Department of Horticulture
MICHIGAN STATE UNIVERSITY

COMPACT FRUIT TREE

ROOTSTOCK BEHAVIOR
SPUR TYPES
INDUCED DWARFING
CULTURAL PRACTICES

THE INTERNATIONAL DWARF FRUIT TREE ASSOCIATION

No. 5, November, 1978 - Prepared by Robert F. Carlson

THE BIG, APPARENTLY FAIR QUALITY APPLE CROP-1978

The old saying that in a good fruit set year the apples "grow on fence posts" was true this year. It was a big crop, and in general the fruit size and quality was good. Some rain during sizing of the fruit may reduce the storage condition somewhat, but, hopefully, not very much. The weather for picking was good, so even though some apples went on the ground, the crop is either sold or tucked into common and CA storages.

Quality of the apples does vary from year to year, depending on growing condition, growing systems, such as tree training, pruning, nutrition and cultivar and perhaps rootstock. There is some thought that fruit firmness is better on some rootstocks than on others. It is well known that fruit on young trees (especially those on the more dwarfing, precocious rootstocks) are larger and softer. But the question whether or not fruit on mature trees is softer on the more dwarfing trees than on the vigorous ones, such as the standard, remains to be seen.

Research data on fruit firmness is not available as it might vary from one rootstock to another. For example, is fruit from 'Delicious'/M. 9 softer than that of fruit from 'Delicious'/seedling? With a range of growth controlling rootstocks now in use, a study of fruit firmness from these in combination with major commercial cultivars could make an interesting study, and result in valuable information for the industry. In fact, fruit firmness should be part of a study in evaluating new rootstocks. Does firmness vary from one rootstock to the next, and if so, how much?

UNIFORM ROOTSTOCK STUDIES

The International Dwarf Fruit Tree Association is funding rootstock research in several states and Canada. This is for rootstock improvement of all fruit trees. A full progress report will be given at the 22nd Annual Conference, February 28 to March 2, at the Pantlind Hotel, Grand Rapids, Michigan.

The Association, also, is cooperating and sponsoring (in part for tree purchases) the regional Apple Rootstock Research Project, NC-140.

Rootstock plantings in cooperating states were established in 1977, mainly with several cultivars on the MAC rootstock series and check trees on Malling

rootstocks for data comparison. In the spring of 1980, a uniform test planting using two cultivars plus pollinators on nine of the newer rootstocks will be planted in 18 states and in Canada. Another planting is in the planning stage for 1983-84 by the NC-140 Committee. This one will include more states and provinces and be composed of at least 16 new rootstocks under virus tested cultivars. More details and progress on these projects will be covered at the Annual Conference.

THE IDFTA INFORMATION BULLETIN

With this letter, you will find enclosed the new Information Bulletin which up-dates activities of the International Dwarf Fruit Tree Association. Daily we get letters asking what the Association is all about, its purpose, and its benefits to members. This Bulletin explains in detail some of the major activities and objectives to aid in serving the fruit industry better through information and support of viable research projects.

After you have read this Bulletin, please pass it on to your fruit grower neighbor, friend or relative who is not an Association member. Should you need more copies, drop a note to 303 Horticulture Department, Michigan State University, East Lansing, MI 48824. You, also, will need a supply to pass out at local and state fruit meetings throughout the year.

Each member, by the use of this Information Bulletin, can get another member or more. This will bring in $37,500.00 more in annual dues to the Association. Currently, 70 percent of annual dues are allocated for rootstock research at Horticultural Research Stations.

UPCOMING ASSOCIATION ACTIVITIES

During the Annual Meeting of the Michigan Horticultural Society, December 5-7, the Board of Directors, IDFTA, will meet to discuss Association plans and business. An agenda will be mailed to the Board Members. The Rootstock Research Committee of the IDFTA will, also, meet and plan future research.

