

KENTUCKY FRUIT NOTES

W. D. Armstrong, Horticulturist, Editor

POSTWAR FRUIT GROWING

A. J. OLNEY

What are the prospects for the fruit grower after the war? This question is vital at this time. Although it would be foolish to try to forecast the future, there are considerations that bear on the future, from lessons learned by experience, and such knowledge as we have of the changes that are to come.

The basis of our national economy has been set for good prices and wages, as a means of paying off the debt of the war. As the war ends, the food stocks of the world will be low, and the United States will be the most important source of agricultural products. Manufacturing demands will be high and will expand rapidly as soon as the factories can be converted. An extensive building program will be needed in every section of the United States. Great changes are expected in transportation. Air express and air freight may be able to solve many distribution problems concerned with perishable products and open up markets heretofore inaccessible. Modern refrigeration is expected to replace the old ice bunkers in rail transportation. New developments of storage will greatly extend the market for perishable goods. Export and import of food products are set to develop on a scale little dreamed of until now. Foreign nations must have our food products, and imports of foreign goods are necessary to pay for them. Practically unknown countries may become our neighbors and business associates. Much of Europe's fruit industry has been destroyed or sadly neglected during the war.

Everybody will be affected, but how can fruit growers adjust their program to profit most? No simple

answer is apparent, but certain considerations should be studied.

It would seem that areas best adapted to fruit growing will crowd out the marginal areas.

Quality fruit should be expected to assume more and more importance as consumers are able to get tree-ripened fruit quickly from distant areas, and the demand for green fruit should fall. Many poor quality, but heretofore profitable, varieties may become unpopular.

During the war there has been a letdown on grading and packing, and considerable fruit has been sold in bulk, on account of scarcity of labor and containers, also of transportation difficulties. Such methods have resulted in much fruit reaching the consumer in bad condition. With the return of a plentiful supply of containers and quite possibly the development of newer types, strict grading may become essential.

How will availability of good quality fruit affect consumption? It seems reasonable to assume that better distribution of good products should result in a greatly increased demand. Also, new fruit products and by-products, as well as the general recognition of the health properties of fruits, should insure a continued large demand. Great possibilities lie ahead in promoting the consumption of fruit to improve the health of the nation. Think what it would mean if everyone had the fruit required for an adequate diet. Certainly, there would be less doctors' bills, less time lost through illness, and the volume of fruit required to accomplish this would be more than double our present production.

In the growing of fruit, there may be many changes. Several new insecticides that will be available after the war, promise to be more effective than those now in use. This may reduce the cost of production, and some who have aban-

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done the business because of the difficulty of pest control, may be encouraged to return to it. Then, there are new developments in spray equipment that point to the saving of time and labor.

Recently, the fruit breeding stations have introduced many new varieties. No doubt, from these new sorts, a few will be found to be more desirable and profitable than the old ones now cultivated. The varieties grown have always been a big factor in success, and in the years ahead they may be of still greater importance. The Kentucky Experiment Station has a number of the new varieties on test, and comments on their behavior will be reported in this bulletin from time to time.

Fruit growers, on the whole, are more optimistic than they have been for several years, but over-optimism should always be avoided. Experienced growers in established localities may well contemplate new orchard plantings, with full consideration of the marked changes dimly foreshadowed for the post-war era.

Inexperienced persons would be well advised to give careful consideration to the highly specialized and complicated nature of the fruit business and proceed with caution.

The post-war period should witness the establishment of a sound fruit program in the areas of Kentucky where fruit crops can be made to flourish. Some of these areas are already well established, but many possibilities of development are still to be realized.

ARE YOU PREPARED FOR THE PEST "BLITZ" OF 1945?

W. D. ARMSTRONG

From the wisdom of history and experience there are things that we have learned to accept as natural. Practically every Kentucky apple grower expects an early spring apple scab attack if he has such varieties as Delicious, Winesap, Ben Davis, and Rome. The required sprays for scab extend from the start of growth to the first or second cover sprays; and require 2 gallons of lime sulfur per 100 gallons in the pre-bloom sprays followed by 6 to 8 pounds of microfine sulfur per 100 gallons in the calyx and first cover spray.

As for codling moth, every cen-

tral or western Kentucky grower with mature apple orchard knows that from 3 to 10 arsenical or nicotine sprays are required to control this pest. This will require from one to four (or more) pounds of arsenate of lead per tree, depending on the tree size and the infestation.

Peach growers in Kentucky plan to put on at least two early season arsenical sprays, one at shuck-fall and one 10 days to 2 weeks later. In all peach sprays most growers use as much lime as arsenate of lead, or 2 pounds per 100 gallons, plus about 2 pounds of zinc sulfate as a corrective for arsenical burning. In addition to the above, western Kentucky growers have been getting benefit from an arsenical spray applied for late curculio control one month before harvest. For peach scab, sulfur is usually added to the ten-day spray and another sulfur spray applied before harvest for brown rot.

