Department of Horticulture

MICHIGAN STATE UNIVERSITY

COMPACT FRUIT TREE

DWARF FRUIT TREE ASSOCIATION

Rootstock Behavior
Spur Types
Induced Dwarfing
Cultural Practices

Vol. 2 No. 10 October, 1966 Edited by: R. F. Carlson

SUNCLING PEACH SEED

Research on germination of peach seed for improved rootstocks has been in progress at MSU for over four years. One of the purposes of this project is to develop a seed source which will give high germination and uniform stand in the nursery row. In addition, the seedling from such source should be totally compatible with both free- and cling-stone peach varieties. And also, the seedling should have a good root system and adaptable to a wide range of soil types. In one test, seed germination of Suncling was compared to seed of Ambergem and Rutgers Red Leaved. Tests in the greenhouse and in the field produced up to 95 percent germination and a seedling stand in the nursery of similar percentage from the Suncling seed.

In addition, detailed studies in the greenhouse and in the nursery also showed that Suncling seed requires a shorter after-ripening period (stratification) than other peach seed. This in itself adds to the total germination since some peach seed will require up to 2 or more years for all the seed to germinate.

Pits of the above varieties planted in the nursery in November, 1965 produced the following seedling stand in the spring of 1966: Ambergem, 28 percent; Rutgers Red Leaved, 47 percent; and Suncling, 94 percent. The actual cause of this difference in germination is not yet known, but it may be due to: 1. less virus in Suncling, 2. seed abortion in some varieties and 3. difference in stratification requirement of each variety.

The seedlings of Suncling were uniform in vigor and size and had a well branched spreading root system. The size of Suncling seedlings was double that of other seedling varieties tested. It, thus, has the characteristics and potential of being a superior rootstock for peach varieties.

Provisions for collecting pits of Suncling from uniform trees need to be established. Until nurserymen establish their own seed trees of Suncling, some method of saving Suncling seed from processing plants should be developed.

A field evaluation study using Suncling and other peach seedlings as rootstocks was initiated in the Fennville area in 1965. This orchard will produce same data as to scion compatibility and orchard performance of Suncling seedlings as rootstocks for commercial peach production in Michigan....R. F. Carlson

PEAR REPORT FROM ENGLAND

Tony Preston of East Malling Research Station, Kent, England, visited Michigan in August. While here he was the guest speaker at the Pear Meeting at Hart.

Pear varieties of commercial importance in England are Williams (same as Bartlett), Doyenne Du Comice, Conference and Beurre Hardy. In general, pear trees are planted quite close together, 15 x 12 feet with provision for later thinning, if needed. The culture is clean-cultivation when the trees are first planted and later sod with herbicide weed control in the row.

The Quince A is often used as a rootstock with compatible varieties. Where the varieties are not compatible with Quince A, the Beurre Hardy is used as an intermediate stem section.

Pear pruning is probably more controlled in the English orchard than in U.S.A. Probably the reason for this is that they do not have to contend with fire blight. Tony Preston explained some of their pruning systems.

1. The established-spur system which as the words describe maintain as many of the fruiting spurs as possible per unit of branch close to the main framework. The tree frame is bush-like with this system forming an open center.

2. The renewal system is also open center type. However, older branches are also cut back to form a succession of more vigorous wood. The tree branches are more horizontal to the point of weeping or arching.

3. The regulated pruning system is an annually controlled or branch selective system whereby the central leader is not maintained. Lateral branches are not shortened, but thin and weak branches are removed.

Comparative yields of these systems for 5- and 9-year periods are shown in the table below.

Total Weight in Pounds of Fruit Per Tree of Comice

Age	Established-spur	Renewal	Regulated	Unpruned
5 years	3	11	15	23
9 years	98	136	162	155

The informative program including Tony Preston's talk was attended by some 300 persons.

