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Orchard Day

August 18, 1955



Results of Fruit Research

Department of Horticulture
Ohio Agricultural Experiment Station

Horticultural Mimeograph Series No. 156

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STORING PEACHES

Donald Comin

Five years results with storing peaches reveals that in general it is unsafe to store this fruit much beyond two weeks. There are two important factors requiring close attention when storing this crop, i.e., harvest maturity and holding temperature. The riper the fruit the better the quality on removal from storage. However, fruit too ripe will be soft and subject to bruising and at the same time have a shorter useful life than less mature fruit. It appears that firm ripe peaches will last longest in storage and on ripening at room temperature will be of good to excellent quality. Firm ripe is judged to be that stage of maturity which would require not more than seven days to reach tree ripe condition if left on the tree.

Regarding the temperature of storage, any temperature may be used if the storage is for only a few days, Table 1. However, it is now known that the respiration (metabolism) of the fruit is not normal below 55° or 60°F. and the time factor thus becomes very important, Table 1. This rapid reduction in flavor and texture is due to a rapid loss of acid. This loss is very rapid at 40°F., less rapid at 50°F. and still slower at 32°F. and below. Also, peaches ripen (soften) very slowly or not at all at 40°F. and below and thus must be ripened at room temperature before they are suitable for eating or processing. For the longest possible keeping the cooling of peaches should not stop at 50° or 40°, but should continue on down to 32°F. This is because peaches retain the ability to ripen normally when removed to room temperature for a longer period of time when stored at 32°F. than at any higher temperature, Table 1.

TABLE 1. SUGGESTED RANGE IN STORAGE PERIOD IN DAYS OF FIRM RIPE HALEHAVEN AND ELBERTA PEACHES.

Storage Temperature, °F.				
77°	62°	52°	42°	32°
		Halchaven		
4-5	6-12	7-12	7-8	13-21
		Elberta		
3-8	5-9	8-15	10-12	9-19

TRENDS IN STORAGES

Donald Comin

A few new refrigerated storages are erected each year in the state. For many years the loose fill type of insulation was popular and the number one problem was properly installing an adequate vapor seal to maintain the insulation in a dry condition. Although this is still a good type of construction, the trend seems to be towards insulation materials that require no vapor seals, that is, are impervious to moisture themselves. Two reasonably priced materials are aluminum foils and plastic boards. The aluminum foil is available in pre-fabricated form of several layers which are easily installed by inexperienced labor by tacking the flanges to the inside or edges of the studs or joists. The use of heavy (thick) material and tight sealing,

with lath strips or adhesive tape is quite essential to success with this material. It is subject to deterioration when in contact with several metals other than aluminum or with alkaline materials. It is very inexpensive per unit of thermal resistance installed.

The newer plastic insulations in board form are vapor proof, inert and may be installed by inexperienced labor with cement mortar. The mortar is applied easily with a push box. In the field of refrigeration the trend is towards large air-cooled condensers installed out in the open some distance from the compressors. This is new to large compressor sizes, but has proved quite satisfactory and inexpensive.

In evaporator or cooling coils in the storage room manufacturers now offer double tube systems, one tube used for defrost liquid or gas. This means fast defrost with this internal heat. The trend is still towards large coils with multi-outlet expansion valves, low air velocity, and a narrow temperature difference between coil and return air temperature.

GRAPE VARIETIES

J. M. Beattie

One phase of the grape research program includes the testing of new and promising varieties both for commercial and home garden use. At the present, about 70 varieties are included in the grape variety planting. Many of these are the American bunch type grape, but also included are some of the French hybrids and hybrids between the European and American species. The planting is maintained to provide information relative to growth, vigor, hardiness, productivity, and quality of the fruit when grown under Ohio conditions. At the present time, those varieties which are of primary commercial importance are Concord, Catawba, Fredonia, Delaware, and Niagara. There are limited plantings of certain special purpose varieties such as Ives and certain of the Seibel selections in the wine grape sections of the state.

