keeping with our changing times; this measure is obviously subject to many variables, especially the matter of spacing.

English biometricians have shown that the "fruit/wood ratio" reflects rather well the distribution of photosynthate (sugars produced in the leaves) within a tree -- that is, what proportion is channeled into fruit, what proportion into wood. This index is particularly useful when comparing trees of the same size; for example, the MM 111 and EM II trees or a set of trees on MM 109, EM XVI, and on seedling stocks (Table 1.).

The "estimated cwt-per-acre" figures are speculative and should be recognized as such. Obviously dependent on the assigned spacing, this estimate also rests on the assumption that individual tree efficiency will remain constant.

Conclusions: On the heavy soils at Geneva, MM 106 and MM 111 are clearly superior stocks for Idared. This variety on all stocks tested (including EM VII and seedling not reported above) was quite precocious, with all individual trees fruiting their second growing season...J. N. Cummins, N.Y.S. Ag. Exp. Sta., Cornell University, Geneva, New York.

An Approximate Guide of Rootstock/Soil Agreement

Rootstocks	Soil Types					
	1*	2*	3*	4*	5*	6*
Very Dwarfing: ($\frac{1}{4}$) EM IX			X			
Semi Dwarfing: ($\frac{1}{4}$-$\frac{1}{2}$) EM 26 Inter.IX/Alnarp 2 Inter.IX/Seedlg. Inter.IX/XIII Inter.IX/XVI MM 106 EM VII	X?	X X X X X X	X X X X X X	X X X X X X	X X X	X
Vigorous: ($\frac{1}{2}$-$\frac{3}{4}$) MM III EM II MM 104 MM 109	X? X?	X X X	X X X X	X X X X	 X	
Very Vigorous: ($\frac{3}{4}$-1) Alnarp 2 EM XIII Antonovka Seedling	 X	X X X	X X X X	X X X X	 X 	 X

Legend to Soil Types

1* Light, gravely or sandy soils, with a tendency to drought.

2* Light, gravely or sandy soils, without the tendency to drought.

3* Good deep soils with average to good drainage and a good waterholding capacity.

4* Good, but shallow soils, with hardpans that prevent deep rooting.

5* Heavy soils, that tend to be wet for short periods of time. Slow drainage but deep rooting possible.

6* Heavy poorly drained soils with clay or hardpans underneath.

The numbers of $\frac{1}{4}$ - 1 give the approximate size of the tree, #1 representing Seedling or a standard tree.

Note: This chart can, due to the nature of the subject, give only an approximate idea. Final decisions should not be made until the appropriate County Agent or State Experiment Station has been consulted...F. W. Amberg Nursery, Stanley, N.Y.

ANNUAL MEETINGS AND CONFERENCE

August 13 & 14, 1968 - Northeast Mechanical Harvesting Demonstration at Lewiston, New York. For details contact T. E. LaMont, Albion, New York.

August 24, 1968 - Compact Orchard Tour at Hartford, Michigan and vicinity. Several orchard stops are being planned to see compact orchards in production, early and late maturing apple varieties and cultural orchard management practices. If time permits, mechanical harvesting of apples might be included. Meeting place: Hill Top Orchards, Hartford, Michigan. Time: 8:30 a.m.

December 3-5, 1968 - Michigan State Hort. Society, Grand Rapids, Michigan.

January 23 & 24, 1969 - Western Colorado Hort. Society, Grand Junction, Colorado.

March 17 & 18, 1969 - Twelfth Annual Conference - Dwarf Fruit Tree Association, Benton Harbor, Michigan.

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PROCEEDINGS FROM 11TH ANNUAL CONFERENCE -- ADDITIONAL PAPERS PRESENTED:

Updating Orchard Practices
for New Mechanical Developments

R. Paul Larsen, Extension Specialist in Horticulture
MSU, East Lansing, Michigan

All growers are excited about the many mechanical advances in the fruit business--machines, which can do everything from planting to pruning and harrowing to harvesting. But machines and mechanization will not substitute for good horticultural practices. You still must grow a tree and if that tree is to return a profit it must be able to carry a good fruit load over many years of bearing. Careful training is the first prerequisite for long-lived and productive orchards. The proper method of training and pruning dwarfed apple trees is fundamentally no different from that for standard trees. The difference is primarily a matter of size and compactness.

The actual shape of a tree may also vary depending on tree spacing within and between rows, and on the method of future harvesting. Trees may continue to be trained to the traditional round or globe shapes; they may be trained to rigid central-leaders (Christmas tree), to vertical hedgerow, or wall types, or to horizontal type of tree walls. The orchards of the future will be some type of tree walls (vertical or horizontal) to permit continuous and rapid movement of harvesting machines. The trees may have multi- or single-level areas of fruit production. Harvesting might be by "assembly-line" picking from slowly moving platforms, or by shake-and-catch units, similar to today's models, or by continuous moving over-the-row harvesters. Also, in order to justify increased costs, the air space must be filled with fruiting wood. The only space that should not be filled is the work space--for spraying, moving equipment and for light penetration. The higher yields that will come with better utilization of space will also make high cost practices, such as irrigation and frost protection, more feasible.

As an industry we must not become stereotyped in plans or practices. All orchards will not fit the same spacing, the same training system, the same harvesting machine, or the same market. Furthermore, all growers do not have the same abilities or the same likes and dislikes. We must remain flexible in attitudes and actions. The ability to adjust to changing situations and improved practices will be increasingly important.