Plans for an educational fruit study tour to South America (Uruguay, Argentina, Chile and Peru) January 5 through January 28, 1979, are now complete and the Tour is filled with 44 fruit growers and pomologists. Comprehensive reports on this Tour by Tour members will be presented at the Annual Conference, IDFTA, February 28 to March 2, 1979, at Grand Rapids. Detailed reports on the European Fruit Tree Study Tour, June, 1978, also will be presented at that Meeting.

The program for the 22nd Annual Conference at Grand Rapids (February 28 to March 2) is now in the formative stage. Our feature speaker will come from Holland, where tree training and high densities have been common practice for some time. Varied subject matter on rootstocks, cultivars, tree training, pruning, tree densities and general orchard culture will be discussed by growers and research and extension personnel. The final program will be mailed to members in January, 1979.

The theme for the 22nd Annual Conference is: "Fruitfulness and Hardiness in Rootstocks and Cultivars are Must Factors for Quality, Compact Fruit Trees."

Dr. Henk Van Oosten, pomologist and feature speaker from Holland, will stress this in his two presentations at Grand Rapids.

FRENCH FRUIT FARMERS

During the first week of November, eight French growers and fruit cooperative managers visited Michigan State University and part of the fruit industry in Southwest Michigan. These people are engaged in fruit growing in the Montpellier fruit region, bordering the Mediterranean Sea. The following faculty members were involved in an afternoon discussion: Don Dewey on storage disorders, Jerry Hull on orchard culture, Bob Andersen on fruit breeding, Jim Flore on fruit thinning and Bob Carlson on fruit tree root-stocks.

NOTICE OF ROOTSTOCK RESEARCH FUNDING

Researchers who are members of IDFTA and who wish to obtain grant money for rootstock research, please contact Dr. Frank Gilbert, Experiment Station, Sturgeon Bay, Wisconsin 54235, for detailed information. Those already receiving funds have this information and need not write. The Board of IDFTA and the RRC will review projects for short-term research during the winter.

IDFTA PROCEEDINGS TYPING GUIDELINES

This year we are asking that members who submit a manuscript for inclusion in the 1979 IDFTA Proceedings, COMPACT FRUIT TREE, Volume 12, follow a specific set of guidelines in typing their manuscript. Our purpose in doing this is to save time and, hopefully, get the Proceedings published and mailed at an earlier date. If a member does not have access to a typewriter or is unable to have the manuscript typed according to our guide-lines, we will still be willing to type these manuscripts. Our goal is to have the majority of the manuscripts submitted in the exact form in which they will be published in the Proceedings. A copy of the guidelines will be mailed to each member who will be making a presentation or submitting a manuscript. We appreciate your cooperation in this matter and are looking forward to having a smoother and speedier transition from individual manuscripts to completed Proceedings volumes.

CHERRY RESEARCH IN SWEDEN

The chief objective for the visits to fruit tree research stations in Sweden (Ranna, Robecksdalen, Ojebyn, Alnarp and Balsgard) was to become familiar with cherry research in progress at these places. Most of the cherry breeding work is done at Balsgard and Alnarp and the testing is done at Ranna, and very little at Robecksdalen and Ojebyn.

Cultivar Trials - I was impressed with the many cherry crosses of both tart and sweet cherries and selections and progenies in the testing program. In

one publication from Alnarp, 106 tart cherry selections and named cultivars are listed; of the sweet cherry sorts, 286 are listed. Several of these cultivars and selections were growing at these stations. Since many were maturing at the time of the visit, fruit size and quality were observed. In 1976, the highest yielding tart cherry cultivar at Ranna and Nyckelby was Heimanna 'Konservenweichsel.' An early maturing cultivar with dark juice was 'Tschernokorka,' a very attractive and high quality cherry. This one should be tried here in Michigan since the processing industry is interested in dark-juiced cherries.

Pollination Studies - The Swedish researchers, also, have done considerable work on pollination factors as far as pollen compatibility of cultivars and time of flowering, especially with sweet cherries. For example, 'Hedelfingen' is pollen fertile with at least 14 other cultivars whereas 'Sam' is fertile with seven cultivars. This, of course, is very important in grouping of cultivars when planting so that pollination is adequate. In checking tart cultivars, they also found an eight day spread among early and late flowering cherry trees.