In addition to the above varieties, certain varieties because of quality, date of ripening, or other factors are worthy of trial in the home garden. These are listed below in order of ripening at Wooster:

Interlaken Seedless - A hybrid between the European and American species. Berries medium in size, clusters large and attractive, fruit yellow-green in color and seedless. Fruit quality excellent. This variety ripens at Wooster about August 28th. Vines moderately productive.

Captivator - An American bunch type grape of very good quality. Berries medium in size, clusters medium size, fruit red. The vines are moderately productive. Ripens at Wooster about September 10th.

Caco - Another red bunch type grape of very good quality. This variety has been very productive in our tests. Berries are large and the bunches compact and attractive. Ripens about with Concord.

Golden Muscat - A green-yellow grape of the European type. Berries are very large and borne in large clusters. The variety is moderately productive. At full maturity the quality of the fruit is excellent. The variety does require a longer growing season than Concord, and because of the late maturation of the wood, may kill back in severe winters.

GRAPE SOIL MANAGEMENT AND FERTILIZATION

J. M. Beattie

For the past nine years an experiment comparing cultivation plus overwintering cover crops with permanent straw mulch has been conducted on Delaware and Concord grapes. During that period approximately 60 tons per acre of straw has been applied. This has been sufficient to maintain a layer of straw about 8-10 inches in depth and has suppressed nearly all weed growth. In the cultivated plots rye was sown in late August and disc'd down the following spring, the plots receiving several trashy cultivations during the growing season. In addition to the different soil management practices described above, two rates of nitrogen fertilization were compared with plots receiving no nitrogen fertilizer. Over the entire period of the experiment the mulch system of management has proven superior for the Concord variety but not for Delaware. With Concord the mulched plots have produced on the average about 1.3 tons per acre more grapes than cultivated plots. In the case of Delaware the cultivated vines which received 80 lbs. per acre of nitrogen per year have produced the highest yields. For the first seven years mulched vines of Concord which received 40 lbs. per acre of nitrogen per year produced highest yields. In the past two seasons, however, the mulch-no nitrogen plots have produced the highest yields. This indicates that at the present time enough nitrogen is being released either by leaching or from decomposed straw to satisfy the nitrogen requirement of these very vigorous Concord vines.

Because of the high vigor, improved yields, and ease of handling, the mulch system of soil management for Concord grapes is strongly recommended for home gardeners with a relatively few vines and for commercial growers who are able to obtain mulching material at low cost and in sufficient quantity. For the Delaware variety, the cultivation plus cover crop system plus nitrogen fertilization at 80 lbs. per acre per year is recommended.

NITROGEN FERTILIZERS FOR APPLE TREES

J. M. Beattie

Since 1948, Orchard J has been used to determine the effect of differential fertilization of the growth, yield, and fruit quality of Baldwin and Stayman Winesap apples. Four treatments were originated in the spring of 1948 and were reversed in 1952 to determine if heavy annual applications of nitrogen were helpful in overcoming biennial bearing. Following this reversal, poor crops were produced by all treatments until 1954. Foliage nitrogen in June, July, and August, shoot growth, and fruit size in 1954 increased with increasing rates of nitrogen application. The percentage of well colored fruit decreased as the nitrogen rate increased. Highest yields of Baldwin were obtained with the $1\frac{1}{2}$ normal nitrogen application and with

Stayman with $\frac{1}{2}$ normal nitrogen. The yield data show that the effect of nitrogen treatment prior to 1952 on fruit bud formation and fruit set has not been overcome by 1954. The effect of nitrogen treatment prior to 1952 on vegetative response has been completely overcome after three years of treatment reversal, however. Data on foliage contents of potassium and magnesium show that as the nitrogen supply increased, foliage nitrogen and magnesium increased while foliage potassium decreased. The potassium content of the foliage was positively related to the sugar content of the fruit while nitrogen and magnesium in the foliage was inversely related to the sugar content of the fruit.

Early season fruit counts on these trees in 1955 seem to indicate that this year the high nitrogen Baldwin trees will produce a heavy crop of fruit following a good crop in 1954 while trees of other treatments will produce light crops.