At the same time, individual growers should standardize their own practices whenever possible. Planting distances, tree size, cultural practices and harvesting procedures should be so established as to make maximum use of machinery and

labor. A harvesting machine should be used in the cling peaches, processing apples, plums, sweet cherries and sour cherries. Growers cannot afford to have expensive machinery sitting around idle anymore than they can afford having paid workers sitting around doing nothing.

* * *

Production and Sales
Curt Eckert, Belleville, Illinois

Dwarf rootstocks are not new, but for many years in this country we were not particularly sold on them for commercial production. It was not until the shortage of competent labor and the appearance of the cost price squeeze that we really began to take them seriously.

In our own operations, we had several orchards which were getting older and needed replacement, and at the same time we were also expanding our orchard operations. We thought it best if we would examine the dwarfing rootstocks which were available in the United States and which might be suitable for our needs. The great changes in the apple industry in the early 1950's such as the use of bulk bins for picking and storage, the polyethylene bag, the use of the tray pack box, and the elimination of the bushel basket brought an advantage to the growers who were the first to use them. We thought the dwarf trees could give a similar advantage if they were adapted to our area.

To get up-to-date information, we talked to a lot of people in Michigan, Indiana, Illinois, and Washington about dwarf rootstocks, but the most convincing story and demonstration to us was that of the late Karl Brase at the Geneva Station in New York. My wife Ruth and son Larry were with me on the way back from the National Apple Institute meeting in the East when we met Karl Brase for the first time. We saw his experimental East Malling Block of various aged trees up to fifteen years old. Many of the varieties which he had such as Golden and Red Delicious and Rome were varieties which we were interested in planting. The demonstration plot was quite convincing, and Karl Brase had a lot of enthusiasm for the EM rootstocks, so we went away convinced that we should plant dwarf trees. The rootstocks which appeared the right size for our operation and which appeared to be doing well at Geneva was EM VII.

Later we talked with Horticulturist at Michigan State, Frank Owen, our Illinois Extension Horticulturist, and Hill Top Nurseries of Hartford, Michigan and decided to venture a new planting of varieties on EM VII on some new orchard sites which we had purchased. Our planting distance was 16' x 24'. About this same time Dr. Jack Batjer of Wenatchee, Washington, and Bill Luce of Yakima, Washington, were quite interested in spur-type trees. These trees were also semi-dwarfing so we decided to plant some of them in this block. Stark Bros. Nurseries of Louisiana, Missouri were promoting the Stark Crimson which we planted on standard rootstocks in this same orchard and at the same planting distances.

The first three growing seasons were good, and we thought we had made the right decision because the orchard looked excellent. The weather during the fourth growing season was very hot and dry, and during the early part of August we noticed that many of the Golden Delicious trees had purple leaves on them. The apples on these trees colored and matured early so we picked them early for we thought it might help the trees. We were not too concerned at the time because we thought that with additional moisture and cooler weather, the trees would recover. However, by the end of September, we knew we were in trouble for we noticed that the purple leaves had dried up and the trees were dead. We lost about 250 Golden Delicious trees at this time; and, in addition, we found many of the Golden Delicious trees had twisted and flat sided trunks. Color rot was quite prevalent on many trees. The Jonathan and Red Delicious trees in this block were also beginning to lean,

so we decided to stake all of them. After this experience, Frank Owen, our Extension Horticulturist, called together Horticulturists and Pathologists from all over the country; namely, Michigan, Indiana, Illinois, Washington, Missouri, and Nova Scotia, Canada. No one had seen anything quite like it. The outcome of the session was to recommend to us to mulch the balance of the trees with a heavy corn cob mulch or wheat straw mulch. This must have helped, for we have lost very few trees in this block since.

Right next to the EM VII trees, we had some Starkcrimson trees on standard rootstocks which were not affected by the hot dry weather nearly as much. We concluded that the spur type trees on standard rootstocks could take the stress conditions much better.

From our experience with the leaning of the Jonathan and Red Delicious trees most of the nurseries are now budding the trees higher so that they can be planted deeper and will make a better anchored tree. In this same block of trees, we had a few trees with MM III rootstocks. These trees stood the drought and heat much better than the EM VII and were much better anchored. Even though the MM III trees are more vigorous and taller, we believe it is a better rootstock for our area. We have also planted Jonathan and Romes on EM II with good success. Our spur type trees (Red & Golden Delicious) MM 104, now in the third growing season, are doing well. We have also planted some Red and Golden Delicious on EM IX rootstocks, but we have had a lot of trunk breakage when the trees are heavily loaded with fruit and following a strong windstorm. We do not believe the EM IX is suited for our conditions.

Pruning of these dwarf trees is different from standard trees. More scaffold limbs are needed, and it's important to keep the trees vigorous. Cutting back is necessary to encourage growth and increase the size of the fruit. We had an older Golden Delicious block on EM VII which seemed to lack vigor and was producing small fruit. After we cut these trees back, the trees looked much better and the fruit sized up real well. Winesap trees which had long willowy limbs when cut back produced a lot of fruiting wood in the tree and stiffened the limbs. Marshall Ritter of Pennsylvania State was quite carried away when I said that commercial growers thought dwarf trees were toys. Today, I am sure they do not consider them as such; and while they have some disadvantages, the advantages out-weigh the disadvantages and will continue to be planted in most areas.