Rootstock Trials - Cherry rootstock used in some of the test plantings were: Hullner-4, F12/1 and seedlings of Mahaleb and Mazzard. No difference in degree of dwarfing or compatibility was observed in six year old trees.

Mulching Sweet Cherry Trees Delays Bloom - One interesting mulching experiment was in progress at Ranna Experiment Station using wood bark as mulch around fruiting cherry trees. Shredded bark is readily available from saw and paper mills. Bark at 10 cm depth spread on the ground around the trunk to the "drip-line" held blossom buds back for one week or more as compared to non-mulched trees. The insulation factor of bark mulch apparently is very good. Although many mulching studies have been done in Michigan and elsewhere, more work should perhaps be done on this with different, useful, available and economical mulch materials. It could be another factor to insure more annual cropping of cherries.

Disease Resistance - At Balsgard, near Kristianstad, work is in progress breeding sour cherries for resistance to gray mold (Sclerotinia Laxa Aderh. et Ruhl). Seedlings from several populations (controlled crosses) are included in this research. For example, among several crosses, 50% of seedlings from a cross of Koro x Tschernokorka showed resistance to the fungus.

HALF DAY TOUR DURING 22nd CONFERENCE

The Orchard Tour will take place Friday, March 2, from 8:30 A.M. to 12:00 Noon. Two stops are planned near Grand Rapids where pruning and tree training demonstrations will take place in medium density orchards. Also, tree removal vs. holding in crowded trees will be discussed.

END OF A GOOD YEAR

Since the next letter will not be out until January, we take this opportunity to say, "To all of you from all of us a Merry Christmas and a fruitful New Year".

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No. 4, September, 1978 - Prepared by Robert F. Carlson

1978 EUROPEAN ORCHARD STUDY TOUR

European Orchard Study Tour, 1978, by Tara Auxit, West Virginia University. A group of 33 growers, researchers, extension agents, and interested persons braved the crowded, expensive and hectic conditions of Europe, in search of "a better way" to grow dwarf fruit trees. Hailing from 10 states and two provinces of Canada, this group produced everything from olives to asparagus, as well as a combined apple acreage of nearly 8,000. Ranging in age from 15 to 81, these travelers not only tolerated one another, but existed happily under a 17-day force-feeding of:

> horticulture; rainy skies - 14 out of the 17 days; 50°F temperatures - prepared for 70°F; colds - 58% of the group were infected; and no shopping for the ladies - thanks to Bob Carlson!

In spite of these unforeseen mishaps, the group managed to take 7,000 slides, spend plenty of Yankee bucks, and see more horticultural practices than Carter has peanuts.

England - The tour began in England, where the group was treated to the famed East Malling Research Station. The Dwarf Fruit Tree Association's old friend, Dr. Tony Preston, led a guided tour of bed systems, virus-free rootstock trials, and the new M. 27 in production. Following the tour, a traditional English buffet was given at the Station's Bradbourne Estate. A visit to the Long Ashton Research Station, in Bristol, also enlightened the group on the progress of the "Meadow" orchard, trellising systems, irradiation for cultivar selection, and techniques for rooting apple hard-wood cuttings. Since the visit coincided with the retirement of Dr. L. C. Luckwill, the 1978 edition of the COMPACT FRUIT TREE was pre-sented to him on behalf of the Association. In addition to seeing research work, the group was fortunate to talk with some English growers. At the Abbleby Fruit Farm, near Abingdon, Gordon Maclean explained his innovative pillar system, which has grown successfully for 30 years.