PRUNING TRIAL FROM HOLLAND

Studies of four different tree-shapes were performed on Golden Delicious and Cox Orange Pippin on EM IX and II rootstocks. These tree-shape forms were: 1) spindle bush, 2) flat spindle bush, 3) tree hedge and 4) regulated hedge. The following table shows yields produced by these different systems.

Variety: Golden Delicious - Total 1957-1963[1]

Variety Rootstock	Pruning Forms or Tree-Shapes	No. Trees Per Acre	Fruit Yield (lbs) Per tree	Per acre
Golden Delicious/EM IX	Spindle bush	506	165	93490
	Flat spindle bush	510	157	90070
	Tree hedge	1024	97	99328
	Regulated hedge	600	162	97200
Golden Delicious/EM II	Spindle bush	270	183	49410
	Flat spindle bush	260	200	52000
	Tree hedge	260	288	74880
	Regulated hedge	290	282	81780

[1] From Jaarverslag fruit journal, 1963. Data converted from hectars to acres and from kilograms to pounds, respectively.

Summary of results show that the yields of Golden Delicious were higher under the hedge system. However, fruit size and quality was better from the spindle bush system of training, according to the authors A. J. Werlheim and G. Toorenaar, Wilhelminadorp.

NITROGEN NUTRITION

In a nutrition study, the Dutch research men found that nitrogen applied to Golden Delicious/EM IX either in November, December, March or in April gave variable yields. They concluded that on a clay soil with grass cover nitrate or ammonia nitrogen should be applied in December. When applied as late as February, maximum benefits from nitrogen were not obtained.

INTERNATIONAL OPEN-HOUSE - 1966

During August 22-24, visitors from sixteen countries visited research activities in the Department of Horticulture, Michigan State University at East Lansing, Michigan. Out of 106 visitors, 28 were from Russia. A detailed program was planned for all the visitors allowing time for individual visitation with the Horticultural faculty. A full day was spent in visiting some of the Michigan fruit areas including stops at Hartford, Grand Junction, Sparta and the Graham Station.

Visits by our counterparts from other countries is an invaluable experience and opportunity to gain more knowledge, to develop mutual understanding and to make life-long friends. Each year the world gets smaller and it is up to all of us to make the most of this chance to work, advance and communicate thoughts and ideas for close and friendly harmony. Yesteryear, our neighbors were Ohio, Indiana, Wisconsin, etc., today, our neighbors also are England, Iran, Russia, Japan, etc.

ANNUAL HORTICULTURAL MEETINGS

December 6-8, 1966. Michigan State Horticultural Society, Pantland Hotel, Grand Rapids. This is one of the country's biggest fruit shows and program. Make your plans now to attend.

February 18-22, 1967. National Peach Council, Wichita, Kansas. Here is a chance to keep informed on peach production problems and solutions.

March 13 and 14, 1967. Tenth Annual Conference of the Dwarf Fruit Tree Association, Holiday Inn, Benton Harbor, Michigan. An excellent program is being planned. Best way to keep up-to-date and informed is to attend local, state and regional meetings. He who learns from all men is best informed.

Suggestions as to type of program and guest speakers should be mailed to Room 303 Horticulture, MSU, East Lansing, Michigan, before December 1, 1966. Let us hear from you and work toward a superb Tenth Annual Conference.

TREE FRUIT BREEDING IN SWEDEN

The Balsgard Research Station under the direction of Dr. Nils Nybom has a very active breeding program as well as mutation studies of fruit trees. Although, most emphasis is toward improved dessert fruit quality, processing sorts are also getting attention.

In apple, several crosses including American varieties such as Golden Delicious and Cortland for winter apples and Red Melba for early fall apples are included. Several of these now are tested under BM-(Balsgard) numbers.

Similarily, several hybrids of pears including Williams (Bartlett) are now tested under BP-numbers.

In cherries some of the objectives aimed toward are disease resistance and fruit which will shake easily from the tree.

Rootstocks for fruit trees are also being developed with major emphasis on cold resistance. No doubt, some interesting fruit varieties and rootstocks will come from the Balsgard Station in the future.