In one of our semi-dwarf orchards last year, all of the 20,000 bushels of apples were picked by women with eight-foot step ladders. In two of our other blocks, we used a "Pick-Your-Own" sales program with some success. This small-sized tree works well for this program and should become more important in areas of heavy population.

We also sell apples to truckers right at the orchard. They either furnish their crates or use returnable crates for orchard-run apples. This is a low overhead method of selling, but the price cannot be too high or the truckers refuse to buy.

Apples for retail are packed in three and four pound polyethylene bags. Tray packs are also used for the larger sized apples. For retailing, we also use a ten pound mesh bag with good results. Also for retailing, we use an open top corrugated box of $\frac{1}{2}$ bushel and bushel size with the name printed on the container. For the off grade utility apples, we use a bag for both $\frac{1}{2}$ bushel and bushel size for retailing.

Some apples go to processors in bin boxes right from the orchard. We try to sell in as many different ways as we can to diversify our outlets.

§. Promotion of the whole apple industry is needed in addition to promotion of certain states or regions. We need to tell people in every way possible the advantages of apples and apple products. I would be amiss of my obligation if I did not ask you to join in this worthy effort and make our apple industry better for everybody.

* * *

Rootstocks and Pruning in Relation to Production

A. D. Crowe, Head, Tree Fruits Section
Kentville, Nova Scotia, Canada

1. The objective of the fruit grower is to find the most efficient way to use sunlight. The orchard of apple trees is a factory for manufacturing apples with light as the power source.

2. In a study of pruning techniques it has been found that considerable reduction in cost can be made. The objective should be to develop and maintain structure of the tree so that all leaves get good exposure to light. This can be done just as effectively with a few large cuts as it can be many small ones and the labor is only one-half or even one-quarter as much. The only time growers need to practice detail pruning is where good size of the apples cannot be obtained any other way.

3. By erecting shades over young apples trees we have been able to show that diffuse skylight (indirect sunlight) plays a major part in supplying energy. Our results indicate that for best efficiency all leaves of the tree should get at least the equivalent of one-half full sunlight intensity.

4. Dwarfing rootstocks, which give a somewhat smaller tree than normal, depending on which stock is used, also tend to give a good exposure of the leaves to light. At the East Malling Research Station they have done an excellent job in selecting the best rootstocks. MM 106 and EM VII are excellent, EM 26 and EM IX appears to be particularly efficient but are quite dwarfing with Red Delicious and need stakes or a trellis for support. MM 111 and MM 112 appear to give a good combination of strong rooting and productivity but are less well known.

5. We have shown in our studies that the south and west sides of the tree are the most productive. We expected to find this for the south, but it was a surprise to find the west does better than the east side. Many orchardists are planting apple trees so the rows make almost a hedge and it is generally thought that a north-south row is better than an east-west. These results from Kentville suggest that it is better to face the south west than it is to face the south east.

6. Seedlings of the hardy Russian variety Beautiful Arcade as well as the Malling series are used for rootstocks in Nova Scotia. These seedlings give a tree which is two-thirds normal size, is very productive and because they are from seed are cheaper to produce. We think that either MM 106 or BA (Beautiful Arcade) seedlings, combined with our scaffold renewal pruning technique makes a pretty efficient combination.

7. The scaffold renewal technique of pruning was developed at Nova Scotia. The system is designed for trees which are spaced between 12 and 20 feet apart and utilizes large cuts to continually renew the bearing parts of the tree. Only the main trunk and inner parts of the basal limbs get old. By this method we have been able to easily control the size of the tree to its allotted space to get good yields of excellent quality fruit and to actually reduce the cost of pruning considerably.

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January 23 & 24, 1969-Western Colorado Hort. Society, Grand Junction, Colorado

March 17 & 18, 1969-Twelfth Annual Conference - Dwarf Fruit Tree Association, Benton Harbor, Michigan.

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BATJER SCHOLARSHIP FUND

The amount of money collected toward the Batjer Scholarship Fund at the Eleventh Annual Conference, March 19, came to \$240.35. Another hundred dollars (\$100) will be added to this from the Treasurer of the Dwarf Fruit Tree Association, thus totaling \$340.35. This amount (\$340.35) will be mailed to Bill Luce, Yakima, Washington who is in charge of the Batjer Fund Raise and will be labeled as a donation from the members of the Dwarf Fruit Tree Association.

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PRODUCTION COST OF APPLES

According to a survey at Washington State, the cost of production per box (about 30 lb.) decreases with the increase of number of boxes produced per acre as follows:

Apple Production Boxes per acre	Production Cost per box
500	\$1.63
1000	.93
1500	.75
2000	.62

* * *

AVAILABLE PUBLICATIONS

A limited number of the following publications are available (no charge) by writing to Michigan State University, 303 Horticulture Building, East Lansing, Michigan.

1. The Incidence of Scion-Rooting of Apple Cultivars Planted at Different Soil Depths.
2. Growth Response of Several Rootstocks to Soil Water.
3. Peach Seed Germination and Seedling Growth as Influenced by Several Factors.
4. Growth and Incompatibility Factors Associated with Apricot Scion/Rootstock in Michigan.

5. Factors Influencing Root Formation in Hardwood Cuttings of Fruit Trees.

* * *

THE SUMMER TOUR - Saturday, August 24, 10:00 a.m. Starting point: Hill Top Orchard, Hartford, Michigan

The summer orchard tour in southwestern Michigan promises to feature a number of interesting orchard stops. Some of these features include: Results of the mechanical hedging and topping machine; Rootstock effects; Early and late varieties; Fruit thinning results; Growing and training spur type varieties; Results of propane radiant heating system; and Several cultural practices.