Poland - The next stop was Poland, where the group was graciously escorted, wined and dined by three more of the Association's long-time friends, Drs. Pieniazek, Zagaja and Czynczyk. Of great interest was their work with winter-hardy rootstocks and interstems as well as their new planting

systems. Visiting the Polish research stations, one gets the feeling that horticulture is being given high priority by the Polish government. Apple production has increased by nearly 500,000 tons in the past 25 years, and at such a rate, Polish apple production will some day make itself known in the European community.

Holland - Nearly a week was spent touring the tiny country of the Netherlands, which is unique in several ways. Although a large portion of the country is below sea level and the population density is nearly 1,000 people per square mile, the Netherlands contains possibly the best horticulturists in the world. It was obvious to the group that the three major ingredients in Dutch apple production are dry land, the M. 9 rootstock and supporting stakes. In this country, the true meaning of dwarf fruit trees can be appreciated. At present, growers plant 2,000 trees per hectare, and the latest trend is to plant 4,000 trees per hectare, using a new triple-row system. The Dutch are also known for their advances in horticultural mechanization. The group was shown advances in mechanically pruning, spraying, and harvesting apple trees. The Netherlands is truly a horticulturist's paradise.

Belgium - Journeying southeasterly to Belgium, one could plainly see the tremendous influence of the Dutch horticulturist. At the same time, however, Belgium growers were trying out many of their own systems. After visiting the Gorsem Research Station and a nearby orchard, the tour ended in Brussels, the seat of the European Common Market, for the return flight home.

Although not an experienced traveler, I can fully appreciate the effort that goes into arranging a tour of this magnitude, and I am sure I speak for the rest of the group in thanking Dr. Robert Carlson for a successful trip.

USE OF CREOSOTE TO PREVENT DEER DAMAGE IN ORCHARDS

Edward Roberts in Granville, Massachusetts, has found creosote-treated felt strips to be an effective deer repellent. The strips of felt are approximately 3/4" x 6" with a wire attached to each strip. (Felt weather stripping is an available and perhaps the most economical source of felt.)

Ed has placed 2,000 strips near young trees (one strip/tree 30 inches above the ground) with excellent results. No feeding by deer has occurred in trees containing the strips for two years. Mr. Roberts re-treats the strips with creosote in an oil can. He suggests "touching-up" the strips about every three weeks during the rainy periods of the growing season. (Once seems enough for the entire winter.) This method saves on repellent and keeps the odor strong. One caution: creosote will burn apple tree leaves and bark. Therefore, the felt strip must be hung in such a manner that the excess creosote will not drip on foliage or wood. A safer method is to drive a 3/4" stick approximately 36 inches in length in the ground near the tree with the creosote strip wired to its top. ...Bill Lord, University of Massachusetts, Amherst, Massachusetts.

ENGLAND - THE HOME OF ROOTSTOCKS

Robert F. Carlson

Visit to the East Malling Research Station - A group of 33 IDFTA members visited England, Poland, Holland and Belgium. This report will cover some of the high points of the Tour in England.

At the East Malling Research Station we had a good opportunity to visit most of the fruit tree research plantings, see performance of the newer rootstocks as well as some of the older and well-established plantings. Mr. Brian Self, Station Liaison Officer, explained in great detail the research in progress. Among other orchards, we saw a planting on some of the Malling rootstocks, which is now 80 or more years old and no doubt the oldest. This orchard gives a good indication that trees will live a long time under the climates of England. From this observation, we can extrapolate that most of the apple rootstocks that are now used will last 50 or more years. Longevity, of course, will depend on many factors, such as the location, soil condition, orchard management, cultivar rootstock combinations, etc.

The well-known Tony Preston showed us a block of apple trees on Malling 27, which is now 15 years of age. This planting is real impressive because it is truly a high density planting, spaced at various intervals, starting with 2 X 4 ft. and upward. The production here has been excellent, according to Tony Preston. These trees are not much over four feet in height at this time. This often brings up the question, "What will we do with the next four feet above?", which certainly is a potential space for growing fruit.