COLORSET ON GOLDEN DELICIOUS AND GRIMES

C. W. Ellenwood

The pre-harvest spray known as Colorset (2-4-5 T.P.) used at 10 p.p.m. on yellow varieties like Grimes and Golden Delicious, tends to intensify and hastens coloring, especially the yellow ground coloring. When the material is applied 7 to 10 days ahead of normal picking times, color changes are noticeable within 5 days. Windfalls are reduced. But, probably the greatest influence of the material is manifested in color changes.

This early coloring is associated with the softening and ripening of the fruit. Quality is apparently not adversely affected. The use of this material on Grimes and Golden Delicious may be advantageous where the fruit is to be marketed early, especially for roadside or local sales rooms. It should be kept in mind that the early coloring is associated with pre-mature ripening and that the storage life may be shortened.

PLANTING DISTANCE INFLUENCE ON YIELD OF APPLES

C. W. Ellenwood

The original planting arrangement for Orchard K set in 1922 was as follows:

Permanent rows 38 feet apart, trees 40 feet apart in rows. Filler and semi-filler trees were planted so that the original planting consisted of 435 trees (4.2 acres) set 20' x 19'. At the end of 10 years the first set of filler trees were removed so that the planting was 20' x 38'. This left a total of 232 trees. At the end of 15 years the second lot of filler trees were removed so that the remaining 120 trees stood 40' x 38' on the 4.2 acres. Yield records in this orchard were modified by spring frost injury to the flowers and fruit several years during each of the five year periods.

From the 6 to 10th years the average production per acre from the 435 trees was 76.1 bushels. From the 11th to 15th years 232 trees produced an average of 244.8 bushels per acre. From the 16th to 20th years 120 trees produced 237.2 bushels per acre and from 26 to 30 years the average acre production was 213.6 bushels per acre. The varieties were Jonathan and Stayman.

The average acre yields in this orchard were low due, as previously pointed out, to frost damage. It was significant though that total production per acre tended to decline after the second set of fillers were removed. This points up the fact that maximum acre yields require that trees be planted closer than 40' x 38'.

HARVEST DATES FOR APPLES

C. W. Ellenwood

The average date of full bloom for apples at Wooster (1955) was approximately 10 days ahead of the long time average. The development of fruit has continued at least a week ahead of the average until late July. Cherries and other early ripening fruits ripened well ahead of normal. Early apples have had "first" picking dates about 10 days earlier than the average. This condition may continue into the early ripening winter apples. On the other hand, cool weather through August and September would tend to delay ripening and the late maturing apple varieties may have average harvest dates.

Growers this year should give attention to all practical indices of maturity such as ground color changes, ease of separation of stem from spur, lapse of time from full bloom dates and, if possible, pressure tests. The average lapse of time between full bloom and date of harvest at Wooster has been: McIntosh, 132 days; Grimes, 147; Jonathan, 151; Delicious, 153; Baldwin, 161; Golden Delicious, 163; Rome Beauty, 167; and Stayman Winesap, 168.

Local and seasonal conditions will change the sequence of ripening suggested by the above figures. In some seasons for instance, Jonathan have been harvested preceding Grimes. The use of hormone sprays to prevent pre-mature dropping may also modify harvest dates. Ohio apple growers are urged to be alert to indications of pre-mature ripening this year. However, it should be emphasized that harvesting too early will result in off-quality fruit and may also induce storage difficulties.

SUMMER VARIETIES OF APPLES

C. W. Ellenwood

The consumer demand for early apples in recent past years suggests a reasonable amount of planting of some of the early sorts is warranted.

There is considerable interest in the home processing of early varieties. This is true both for canning and freezing.

Yellow Transparent is especially popular for home use. Transparent bears early and is productive, but tends toward alternate bearing unless rigidly thinned. Elgetol at the rate of 1 pint per 100 gallons or the equivalent amount of dry Dinitro thinning compounds applied in full bloom will help to make Transparent and Lodi annual in production.