Persons coming some distance may be interested in an evening "problem discussion session" Friday, the evening before the orchard tour. This could be arranged and held at the Holiday Inn Motel, Benton Harbor. Persons interested in such a session should contact Stu Carpenter, District Horticultural Agent, Federal Building, Paw Paw, Michigan, Telephone: 616-657-5564.

* * *

Picking Machines for Pears

Ted Horsky, Fruit Grower
Walnut Grove, California

About 3 years ago we became involved in mechanical aids, and please keep in mind that the picking platform which we have developed is strictly experimental. We are not completely satisfied with it, and still have a lot of work to do. Also, what works for us may not necessarily work for someone else. In the fall of 1965 we mechanically topped and hedged a 100 acre block of pear trees, planted on a 12 x 12 spacing, hoping that we could develop some type of mechanical aid for pruning and picking. The trees were topped at 16 ft. and were hedged with a 6 ft. opening between the trees, leaving a tree 6 ft. wide in a hedge row, running north and south.

First we built a three level pruning platform to test the feasibility of working from a platform. This seemed to work quite satisfactorily as our pruning costs were cut by about 25 percent. We then decided to go further and try to develop some type of platform to pick from.

In the spring of 1966 we started to work on a 5 stage platform. It is 20 ft. long and 6 ft. wide. The first level is 18 inches off the ground and each level after that raises 28 inches, with the top level at about 11 ft. Each stage has a floor area of 4 x 6 ft. which makes it possible to use 2 pickers on each side of every level, giving us a total of 20 pickers, if necessary. We ended up using only ten pickers with the crop which we had that year. The platform has 4 wheel hydraulic steering, making it possible to turn in narrow headlands. It was pulled by a wheel tractor with a trenching transmission capable of very slow speeds.

The fruit handling equipment consisted of short metal chutes lined with plastic covered sponge rubber and belts. The metal chutes did not prove as efficient as we would have liked them to be and were subsequently changed. The picker placed his fruit in these metal chutes where it tumbled on to a finger belt running down the center of the platform from top to bottom. We had some difficulty keeping this finger belt in alignment.

The finger belt lowered the fruit on to a belt running horizontally through the lower part of the platform from front to back. The fruit then went on to a manually operated bin filler. When the bin was full, it was rolled off onto the ground by means of a set of rollers which drag on the ground behind the platform.

The hydraulic power for steering and operating the drive motor for the belts and bin filler was supplied from the tractor. The steering and belts could be controlled by either the tractor driver or the man operating the bin filler. The platform carries 5 bins at one time and additional bins could be rolled in from the back when needed without having to stop.

We picked 10 acres of nine year old trees which averaged 27.5 tons per acre. The picking crew consisted of ten women picking from the platform, two men picking the lower portion of the tree from the ground, a tractor driver and one man operating the bin filler, making a total crew of fourteen. The pickers were paid \$1.75 per hour, the tractor driver and the bin filler operator were paid \$1.50 per hour. By figuring in the cost of breakdowns we ended up with a 25 percent savings over what it cost us to pick with ladders.

When picking with ladders we must have one forklift for every 30 to 40 men to move partially filled bins as the pickers move from one set to another. Picking with the platform eliminated the moving partially filled bins and results in further savings.

As far as fruit injury we did not run any test to determine, but our cannery field man said that he thought that there was less injury from the platform than with hand picked fruit.

In 1967 we had a complete crop failure except for a few rows of trees which had Winter Nelis interplanted for pollenizers. We felt that this would be a good opportunity to do some work on our fruit handling equipment to make it more efficient and handle the fruit with even less injury. We removed the finger belt and metal chutes, and tried four different methods of lowering the fruit on to the horizontal belt. Two of these methods worked quite well and with some modification will work even better.

One design is an 8 inch rubber tube with rubber fingers inserted into it to slow the descent of the fruit. By adjusting the distance that the fingers protruded into the tube we could control the rate of descent as the fruit moved down the tube. The upper end of the tube is connected to a rubber lined metal funnel in which the picker placed the fruit.

The second design was a six inch metal pipe with four air filled rubber tubes inside it running the length of the metal pipe. The rate of descent was controlled by the amount of air in the rubber tubes. The upper end of this tube was attached to a similar though smaller funnel. Both devices emptied on to a foam rubber pad before going on to the belt.

In a third method we tried was a small metal funnel strapped to the pickers chest, with a length of exhaust tubing containing a plastic liner attached to a foam rubber lined elbow which could swivel 360°. This method did not prove to be as practical as the other two, but we feel that the small metal funnels and exhaust tubing used in conjunction with our other tubes deserves further trying. The picker would only have to bring the fruit to his chest instead of all the way down to the side of the platform.

We felt the overall efficiency of the platform with these new fruit handling devices was increased, but we were not able to pick enough tonnage to obtain any cost figures.

Several new changes will be made this year on the machine and on the fruit handling equipment. The platform will be self propelled, probably with a 4-wheel drive hydrostatic system. The front of the platform will be opened and empty bins will enter from the front instead of being pushed in from the back. Lights will be installed and we will try to use a night shift. We are considering the possibility of removing the plywood staging in the winter and installing one of our pruning platforms, thus getting an additional three months use per year from the trailer and propulsion system.