Also, we had an opportunity to see nutritional plantings and different density plantings using some of the more tested rootstocks. The 'Colt' cherry rootstock still performs well. All in all, visiting the East Malling Research Station is really intriguing because most of the research centers around rootstocks, cultivars, nutrition and tree management systems.

Grower's Orchards - Kent - It was interesting to have a chance to visit the East Kent Packer's plantings, which are well managed and cared for. Some of the East Kent Packer's advisors are busy trying new pruning and planting systems as well as spacing distances for maximum yields and best quality fruit. The fruit tree advisors and growers on hand to explain the pruning system and orchard management in general were: M. G. Banwell, Eric Gunn, Phil Clarke and Basil Naeme. These men have either appeared on horticultural programs in Michigan or traveled extensively throughout the fruit areas of the States.

Trees in most grower orchards are planted with Cox Orange Pippin and Brambly seedling on Malling Merton 106. Malling Merton 106 is budded high, up to 18 inches, and a good portion of the rootstock shank, approximately 12 inches, is kept above the soil line. This, of course, will give added dwarfing to the cultivar. Nearly all the trees are trained to a central leader, but how to control top growth seemed to be a case for discussion among the men.

We should note when visiting both experimental and grower's orchards that all the trees are staked, regardless of rootstock and cultivar. This, apparently, is necessary in some cases due to high winds at times of the year. However, they also have wind breaks which are a deterrent of wind currents. Due to the cost of tree support materials, we envision the English apple growers may soon be going to a free-standing tree.

Long Ashton Research Station - A half day was spent at this Station, near Bristol, visiting the "Meadow" orchards which are very interesting. Dr. Luckwill, who has carried on most of this research, was on hand to explain the various growing steps necessary for high production. Growth regulators, such as "Alar" and ethrel, are used to give growth control and flower induction. He stressed the fact that to get maximum yield from the "Meadow" system it is so important to have the right rootstock and the right cultivar. Some of the cultivars do not respond at all to "Meadow" plantings because they are not precocious. 'Cox' and 'Golden Delicious' do well in this respect. The rootstocks M. 26 and MM 106 are used because of their precocity influence.

Since this was the day that Dr. Luckwill retired, he was presented with the International Dwarf Fruit Tree Association's Award and also given a copy of the Association's publication, COMPACT FRUIT TREE, Volume 11. This presentation appropriately took place near the "Meadow" orchards.

We, also, had a chance to see Dr. Campbell's work with developing precocious, spur-type and dwarfing cultivars by way of irradiation. To date, he has come up with a few mutations which are definitely smaller in shape and precocious. If the fruit from these are of adequate size, color and production, they may be of commercial value. The visit to Long Ashton was very interesting and educational to the entire group.

Maclean "Pillar" Orchard - At the Maclean Orchard at Abingdon, we saw the "Pillar" system, which has been used for 30 years on this particular farm. Mr. Maclean was there and adequately described the "Pillar" method of tree training. This is a different system from the spindle type in that most of the fruiting wood is cut out every year and new one- and two-year old wood is left for fruiting in succeeding years. In other words, there is a three year branch rotation that must be adhered to in order to keep annual production on two- and three-year old wood. The "Pillar" system may be an orchard system that an over-the-row mechanical harvester could be adapted to because the trees are kept narrow with a sturdy horizontal branch structure that could be developed parallel or perpendicular to the row direction.

NOTES AND QUOTES

From Japan, we learn that in 15-year old trees the tree crown size and quantity in yield can be estimated to some degree of accuracy by tree circumference. And, after the conformation of a well-trained hedge row, tree vigor is stabilized by such dwarfing treatments as: withholding nitrogen, bark inversion and summer pruning.

In the Akita prefecture, the fungus Alternaria Mai has been infectious on 'Golden Delicious' and on 'Starking Delicious' causing a russeting appearance of black and brown spots and later turning into radial, shallow surface cracks. The infection period is from petal fall to 30 days later. No satisfactory control was reported.