Lodi is similar to Transparent in general characteristics but larger and a week later. It is a good culinary apple but perhaps not quite as good as Transparent. Lodi will frequently sell for a higher price than Transparent.

Melba ripens two weeks later than Transparent. This variety is very high in quality for both dessert and culinary purposes. It is a tender fleshed variety

and its marketability is restricted to roadside or local delivery. Melba is gaining in popularity where it has been properly introduced to the consumers. The spicy McIntosh like flavor of the raw fruit is transmitted into the cooked product. Red Melba is to all intents and purposes merely a highly colored Melba. Gravenstein is an old variety which has been somewhat neglected in Ohio. It is an excellent cooking apple and for those who like a firm fleshed, juicy, rather acid apple, it is acceptable for eating out of hand.

Wrixparent is a yellow variety ripening just ahead of Transparent. At Wooster, it seems to be less valuable than Transparent even though it has good culinary qualities.

Close is a U.S.D.A. product similar to Transparent except that the over-coloring is red.

Oldenburg (Duchess) is not recommended for planting. Early Red B rd has not proven well adapted and is certainly less valuable than the other varieties suggested here.

PRE-HARVEST SPRAYING FOR BALDWIN

C. W. Ellenwood

Baldwin has been one of the winter apple varieties which has not responded too well to the use of pre-harvest sprays to prevent dropping.

In 1954 the Station tested two materials in a limited way on this variety. Due to seasonal growing conditions the unsprayed trees did not drop their fruits as seriously as has been true some years. The check trees showed total windfalls of 10.9 percent while the trees sprayed with App-L-Set (10 p.p.m., NAA) 5.1 percent and the Colorset, (15 p.p.m. 2-4-5 T.P.) 4.7 percent. The trees sprayed 10 days prior to harvest dropped slightly less than those sprayed 18 days before harvest. It is not suggested that these sprays will in all cases reduce the pre-harvest drop on Baldwin in the ratio here reported. They are at least suggested for trial.

PEACH INVESTIGATIONS

R. G. Hill, Jr.

There are three phases of the peach investigations. The first phase is designed to determine the cultural and fertilizer practices to be followed on sites where soil erosion necessitates the growing of trees in sod. The second phase deals with the evaluation of promising new varieties and selections. The third phase is concerned with the use of chemicals for fruit thinning.

The 1951 orchard located just to the north of the plum orchard is being used in connection with the first phase of these studies. The orchard consists entirely of trees of the Halehaven variety. Some trees in this orchard are growing under the conventional soil practice of cultivation plus cover crops with normal nitrogen applications. Other trees are growing in bluegrass sod which is mowed several times during the growing season with the clippings being allowed to remain on the orchard floor. Some of these trees receive the same amount of nitrogen each as the cultivated trees, while others receive two and three times that amount. Cer-

tain trees in the orchard are grown under mulch. Some of these trees are fertilized in the same way as the cultivated trees while others receive twice the amount. For the purposes of these studies, the normal rate of nitrogen fertilization is considered as $\frac{1}{4}$ pound of 16 per cent nitrogen carrier per year of tree age or the equivalent. The effect of these different treatments upon the growth and yield is being compared. The effect of the different soil management practices upon soil moisture is being determined by Bouyoucus moisture blocks. Results of previous seasons indicate that when there is sufficient rainfall (15-20 inches) during the growing season May-September, trees growing in sod and receiving twice the normal amount of nitrogen will compare favorably with trees with the normal amount of nitrogen and standard cultural practices.

The peach block located just west of the vineyard contains 43 peach varieties and selections. These include such standard types as Elberta as well as some of the newer varieties such as Ranger. These trees are being carefully evaluated as to growth and yield characteristics. Among the newer varieties which show promise are Fairhaven, Sunhigh, and Red Skin.

The emphasis in chemical thinning work has been on the fruit thinning sprays rather than on blossom thinning sprays. Different concentrations of NAA (Naphthalene-acetate), NAM (Naphthacetamide) and Chloro IPC (Isopropyl N-(3 Chlorophenyl)Carbamate) have been used 30 days after full bloom. Results to date have been erratic. The most promising sprays have been 20-30 ppm NAA, 80-100 ppm NAM and 300 ppm Chloro IPC. None of these sprays can be relied upon to do a complete thinning job. They can, however, be expected to greatly reduce the labor required to properly thin an orchard.