Mechanical aids offer us many advantages such as lower cost of picking and a new source of labor. We can now use women and possibly teenagers. With the new labor laws that are coming into effect which may necessitate our paying overtime beyond 40 hours a week, we could possibly go to two or three eight hour shifts. This would give us longer use of our equipment and reduce the number of platforms which we would need.

* * *

REPRINT FROM THE JOURNAL OF HORTICULTURAL SCIENCE (1968) 43:17-22.

Pruning and Rootstock as Factors in
The Production of Primary Branches on
Apple Trees

By A. P. Preston
East Malling Research Station, Kent

SUMMARY

The results from two trials with Cox's Orange Pippin concerned with the development of primary branches are reported. The first trial, with newly planted one-year-old trees, compared the use of feathers as primary branches with trees where these were removed and new shoots selected as branches. Where feathers were retained the trees had larger girths, more shoots, greater total shoot growth, and the final tree weights were heavier. The crotch angles of all three primary branches were wider where feathers were utilized. On feathered trees there was no advantage in leaving the central leader uncut for the first year. The second trial, in the nursery, showed that by removal of incipient feathers up to 70 cm. from the ground, more and longer feathers were secured in the region where primary branches are required. Trunk renewal, involving the drastic cutting back of the maiden tree to within 5 cm. of the bud union, did not increase the number and length of feathers the following year in this trial.

Department of
Horticulture

MICHIGAN
STATE
UNIVERSITY

COMPACT FRUIT TREE

DWARF FRUIT TREE ASSOCIATION

Vol. 3, No.1, October, 1968

Rootstock Behavior

Spur Types

Induced Dwarfing

Cultural Practices

Edited by P. F. Carlson

STEM-PITTING OF PEACH ROOTS

Stem-pitting, similar to that found in Virginia crab apple, is now found in peach in certain areas of the Mid-Atlantic States where peaches are grown. The symptoms in the form of pits, grooves in the wood, and thick bark are found at and below the soil line. Leaf symptoms are in the form of upward tight rolling and some mottling. Trees affected do not recover.

The exact cause of the stem-pitting disorder has not been established. Presently, research men are determining possible causes, mode of spread, resistance to the disease and programs of approach to prevent further spread.

Nurserymen who propagate peach trees and peach growers seeing symptoms similar to those above should contact an experienced person to check for stem-pitting. The stem-pitting disorder has also been found in the stone fruit seedlings of apricot and nectarines.

The symptoms and tree disorders of stem-pitting have been described and published in the Plant Disease Reporter, Vol.52, No. 2 and 4, Feb. & April, 1968 by J. G. Barrat, S. M. Mircetich and H. W. Fogle.

SOME FACTORS IN SPACING APPLE TREES

The distance apple trees are spaced in the row and between rows depend on many factors. Some of these factors will be considered here.

The topography of the fruit site must be considered. A steep slope with rows in contour layout will require more space between the rows, but not necessarily between the trees, than on a more level site. A fruit site with a fertile soil generally can support more trees per acre-unit than a light sand, less-fertile soil. Fruit sites exposed to strong winds could be planted to high density, providing the soil is suitable. In such case, each tree would provide wind protection for its neighboring tree.

Aside from the fruit site, the type of tree, the form of the tree and the orchard management program must be taken into consideration in tree spacing. Vigorous growing varieties such as Delicious, Winesap group and Northern Spy require more space than less vigorous varieties whether on standard or dwarfing rootstocks. In a research orchard planted in 1956 at East Lansing and spaced 6x15 feet, Jonathan, McIntosh and Golden Delicious were easily maintained small with good fruiting. However, Red Delicious, Winesap and Northern Spy were difficult to hold and maintain in fruiting condition even though on dwarfing rootstocks.

The vigor of the rootstock also has a great influence on tree spacing and tree density in the orchard. On a given fruit site, the number of trees planted per acre could increase in direct proportion to the vigor of the rootstock used. For

example, if the number of trees per acre on seedling and Robusta No.5 were 80, the number using rootstocks EM II and MM 111 would be 120 trees per acre, EM VII and MM 106, 160 trees per acre, and EM IX and EM 26, 200 trees per acre. Obviously, these figures are relative and would be dependent on the spacing factors already mentioned.

The type of tree grown, its adaptation to present cultural and harvesting methods, and its fruiting potential are other very important factors to be considered prior to planting a new orchard. Furthermore, each variety and rootstock responds differently to soil, nutrient, pruning and irrigation. It is relatively easy to grow trees, but each grower must aim for high acreage yield of quality marketable fruit. That is a challenge...R. F. Carlson

VOLUME NUMBER 3

With this Newsletter a new volume is initiated and thus, Volume 2 is completed. Copies of Volume 2 (117 pages), hinged-bound, are now available by writing to P.O. Box 143, Hartford, Michigan 49057. Each copy is \$2.00. Volume 3 just initiated will contain up-to-date fruit tree research with emphasis on keeping the grower and extension and research men informed on various rootstocks and cultural practices.

EUROPEAN FRUIT STUDY TOUR - SECOND REPORT

1. Notes from Arthur Dowd, Michigan: "First of all I would like to express my personal thanks to you both for a job well done. The planning of the tour and the work in making all the contacts was immense and every day was packed with interesting and educational sights and events. We certainly saw some of the best research stations and fruit farms of Europe".

"This was our first visit abroad and we found it a very pleasant experience. We appreciated the opportunity to get a better insight into the working of the European fruit industry and I have a feeling that this much contact with good fruit growers and research people will help to spur us on to improve our own operations".