MSU HORTICULTURIST RECEIVES AWARD

Dr. Robert F. Carlson, of the Department of Horticulture, received the Stark Award of the American Society for Horticultural Science for 1966, at the annual meeting of the Society at the University of Maryland in August, 1966. This award is presented annually "for research on improving the quality, performance, and longevity of fruit trees." Dr. Carlson won the award for a research paper that he had presented at the 1965 meeting of the Society, entitled, "The Effects and Relationships of Intermediate Stem Sections on Growth and Behavior of Apple Cultivars." He is one of the outstanding authorities in the country on the use of interstems and rootstocks for controlling the size of fruit trees....G. M. Kessler

TREE HEIGHT AND PICKING

Tree height and yield are important orchard characteristics affecting the picker's productivity. The observed picking rate for trees on standard root stock was 9.6 bushels per hour versus 11.3 for dwarf and semi-dwarf trees. When trees were grouped by height, the picking rate was 11.5 bushels per hour for trees 8 feet or less in height, 10.2 bushels per hour when tree height was 9 to 13 feet, 10.2 bushels per hour for trees in the 14 to 18 foot category and 9.1 bushels per hour when trees were more than 18 feet high....From: 1965 Apple Picking Productivity Study

READER RESPONSE TO SEEPAGE AT GRAFT UNION

In the recent issue of the Compact Tree Fruit Newsletter, you wrote about a graft-union seepage. I have seen some of this in the young plantings in Arkansas to which you refer (Vol. 2, No. 9, July, 1966).

I am reasonably convinced that this is only a borer problem. Although I did not take extensive note of summer seepage in 1965 and apparent borer damage by winter of 1965, I think that this might well be correlated. This past winter I read a little about the flat headed borer. In Fernald and Shepherd Entomology Book it states that following an attack by young larva borer there may be an outpouring of sap at the wound. This may eventually kill the larva. In many of the trees attacked by borers, there were more than one larva present and this could account for considerable seepage. If the larva were drowned out by the sap, the evidence of the seepage would remain as a blackish smudge on the union and stock but new growth would obliterate the abortive infestation by borers. Since eggs are laid in fine cracks around the union of stock and scion, it appears that this is a natural point of entry for the larva....Roy C. Rom, University of Arkansas

PICKING AIDS

A picking aid is anything that will increase the picker's efficiency. Depending on orchard conditions and crop density it has been determined that only 50-70 percent of the workers' time is devoted to actual picking. The remainder is consumed in

ladder placement, climbing, emptying bags, etc. If the amount of time required in non-picking activities can be reduced, harvest efficiency can be increased.

Mobile orchard towers have been evaluated as picking aids. Several types are available, some self-powered, other drawn behind a tractor. Various devices and conveyor systems have been added to transport fruit from the picker to the field container. While in theory it would seem that a 30 percent increase in picker efficiency could be obtained, in practice this figure is probably unattainable. A maximum potential increase of 15 to 20 percent is more realistic since even with mobile orchard towers time is required to position the equipment and to replace field containers. The picker must operate the unit independently because if another worker becomes involved the person picking the fruit must harvest enough to compensate for both men.

Mobile orchard towers fitted with conveyors conservatively cost from $2,000 to $4,000 per unit in order to aid one or possibly two workers. These units would have a relatively short period of usefulness even though they may have application in pruning and thinning. For these reasons, mobile orchard towers do not offer sufficient potential to justify the high capital investment.

In an attempt to reduce this cost per man, systems have been conceived where several men would work off of a large unit fitted with conveyors, bulk bin fillers, et. Thus far, such systems still involve a high investment per man, but offer no greater potential for increasing the average efficiency of the total crew over single man units.

A very real problem associated with mechanization is that when the worker is supplied with more sophisticated equipment he must be more highly trained to effectively use the equipment. Such persons are not commonly found available to work in the harvesting operation.