THE BLUEBERRY PLANTING

R. G. Hill, Jr.

The blueberry planting, which is located west of the storage, is maintained as a source of information which will assist commercial growers and home gardeners in the production of blueberries on upland soils. Four different soil management practices are being followed in this planting: clean cultivation, straw mulch, peat moss mulch and sawdust mulch. Each year the growth and yield responses of the plants to these soil management practices are determined. Results to date indicate that any mulch system of soil management is superior to cultivation for the blueberry. Through the use of mulch, markedly greater yields and larger berries have been obtained. Of the materials used for mulch, sawdust has proven the best.

Another phase of the blueberry work has been concerned with methods for correcting blueberry chlorosis, a yellow condition of the leaves associated with iron deficiency; common with the blueberry grown on upland soils. The use of newly developed chelated iron compounds has apparently solved this problem. An ounce of this material applied to severely chlorotic plants in 1953 corrected the visual symptoms of this disorder within 30 days. As yet, the plants so treated still exhibit no symptom of this disorder. The effects of these treatments may be noted in plot 27; the individual plants are labelled as to treatment received.

Also included in this blueberry planting is a variety evaluation study. At present there are 21 varieties included for comparison purposes. Included in this list are the new varieties Coville, Dixi, Bluecrop, Earliblue, Herbert, Ivanhoe and

Berkeley. All of the varieties seem to be equally well adapted to Ohio growing conditions. As yet, it is too early to determine the productiveness of the newer varieties just listed. They all, however, produce outstandingly large fruit. Of the older established varieties, June because of its earliness, Jersey because of its productiveness, and Stanley because of its quality, appear to be the most desirable.

STRAWBERRY STUDIES

R. G. Hill, Jr.

There are two phases of work being carried out with strawberries. One phase deals with the evaluation of promising strawberry varieties and selections, while the other is a study of chemical weed control in strawberry plantings.

The planting just to the east of the barn is being used to determine the relative worth, under local growing conditions, of nine promising new selections and nineteen named varieties. The growth, yield, and quality of the new sorts is being compared to that of the commercially popular varieties Premier (Howard 17) and Robinson. The planting is being maintained in such a way as to simulate commercial growing practices. The west half of the planting is being grown under irrigation. Each week during the growing season it is given sufficient supplemental irrigation water so that with natural rainfall it receives one acre inch of water. The east half of the planting is growing without supplemental water. In order to minimize the possibility of contamination of the virus-free plants, the planting is being dusted at 7-10 day intervals to control aphids. The results of this phase of the work serve as a partial basis for variety recommendations to Ohio growers. Included in the planting are three newer varieties, Armore, Empire, and Erie which have exhibited promise as commercial varieties.

The chemical weed control work is being done in the planting just to the south of the barn. The planting consists entirely of virus-free Premier. In the planting SES (CRAG Herbicide No. 1) and the amine salt of 2,4-D are being used for the control of summer weed growth. Data is being obtained as to the effect of these different herbicidal materials upon the growth and yield of the strawberry and upon the labor required to maintain the planting commercially weed free.

Results from previous studies have indicated that SES used at the rate of three pounds per acre was effective in destroying germinating weed seeds and very young seedlings. One pound of the acid equivalent of the amine salt of 2,4-D per acre was effective in destroying vigorously growing broad leaf weed seedlings. If properly used, both materials can effect a real labor savings. At this time, however, because of the number of variables involved, use of chemical weed control procedures in strawberries can not be generally recommended. In any case, chemical weed control procedures should be considered not as a replacement for manual means of weed control, but rather as a supplement to them.

PLUM VARIETIES AND CULTURE

R. G. Hill, Jr.

The plum orchard, located north of the storage, is maintained for two purposes: one to determine the adaptability of various old and new plum varieties to Ohio orchards; and two to compare the value of the two most generally followed soil

management practices used with plums in Ohio--sod and cultivation with cover crops. Those trees which are grown under sod receive twice the nitrogen fertilizer as the trees grown under cultivation with cover crops.