"It is rather difficult to pick out the real high lights of the trip as we had so much that was good. Surely the boat trip on the Rhine River, the tour through Switzerland, the Geneva Rose Gardens, the visit to the fruit area of Jork on the Elb River, the day at Odense and visit to Casa Market, the visit to East Malling and the day at Long Ashton are all memories that we shall long cherish. The good fellowship that we enjoyed also helped make the trip a very pleasant experience".

2. Notes from William Page, North Dakota: "About our trip I must say that I am very glad that I had the opportunity to go. The men and women involved were a pleasure to know and be with. In certain ways what I learned has helped my fruit growing and I feel like a more complete person for the experience. My respect for Europeans, though not small before, increased tremendously from meeting a few and also seeing how they seem to live and get along together. They are certainly tidy people as a whole---and this even goes to their wisdom of wearing pants without cuffs. Glory be! As for Mini skirts, who would object to that and especially when the wearer has a good pair of gambs!".

"Two items that struck me about apple lore was (1) that wind pollination was a factor that might effect cross polination and (2) transplanting 12-year-old trees presented no serious problem where it was done in West Germany. Of course we all recognized that the cooler summers and plenty rain would be a helpful factor. I was really surprised to hear that winter injury is sometimes experienced, especially in Jork Germany where they attributed it to the high water table, and slow hardening off for winter. The canker (Nectria galligena) damage in lower tree stems of apple at this station was also observed in some varieties".

4. Notes from Robert Longely, Canada: "I was again highly pleased with your second tour. A serious regret, I could not listen, look, write notes and take pictures all at the same time or fast enough. There was much to hear, see and record".

5. Notes from Dr. Arthur Thompson, Maryland: Gorse Research Station, St. Truiden: "Our first professional stop was the Gorse Station east of Brussels. We were addressed by Dr. Soenen, the director of the station, on fruit growing in Belgium and the role this station plays in Belgium. He reminded us first that Belgium has 500 years of history as a nation in which distinct cultures are involved. West Belgium speaks French, while eastern Belgium speaks Flemish; all material issued by any government agency must be printed in these two languages. Dr. Soenen pointed out that Belgium has been frequently occupied during her history and this experience has left the Belgian people with a curious passion for circumventing the law. It seems that any regulation passed by the government is immediately scrutinized to determine how and under what conditions the law may be ignored. Belgium is a crossroads country, the gateway to Europe, if you will. Brussels, for example, is the headquarters for the Common Market. This little station reflects this geography with a log of 2500 visitors in 1967.

The Belgian fruit industry consists of 20,000 hectares planted largely to apples and pears, with a count of 500,000 sweet cherries included. However, the sweet cherry is in trouble in Belgium because of high trees and the constant upward surge of picking costs. We gathered that until and unless a smaller sweet cherry tree is developed, this crop will decline in Belgium. Dr. Soenen didn't mention birds, but this too militates against cherry production here as everywhere else.

Dr. Soenen said, "the elite of the Belgian growers are the best in Europe". He said it is not climate, not soil, but people. He cited three reasons for his statement:

1. "The human point of view," the people. Good growers in Belgium work hard on their own plantings. On Sundays they do not work, but they go out in the orchard to observe. Soenen stressed this as important. The young men do not do this, but the experienced growers in the elite group do, and this was held as the difference.
2. The School or University. Training in horticulture began in 1845. Prior to this time orchards were around the castle where microclimate was good. The advent of the railroad meant farm produce could be transported elsewhere for marketing; fruit growing drew away from the confinement of the castle and out into the countryside. Exports began, first to England, later to Germany.

About 1931, exports to England ended, to Germany shortly thereafter. Up to this time exports consisted of inferior quality, even poorer grades and standards. Consumers would no longer support this business, and hence the modern era in Belgian fruit production began, but it wasn't until after World War II that the transition to clonal stocks took place. They have annual fruit schools here at St. Truiden and apparently the good growers attend to keep abreast. The present situation is the result of many decades of some kind of instruction beginning with the spreading out of the fruit industry throughout the land.

3. The Research Station. There is no contact between the theoretical university, the people and the farmer or between the theoretical and the practical. Dr. Soenen said this is the reason for this station - to bridge the gap. Trained personnel here live with the problems of the fruit industry, but they are professionally trained in the sciences.

The Ministry of Agriculture maintains an extension service in each of the nine provinces (counties) of the country. Dr. Soenen feels that one man in each province is not enough. They also have a library service in which popular literature from all over the world is reviewed, condensed, and important ideas put out to Belgian growers. The significance of such a service was not lost on many of our group.

The fruit industry can be divided into three groups:

1. "Capitalistic" Orchards. Owned by MD's, lawyers, etc., these are 20 to 50 acres in size, generally good orchards.
2. "Professional" Orchards. The best in Belgium, generally small, 8 to 15 acres. The "pros" continue to come to the fruit schools, keep on top of everything. But they must get larger, but acquiring more land is next to impossible.
3. "Non-professional" Orchards. Factory workers, shop keepers and workers who have a small orchard make up 90% of the fruit industry. Non-technical, these people are the poorest growers.