In summarizing the potentials for increasing harvest efficiency through increased mechanization, the picture is not bright. The more elaborate picking aids are too costly and too limited in their potential to be economically practical. They have been described as fancy and expensive ladders. "Picking heads" thus far conceived are also far too costly for the limited potential they offer. Part of the problem in developing harvesting equipment is that conventional methods are not inefficient. Apple harvest costs represent less than 25 percent of the value of the crop, whereas in contrast cherry harvest costs represent about 75 percent of the value of the crop. The greater the potential savings the greater the opportunity to develop economically practical equipment. At the present, the mass removal of fruit does offer some economic promise for processing apples if the bruising associated with such techniques could be reduced....H. A. Rollins, Jr., et. al., V.P.I., Blacksburg, Virginia

HIGH CONCENTRATE SPRAY APPLICATIONS

During the 1965 and 1966 growing seasons, a study was made to compare the effectiveness of highly concentrated spray mixtures with those of the conventional form of 2x application. The evaluation was made on large bearing apple trees 20 feet in height and on smaller trees with dwarfing type rootstocks no more than 14 feet in height. In 1965, the study was started two weeks after bloom, while in 1966, the evaluation was initiated at the time of late Green Tip approximately three weeks before bloom.

The highly concentrated mixtures were applied in every case using a Marlow Econ-O-Mist sprayer, in 1965 using 33x mixture applying 1/33 gallonage, and in 1966 using 40x mixture applying 1/40 gallon. In 1966, the rate of travel while spraying the large trees was 2 m.p.h. and increased to 2½ m.p.h. when spraying those on dwarfing stocks. The control applications were made as a model 275 Bean Speed Sprayer

using 2x concentration and ½ gallon. The rate of travel was 2 m.p.h. when spraying the large trees and 3 m.p.h. when spraying those on dwarfing stocks.

The pesticides used in every case were those in the 1965 and 1966 Fruit Spraying Calendar for use on apples and included liquid lime sulfur, cyprex (dodine), glyodin, ferbam, guthion, lead arsenate, parathion, tedion, and kelthane.

In 1965, spray injury was encountered on McIntosh fruits in the lower portion of the trees from applications made late in July and August. This was corrected, however, in 1966 by reducing the amount of material dispersed in the lower portion of the tree and increasing the amount applied in the tops.

Insect, mite and disease control was excellent in both years. Studies will be continued in 1967 using the same group of pesticides. However, the rate of travel will be at least 3 m.p.h. for all concentrations of pesticides when spraying trees 12 to 14 feet high....A. E. Mitchell

FRUIT AREAS OF EUROPE REMAIN COMPETITIVE

Every fruit area of the world has some feature which permits it to exist and to survive competition. But in each area, human beings are much alike. For example, the First Ferrara Biennial Fruit Congress recommended a program that sounds much like those heard in Michigan, namely: (1) reduce cost of production, (2) improve quality of crops, (3) extend consumption by means of publicity and advertising.

Growers first of all apply their abilities to production and its problems, and sooner or later to cope with them. Thus, the virus-infested regions develop potent virus research and learn to live with, if not to control, what would otherwise be their downfall. This is Scotland and the small fruit industry. Northern Continental Europe with heavy soils, relatively cool summers, and color development turns to the plum, the grape, the sweet cherry, the pear, and the apple. Belgium, with mild winters and low heating costs, finds profit in hot-house grapes and peaches for nearby luxury comsumption. Northern France, still needing more natural sunshine, grows fruit on elaborate trellises or on walls with southern exposure. Southern France and Italy, where the growing season is long and where good color develops, turn to dessert apples and the peach.

Of interest in Russia, where first things come first and where calories and common consumer goods take precedence over interesting variety and luxury items, food production is at low ebb, and Russia yearns for an economy that will permit an expansion of fruit growing or imports from abroad. Fruit production in the USSR amounted to only 6,590 thousand tons in 1962 as compared to 16,851 in the USA.

Dr. H. B. Tukey