There are 34 varieties represented in this planting. Each year records are taken as to the amount of winter injury, growth characters, time of bloom, time of ripening, yield of fruit, size of fruit and fruit quality. Comparisons are made between the varieties each year on the basis of these factors. Those varieties which have been outstanding in this planting are Stanley, Imperial Epineuse, Bradshaw, Italian Prune, the Shropshire Damson and the French Damson. Japanese type plums have produced some spectacular fruit but have not performed very satisfactorily here.

Satisfactory growth and yields are being obtained from trees grown under both cultural systems. Fruit of the trees in the cultivated area tends to mature somewhat earlier, 1 to 3 days, than similar trees grown in sod. The factor of soil erosion seems to be paramount in determining the cultural system to follow.

GRAPE WEED CONTROL STUDIES

R. G. Hill

Studies conducted over the past several years have indicated that weed growth under the vineyard trellis can be controlled with herbicidal sprays. Through the use of these sprays, this difficult weed problem can be overcome without the hazard inherent with conventional means of control and with a reduced labor requirement.

A spray mixture consisting of dinitro ortho secondary butyl phenol, diesel fuel oil and water offers satisfactory control of such under trellis weed growth. The spray is applied at 50 pounds pressure to swath approximately 3 feet wide directly under the trellis. It consists of 10 gallons of oil, 2 pints of 55 percent dinitro ortho secondary butyl phenol and enough water to make 100 gallons of spray. This mixture was applied at the rate of 100 gallons per acre. It controls most types of weed growth. For effective control, three such sprays are required. The first application should be made in May following the first flush of weed growth when the weeds reach a height of 6-8 inches. The follow-up sprays should be made when the weed growth reappears, a period of three to four weeks normally elapses between repeat treatments. The grape apparently has considerable tolerance to this spray mixture.

These sprays do not offer complete destruction of the weed plants, but rather offer a type of control termed "chemical mowing." With this type of control the competition between the weed plants and the grapes is nullified and yet sufficient growth remains to hold the soil.

It will require a number of years before the actual worth of this program can be evaluated. At present, it appears to be a most satisfactory solution to the under trellis weed problem in the vineyard. Through such a procedure the weeds can be effectively controlled without hazard to grape trunk and roots and with less labor than is required for conventional methods.

A new material, Dalapon, has been used to control vineyard grass during the past two seasons. This material has been applied this year to the two west rows of the vineyard at the rate of 3 lbs. of active ingredient (2,2-dichloropropionic

acid) per acre. It appears to give excellent grass control. Further testing of this material is required before it can be suggested for commercial use. It does not control other types of weed growth.

SEMI-DWARF APPLE TREES IN OHIO

Freeman S. Howlett and T. E. Fowler

Interest in the use of semi-dwarf apple stocks for establishing new orchard plantings in Ohio has increased greatly in the last few years. This has been due in part to the publicity given growth regulating stocks in the popular press as well as results being obtained from Experiment Station trials. Some growers have already established limited acreages on trial, a fact which serves to encourage others to consider semi-dwarf trees in proposed plantings.

Considerable data and experience have now been obtained from the semi-dwarf trees in the Ohio Station orchards planted in 1940, 1941, 1943 and 1944.

The principal results obtained may be briefly summarized as follows:

(a) Growth of the Trees

The difference in size of trees on French Crab and Malling understocks while considerable, is not as great as would have been apparent had the semi-dwarf trees planted in 1940 and 1941 fruited heavily from the first flowering year. The frost injury occurring during 1945, and to some extent during the subsequent two years, permitted greater growth than otherwise. The 1940 and 1941 orchard had alternate rows removed in 1952. The trees of Malling VII are now somewhat smaller than those of Malling II, although the difference depends somewhat upon the variety topworked upon these growth regulating stocks.