Since World War II, Belgium has been moving toward more intensive culture, a transition stimulated not only by rising production costs, but also by the inability to buy more land. For years the new look was 2x4 M, tree spacing of 6x12 ft., but now they are following the Dutch to even closer spacing, generally 1x3.5 M. There is much discussion going on as to which spacing is best for the full dwarf tree; no agreement yet except that 2x4 M is not close enough either way. Leading varieties today are Cox, Jonathan, Golden Delicious, Boskoop, Winston, and Tydeman's Early. In pears, Comice, Conference, and Hardy lead. Apples constitute 80% of the fruit output in Belgium, and the majority of the remainder is pears. While sweet cherries have been declining, pear production has been increasing.

Dr. Soenen emphasized that this station is a private research station, even though the Government pays 80% of their costs. Support for this station comes from 3 groups: 1) All of the better growers pay a subscription of about one dollar per acre, but, being Belgians, no one pays for all of his acres. 2) Allied commercial industries including cooperative marketing groups pay a total of 20% of the costs of this station. 3) Government. The station has a board of directors to which Dr. Soenen is responsible. The board has no government men sitting on it. However, the government does have control over accounting procedures and how money is appropriated, where spent, and even though they apparently have no voice in the development of the research program at the station. Dr. Soenen, therefore, has certain liberties and freedoms, but he is also under certain restrictions. The execution of a new program, for example, is contingent on the availability of money just as it is in the United States. While government men will not question the advisability of a new program they can and do put ceilings on how much is available for labor, for staff, for equipment, and for miscellaneous items. The director, then, must make the decision on distribution within the station program. This station has 13 university people and 25 technicians who specialize in fruit. They have five major divisions at the station including entomology, mycology, physiology, virology and phytopharmacy.

Soenen emphasized the Warning Service as perhaps one of the most important of this station. This service is designed to keep growers abreast of the growing situation in the orchard, especially with regard to insect and disease control, but also in regard to low temperatures and other climatic phenomena that may be of importance at the time. The Warning Service is made up of four specific items: 1) The written word. They send out written material to fruit growers on their mailing list with periodic information of consequence. 2) Daily broadcasts which go from this station in the general newscasts throughout the country. This is aimed largely at homeowners in the suburbs who have fruit trees and who would not otherwise get this information. Dr. Soenen claimed that this was the only place in the world where general newscasts contain information regarding the care of fruit trees. 3) A telephone request list. They have about 200 growers on a separate list who are called at appropriate times with warnings of one kind or another. If a grower wants to be on this list apparently all he has to do is ask that his name be included. 4) Recordings. This was perhaps the most fascinating of all in that Belgians are able to dial a certain number on the telephone and get a tape recording (in French and Flemish) of whatever the word is for the day just as we dial weather in all metropolitan areas of the United States. At the Gorse Station this recording is available 24 hours a day, and hence can be heard any time of the day or night when it is convenient. This Warning Service is certainly one of the most comprehensive we have ever heard about.

Dr. Soenen hinges the success of the good fruit grower in Belgium on their very advanced warning system. As he stated to us in his lecture, they want to know when the first codling moth appears, the first aphid, the first evidence of scab or of mildew, and they want that information broadcast to everyone immediately.

A short note on land costs in Belgium: The four-thousand dollars per hectare (2.5 acres) so frequently quoted is strictly theoretical in Dr. Soenen's view. Demand forces prices up well beyond this and this too is a formidable obstacle to extension of one's landholding. However, taxes are the same for everyone and the good growers benefit from this since they are able to realize substantially higher production from the same area of land.

Dr. Soenen understood that we wanted a quick inexpensive lunch prior to visiting commercial orchards in the afternoon and so he made arrangements for us at a new and very nice local restaurant. However, it didn't turn out quite as we expected. The waiters were in formal dress, the lunch was several courses, took the better part of two hours and cost five dollars each. However, it was a marvelous lunch and the white wine was superb.

Rene Nicolai Nurseries and Orchards, Alken Belgium: In the afternoon we were guests of Mr. Rene Nicolai in his very beautiful home where we were served graciously with most welcome refreshments. After a heavy shower we got out briefly to look at some of Mr. Nicolai's young plantings on the home property. In his own orchards Nicolai grows Golden Delicious, James Grieve, Jonathan, and Cox. He expressed a view that in Belgium they had gone too much to Golden Delicious, a single variety, and that this is evidenced in the constant decline in the price of Golden Delicious in the marketplace. Up to now, tonnage per hectare has made up for it in higher production, but Nicolai sees an end to the business. EM IX is the "new stock" in Belgium and I gathered from Nicolai's remarks that his nursery customers for the most part want their trees on EM IX. On this stock he is planting 3000 trees per hectare of Golden Delicious, Jonathan and James Grieve at a spacing of 1x3.5 M. Boskoop and Cox they have planted at 1.5x4 M. Trees set at opposite angles (about 30°) towards the row middle was referred to as the "Nicolai V," apparently developed by Mr. Nicolai himself. He claimed that with this kind of angled planting he could get a 15% increase in production. On the far edge of this field he had a planting of 50 cm x 3.5 M giving him 6000 trees per hectare, also planted in the "Nicolai V".

We had to remember that Mr. ...
trees for a hectare of land ...
sure that 6000 trees per hectare ...
no one laughs at anything ...
proved to be a colorful host ...
his hospitality and his home

a nurseryman and anytime 1 6000
pretty good thing going. I was not
ing to be feasible, but in these
high density plantings. Mr. Nicola
ously a very successful man. We enjoyed

THE DOLLAR AND THE MEAL

In visiting eight or more countries in three weeks, one is apt to end up with a pocket-ful of coins of all denominations and values. Our young Chuck Bristol aptly put this dilemma into the following poem. Chuck also had some ideas on food which is usually good in Europe but requires certain taste fortitudes....Ed.