With these basic needs of spray materials in mind it is good business for the grower to order or make definite commitments for his material well in advance and not depend upon getting it at the last moment. Where orders are placed early, it gives the retailer, wholesaler, and manufacturer an opportunity to deliver the goods on time. The same thing is true concerning fertilizer materials.

It naturally takes a good machine to apply the spray materials listed above. Hence it is the part of wisdom to keep the sprayer well lubricated and tightened up; as well as to make needed repairs at any brief slack period.

Several pitiful cases were reported in 1943 and 1944 concerning spray machines that broke down, resulting in the loss of the crop from scab or worms before repair parts could be obtained. Large quantities of spare and repair parts are carried along by every armored division. It is just as logical for the fruit grower to keep on hand a few extra critical and heavy wearing spray parts. With all types of food and fruit vitally needed in our war effort, it is patriotic to guard every possible way against loss from breakdowns. Sprayer parts are more difficult to get now, but every company is making a supreme effort to furnish repair parts for their sprayers in use over the country.

SOME RASPBERRY CULTURAL STUDIES

C. S. WALTMAN

A planting of Latham raspberries, made in 1932, on the Experiment Station grounds has been carried through seven years of test under mulching and nitrogen fertilizer applications. The mulching consisted of an application every other year of fairly fresh strawy manure from the Experiment Station Dairy Barn and was used at an estimated rate of fifteen tons to the acre. The manure was applied over a strip approximately two feet wide and covered the full length of the rows. When the application was made, the straw was about ten inches deep and since it was applied every other year, the material was fairly well decomposed before time for its renewal. Nitrate of soda was used as the source of inorganic nitrogen.

All treatments were in duplicate with an untreated row left between all treatments and the duplicate treatments were separated by seven rows in all cases. The yields for the past seven years are given in Table I. All similar treatments are averaged for each year and the figures obtained for the buffer rows were an average of eight rows for each season.

The most significant thing shown in the average yield of the different treatments is that the rows receiving the heavy manure mulch alone consistently produced, by far, the greatest yield of berries. In only two years out of the seven did the yield from any other treatment exceed that of the heavy manure plots.

It is interesting to observe that in only one year in the seven did the heavy manure mulch plus nitrogen exceed the yield of the heavy manure alone and that difference was not significant. The application of manure on this plot was as heavy as where the manure mulch was used alone. The probable explanation for the lower yields from this treatment seems to be that the nitrate of soda which was added to the manure had the effect of increasing the rate of decomposition and in that way tied up the nitrogen so that the plants could not readily obtain it. It has been noticeable each season that the plants under this treatment (manure mulch, plus nitrogen) have been

lighter in color and have made less growth than where the manure alone was used.

Table I
Seven Years Results With Nitrogen Fertilizer and Mulching on Latham Raspberries
(24 pint crates per acre)
Planted in Spring of 1932

Year	Treatments				
	Manure Mulch	Manure Mulch Plus Nitrate of Soda, 286 lbs. per Acre	Nitrate of Soda, 571 lbs. per A.	Nitrate of Soda 1143 lbs. per A.	Buffer Rows No Treatment
1938	333	188	251	266	254
1939	378	218	291	283	230
1940	127	88	138	62	146
1941	200	129	89	39	112
1942	30	25	10	7	20
1943	93	60	30	22	41
1944	29	34	18	13	17
Average	170	106	118	99	117

The heaviest application of nitrate of soda resulted in succulent growth on which the buds were killed in great numbers during the winter and also during some of the years cane killing was quite severe; as was the case in 1940 and 1942. Other plots also suffered some from winter injury in 1940 and 1942. A study of Table I will show that the lightest nitrate application of 286 pounds per acre plus mulch generally gave the highest yields of any nitrate plots except for the heavy yielding years of 1938 and 1939. The buffer rows were between treated rows and hence undoubtedly got some benefit from the adjoining applications.

Age and Decreased Yield: Another very significant fact as shown by the yields is that as the area has increased in age there has been a decided lowering of yields regardless of the mulching or fertilizer treatment received. This planting has continued in heavy production remarkably well for ten years which is very unusual. Most Kentucky plantings, however, do not retain

their productivity so long and usually need replacing every five or six years.

In addition to age, part of the decrease in two or three of the years can be attributed to a decided deficiency in the amount of rainfall. Raspberries are shallow rooted and are seriously affected if ample moisture is not available. The manure mulch is not only helpful in supplying nutrients but aids in the retention of moisture as well as to help maintain a lower soil temperature that is so beneficial to raspberries.