(b) Yield

The accumulative total yields per tree of Jonathan and Stayman Winesap upon French Crab and Malling stocks thru the 1954 crop have not been outstandingly different. Jonathan trees on French Crab have produced an average total yield of 3594 pounds as compared with 3643 on Malling I. The trees of Jonathan planted in 1940 on Malling VII have produced an average total yield of 2305 pounds or 36 percent less than those on French Crab. In the case of Stayman Winesap, the trees planted in 1940 on French Crab have produced an average total yield of 4357 pounds while those on Malling II have yielded 3968 pounds or about 9 percent less. Those on Malling VII averaged 3883 pounds or 11 percent less. It is thus evident that in view of the considerably greater number of semi-dwarf trees per acre, the total yield per acre would still be outstandingly in favor of the semi-dwarf trees. Just when the yield per acre would be equalized obviously depends upon the planting distance per tree or number of trees per acre. Possibly, this will be after the 20th year in this planting.

Generally speaking, the trees of Malling VII have developed the most satisfactorily in this planting.

THE FRANKLIN APPLE

Freeman S. Howlett and C. W. Ellenwood

The Franklin Apple proved itself to be extremely popular with student consumers at the Ohio Union on the University Campus in Columbus last November. Outstanding red color had resulted from the thinning out pruning given the trees in the Station orchards from which the fruits were taken. A large proportion of the fruits came from the semi-dwarf trees developed from the various Malling type rootstocks.

Continued experience with Franklin indicates that for attractive fruit color, the trees must be well pruned as the fruits characteristically grow within the interior of the tree. The fruits should be allowed to hang as long as possible. Their best period for sale extends from late October thru November into early December. Not only are the fruits of very high dessert quality, unexcelled for their season, but they also make excellent apple sauce. The variety gives outstanding promise for sale at roadside and farm markets or where the fruits may be offered individually to consumers in restaurants or for counter sales.

STATUS OF INTERMEDIATE (TRUNK-FORMING) STOCKS FOR THE APPLE

Freeman S. Howlett

Fruit growers contemplating the planting of a new orchard naturally are concerned with any advantages which might occur from the use of intermediate stocks in the framework for the desired varieties. Hibernial and, to a very limited degree, Virginia Crab have been utilized for this purpose in a few Middle West apple orchards. Naturally, the hardiness characteristic appeals to those who recall the extent of injury to trees 20 years ago. Furthermore, the wide-angled crotch structure resulting from the use of these varieties has likewise been emphasized as one of the several advantages of intermediate stocks.

Five years ago a young orchard of Jonathan and Gallia Beauty was established on the Mahoning County farm at Canfield. Hibernial, Virginia Crab, Florence Crab, Columbia Crab and fourteen other hardy types or varieties, including several of Russian origin, were utilized for the intermediate framework. The trees have already borne one full crop.

Some preliminary observations may be given as follows:

1. The trees of Jonathan and Gallia Beauty on their own framework are larger than those on any intermediate stock and generally, at present, are better looking trees.
2. Certain combinations of Jonathan and Gallia Beauty with intermediate stocks have already exhibited undesirable growth characteristics. For example, Gallia Beauty on Florence has produced a framework twisted and torn following production of the first crop.
3. Jonathan and Gallia Beauty do not behave similarly on the same intermediate stock, indicating that the various combinations of a variety with stocks must be given trial previous to recommendation for commercial plantings.

4. Hibernial is also tending to show the twisting and bending which has been observed in certain commercial orchards.
5. Generally speaking, all of the varietal combinations have shown distinctly wider crotch angles than those of Jonathan and Gallia Beauty on their own framework.
6. It would appear that, for the present, the prospective purchaser of apple trees is restricted to trees developing on their own framework, provided topworking is to be carried out on the laterals of the intermediate stock.

PRUNING THE NEWLY PLANTED APPLE TREE

Freeman S. Howlett

The training of a young apple tree following planting is an important operation. It is at this time that the number and location of the laterals which make up the primary scaffold framework of the tree are selected. Failure to realize this point may make the difference between a strong tree capable of bearing heavy crops without branch splitting and one which will break down at an early age.