EUROPEAN MONEY

European money is sort of sad,
European money makes me mad.
If they all used the same kind
I'd be glad,
But since they don't I must
stay sad.

The Belgians, the Swiss, and
the French all use Francs;
This makes trouble when you go
to the banks.

The Danes use Kroners,
The Germans use Marks,
The Dutch use Guilders,
The English use Pounds,
Using all this money makes my
language profound!

All this money often makes me
holler, so
I'll be glad to get back to
the dollar!

by Chuck Bristol

EUROPEAN MEALS

Huge soup spoons, huge soup spoons,
Big enough to hold the moon.

Water to drink, water to drink,
Waiters don't know what to think.

Hard rolls, hard rolls,
They weigh about a ton.
Hard rolls, hard rolls,
Can hardly choke down one,

Strong coffee, strong tea,
A couple of strong drinks,
Strong coffee, strong tea,
Were they made from the bark
of a tree.

EUROPEAN MEALS (Cont'd)

Many dishes, many dishes,
Some are very hot,
Raw fish, raw fish,
We prefer not!

Slow service, slow service,
Which takes forever.
Fast service, fast service,
Never, Never, Never!

At our meals we don't know
what to expect,
But we survived to crunch
down the next.

by Chuck Bristol

REPRINT FROM: ASHS 87:21-28, 1965 By R. F. Carlson, Dept. of Hort., MSU

The Effects and Relationships of Intermediate Stem Sections on Growth and Behavior of Apple Cultivars

Abstract. The growth of several apple scion/interstock/rootstock combinations over an 8-year period showed certain trends. Interstock influenced ultimate tree size. The order of influence, small to large trees, was as follows: Clark, EM IX, EM VII, K-41, O-524, Robin and Muzalma. The inherent vigor of the variety also influenced the ultimate size of the trees. The different seedling rootstocks apparently did not affect the size of the trees to the same degree as the interstock. Suckering was influenced by the degree of dwarfing of the interstock rather than by the rootstock. Accumulative fruit yield was effected by both scion and interstock. No serious incompatibility or anchorage problems were found for the different clone/seedling combinations. The optimum spacing of trees was found to be dependent on the dwarfing influence of the interstock and the inherent vigor of the cultivar.

Although the trees in this study carried latent viruses with visible symptoms of stem pitting in some clones, the growth and fruiting of the trees were apparently not adversely affected. Certain scion/interstock/rootstock combinations were outstanding in this study and merit further evaluation.

ANNUAL AND INTERNATIONAL CONFERENCES

December 3-5, 1968 - Michigan State Horticultural Society, Pantlind Hotel,
Grand Rapids, Michigan.

March 17 & 18, 1969 - Twelfth Annual Conference -- Dwarf Fruit Tree Association,
Benton Harbor, Michigan.

March 18-25, 1970 - XVIII International Horticultural Congress. Tel-Aviv,
Israel.

Dwarfing Interstocks: Their Effect On
The Field Performance and Anchorage Of
Apple Trees

Summary: An interim report is given on an experiment in which trees of Cox's Orange Pippin and Worcester Pearmain, 5 years old and incorporating dwarfing interstocks, are compared with single-worked trees using the same dwarfing clones as rootstocks. The dwarfing clones used as interstocks were M.VII, M.26, M.IX, M.VIII, and 3426 and the root systems were MM.104 and M.VII. The interstocks dwarfed the trees roughly in proportion to their dwarfing effect as rootstocks, giving a range of tree size down to about a fifth of that of control trees single-worked on MM.104. There was a corresponding increase in precocity.

In comparison with the controls, interstock trees were less firmly anchored, apparently because the rootstocks were dwarfed at least as much as the scions. Interstock trees were much more liable to develop root suckers than were single-worked trees of the same vigour.

With the exception of M.IX, which was as dwarfing when used as an interstock as when used alone as a rootstock, the interstocks produced trees intermediate in vigour between that of the two rootstock components used separately. The ratios of crop to stem sectional area of both single- and double-worked trees conform to a single pattern of behaviour, suggesting that, in general, interstock trees are neither more nor less productive for their size than single-worked trees.

PEACH ROOTSTOCKS - Report I.

The peach (Prunus persica) is propagated by budding the varieties on peach seedlings. The source of peach seedlings vary from year to year depending on what is available. During the early part of this century peach pits were collected in the mountains of Kentucky and Tennessee from peach trees growing in the "wild" and these were referred to as "naturals". Thus, the names Kentucky naturals and Tennessee naturals were used. The pits from these "natural" peach trees were small (about half the size of Elberta pits). The fruit apparently was used locally, and the seed dried and sold to nurserymen in many states.

The "natural" pits produced good uniform seedlings and were tolerant of cold winter temperatures. However, due to lack of help in harvesting these "natural" peach pits, and perhaps for other seasons, the supply dwindled by the 1940's.

Since then, the California Lovell peach variety has been a uniform supply of good pits to nurserymen. Due to change in processing methods and in varieties, the supply of Lovell pits also has dwindled in recent years. The Halford peach variety is now processed in California and is providing a source of peach pits. The germination of the seed in these pits vary considerably, depending on several conditions, such as: 1. Processing of the pits at the plant. 2. Handling, shipping and storing of the pits. 3. Pre-planting treatment and planting time of the pits. These and other factors will be covered in subsequent reports..R.F. Carlson.