BARK INVERSION

Bark inversion - what is it? As the words say, it is inverted bark but where, when and why are the questions and facts which must be known before doing, or the results may be dead trees. The best time to try the bark inversion graft is in the spring when the bark is slipping. Like "scoring", it could be done up to two weeks after petal fall. The bark must be slipping. Either the trunk or a branch can be bark inversed.

A narrow ring (1/4 to 1 inch wide) of bark is carefully removed from the trunk, inverted and put back in the same place, but in up-side-down position. It should be immediately tied with a string or wrapped fairly tightly with plastic strips or cloth to hold it in place until a new union has been established. One vertical cut is made after the two horizontal cuts in order to open and remove the ring.

Bark inversion is a temporary (two to five years) measure to induce early bearing, slow down growth and give more continuous cropping. Bark inversion should be used only on vigorous trees which may have scion rooted or may be on a vigorous rootstock or seedling. For a start, try this technique on a tree or two, knowing that if your ring graft does not take, the tree may not survive.

CULTIVAR CORNER

The 'Spartlet' pear was released in Michigan in 1973. It appeared in a grower's orchard as a single tree, a shoot originating from a seedling rootstock. Second generation testing clearly proved that 'Spartlet' had certain qualities needed in a pear, such as: large fruit size, long shelf life, good culinary and processing qualities when properly after-ripened, and strong tree form with spreading branches. It is not resistant to fire blight, but responds well to fire blight prevention treatments. Harvest season of 'Spartlet' depends on its use so it can vary from September 1 to 20. Post-harvest studies of 'Spartlet' are in progress at Michigan State University. In addition to good size, the fruit also develops a scarlet blush on the exposed side so that an attractive tray pack can be made for fresh market outlets.

BACK VOLUMES

Back volumes of the International Dwarf Fruit Tree Association's publication, COMPACT FRUIT TREE, are available from 303 Horticulture, Michigan State University, East Lansing, MI 48824. Volumes 7, 8, and 9 at $2.00 each; Volume 10 at $5.00 each and Volume 11 at $10.00 each.

MEETING SEASON

A few meeting sites -

November 15 - 17, 1978 - Arkansas Horticultural Society Meeting, Fayetteville, Arkansas
December 4 - 7, 1978 - Michigan Horticultural Society Meeting, Pantlind Hotel, Grand Rapids, Michigan
January 31 - February 2, 1979 - Michigan Nurserymen Association Meeting, Pantlind Hotel, Grand Rapids, Michigan
February 6 - 8, 1979 - State Horticultural Association of Pennsylvania Meeting, Hershey Motor Lodge, Hershey, Pennsylvania
February 28 - March 2, 1979 - International Dwarf Fruit Tree Association Meeting, Pantlind Hotel, Grand Rapids, Michigan

Support your State, National and International Associations.

MORE ABOUT 'MUTSU'

"Here in Pennsylvania, longitudinal growth cracks in the bark on the trunk and central leader are common. This condition seems more pronounced when Mutsu is growing on MM 106 and M. 26 rootstocks. I do not have any evidence that these growth cracks are a detriment to either the production or longevity of the trees. They do cause questions by growers. The bacterial fruit epidermis disorder is very common in Pennsylvania on Mutsu. Actually, the common name of "blister spot" is applied to the disease, rather than bacterial spot. The causal organism is Pseudomonas populans." ...Donald H. Petersen, Specialist, Plant Pathology Extension, Pennsylvania State Univ.

STABILITY OF MUTANTS

"Genetical instability is not limited to genotypes resulting from the generative process. Spontaneous or induced mutations also are often far from stable. Spur types are notorious in this respect, and certain skin colour mutants are also known to revert frequently to the original type. Several causes for this instability can be envisaged. The most plausible hypothesis is that the mutation in question is limited to cells of the outer mantle layer, and that the mutated cells are less vigourous than the normal ones. The latter could then rather easily invade the outer mantle layer and push aside the weaker mutated cells." ...J. Doorenbos, Department of Horticulture, Agricultural University, Wageningen, The Netherlands.