Results obtained from an orchard of Stayman Winesap, Blaxtayman, McIntosh, Delicious and Richared planted in 1941 to study the effect of height of heading the whip and subsequent de-shooting are valuable in suggesting procedures for those growers who are interested in improving tree structure. The more important points are as follows:

1. The conventional heading of one year whips by the nurserymen to 32 inches results in only a twelve inch length upon which to locate the primary scaffold. Heading to 44 inches results in doubling the space over which to develop the lateral branches forming this framework.
2. Heading to 44 inches thus permits the grower to make a better spacing of the three to four laterals utilized for this purpose. Generally speaking, growers should purchase one year trees in order to permit a more desirable spacing than is possible with the average two year old tree purchased from nurserymen.
3. Selection of the most desirably placed laterals in June, eliminating the remainder (called de-shooting) resulted in trees with the most satisfactory framework. The angles produced were not more acute than those of the other treatments. This procedure as carried out in this experiment had no undesirable features other than the time involved in the operation.
4. Only four laterals were allowed to develop into the primary scaffold system.
5. The trees were trained to the Modified Leader System, a type which requires making particular effort to favor the growth of the laterals (three) other than the leader. Whenever possible, small branches growing from the leader conflicting with the growth of the primary laterals forming the scaffold were removed. Otherwise, the superior growth of the leader was even more accentuated.
6. No outstanding differences in total yield per tree have resulted in consequence of the differences in training of the trees.

It is recommended that growers give preference to purchasing one year old whips of large size, thus permitting heading back to 44 inches. Selection of desir-

able placed laterals in late June is not difficult. Trees with a potentially stronger framework will be possible.

STATUS OF THE PEAR INDUSTRY IN OHIO

Freeman S. Howlett

Pear production in Ohio should be increased in line with the increase in population and the greater emphasis upon roadside and farm marketing. Provisions for reducing the serious inroads due to fire blight infection have become available. Growers who have frost-free sites and who are willing to follow a well-rounded program of blight reduction and elimination should consider this fruit in developing a well-diversified planting.

The following provisions should be considered by those planning and maintaining a pear planting:

1. Use of Old Home blight-resistant framework.
2. Proper choice of varieties in relation to type of marketing.
3. Sod-culture system of soil management with intermittent applications of nitrogen.
4. Little or no pruning after framework of trees has been developed.
5. Use of anti-biotic sprays.
6. Systematic and regular removal of all blight-infected shoots and branches.

PEAR VARIETY COLLECTION INDICATES SEVERAL DESERVE LIMITED TRIAL

Freeman S. Howlett and C. W. Ellenwood

As a result of observations and data taken on more than 125 pear varieties in the Station pear collection, certain conclusions relative to varieties may be briefly considered here:

Bartlett

This variety continues to be the most desirable commercially in Ohio in view of its consumer acceptability, season of harvest, and freedom from core breakdown when harvested over a reasonably wide period.

Max-Red Bartlett

The reddish surface color of the fruits is attractive. Other characteristics show no improvement over Bartlett.

Ewart

This variety is harvested about two weeks after Bartlett. While the fruit is not particularly attractive, its flavor and dessert quality are very good. Ewart is seemingly more blight resistant than Bartlett. It is an effective pollinizer for Bartlett and might well be used in a limited way for this purpose. This variety is one of the most promising of those on trial at Wooster.

Bosc

Bosc has done very well in the Wooster tests during the last 20 years. The fruits must be harvested at the proper degree of firmness which can be ascertained only by the use of a pear pressure tester. Its season of harvest is approximately three weeks after Bartlett. The fruits may be kept quite long in storage.

Beierschmidt

This variety is harvested at the same time as Bartlett which is a definite disadvantage. The fruits are reasonably attractive and of very good dessert quality.

In the Wooster trial, several varieties offer sufficiently favorable fruit characters to warrant continued careful observation with eventual limited trial in commercial orchards. Among these are:

Clyde
Laxton's Progress
Laxton's Satisfaction
Laxton's Wonderful
Stanley