Pruning or Cane Thinning: During the years of 1938 and 1939 areas were selected in each of the rows to test the effect of cane thinning on yields. Fifty-foot strips were selected in which the row was narrowed to fifteen inches and no canes were removed. In other comparable fifty-foot lengths, the rows were narrowed to fifteen inches and the canes in the row thinned so that there remained only ten canes for each four feet of row. The yields under these tests are given in Table II. The two year average shows 245 crates where the canes were thinned out in the row and 310 crates per acre where no thinning was done. In every case, there was a significantly higher average yield where no canes were removed from the row. It should be mentioned in this connection that during these two years the moisture supply was plentiful and the yields from all plots were exceptionally high.

Table II
1938-1939 Yields
Raspberry Cane Thinning Test—In
24 Pint Crates Per Acre

	Ave. of		
	1938	1939	1938 & 1939
Canes Thinned (Pruned)	240	251	245
Canes Not Thinned (Unpruned)	310	309	310

It is seen from Table II that severe cane thinning sharply reduces the yield. On the other hand, where all canes are left the berries are smaller and a severe strain on the plants results. A practice in between these two extremes would likely give the best long-time results.

CODLING MOTH IN 1944

P. O. RITCHER

The worst codling moth in years, that's the way most western Kentucky, southern Illinois, and Indiana apple growers sum up the past season. By almost continuous spraying, even after the usual spray schedule was completed, some growers came through with very clean crops. Others who were less fortunate or stopped spraying too soon lost their entire crop. In eastern Kentucky, in the hill country where codling moth has never been much of a problem, commercial growers came through with another fine crop of high quality fruit.

The season of 1944 started with a big carry-over of worms and there was little winter mortality. Warm weather the latter half of May was ideal for codling moth, causing them to emerge in unprecedented numbers over a short period of time. Due to the hot, dry weather prevailing into September, the heavy first brood attack was followed in July and August by still heavier second and third-broods. Growers could see more and more worms hitting the apples every day almost up to harvest time, long after the normal spraying season was over, and many continued to spray. Where lead arsenate programs were used the dry weather seemed to reduce the toxicity of the arsenical deposits and there was more or less foliage injury. Fixed nicotine and summer oil were more effective, if more expensive, but supplies were scarce by the middle of the season.

The Kentucky Spray Service, cooperating with spray services in neighboring states was on the job again in 1944 and warned Kentucky growers of the serious codling moth attack in prospect. It is felt that these warnings were especially valuable this season.

Much time and thought will be spent this winter, wherever apple men get together, on what to do about codling moth; and there will be a great deal of interest in improved spray schedules and new materials such as DDT. Many will spend more time this winter on scraping trees, screening packing sheds, and other sanitary measures.

There is one ray of hope, at any rate—1945 certainly cannot be any worse than 1944. Too, we are overdue for a season when the weather is unfavorable for codling moth.

MORE ABOUT DDT

P. O. RITCHER

There is a great deal of interest on the part of fruit growers in the new material DDT (dichlorodiphenyl-trichloroethane). Interest is especially keen since lead arsenate spray schedules did not always give good control of codling moth this past season and nicotine products were hard to obtain.

In the midwest, the Vincennes fruit insect laboratory of the Federal Bureau of Entomology and Plant Quarantine, under the able leadership of Mr. Steiner, has pioneered in the testing of DDT formulae on apples. Their published results to date indicate that DDT is an effective spray material for controlling codling moth when used at the rate of $\frac{3}{4}$ to $1\frac{1}{2}$ pounds of DDT per 100 gallons of spray. There was a considerable build-up, however, in the mite and red spider populations on DDT-sprayed trees and some unexplained leaf drop on Grimes Golden.

Mr. Steiner's results, while promising, do not give us much hope that even by using DDT we can reduce the number of sprays needed. Also, growers who do not use enough material or do not get good coverage, cannot expect DDT or any other material to give good control.

Before DDT is put on the open market there will have to be a considerable surplus over and above that needed by the armed forces. Too, there is much work to be done on DDT before it can be put up in a usable standard form by manufacturers. There are also many questions concerning DDT's effect on human health and its compatibility in various spray formulae that need to be answered.

NOTES ON BLACKBERRIES IN KENTUCKY

W. D. ARMSTRONG

A small variety planting of blackberries made in western Kentucky in the spring of 1939 has furnished some results that might be of general interest to berry men. This planting is located about 75 miles east of where the Ohio River joins the Mississippi, on the grounds of the Western Kentucky Experiment Substation, Princeton, Kentucky. The planting is on low ground that

is subject to temperatures somewhat more severe than are general throughout the section. The following table gives some of the characteristics of the varieties as shown in this planting to date:

Variety	Winter Re-sistance	Orange Rust Re-sistance	Productivity
Eldorado	Hardy	Medium	High
Alfred	Hardy	Low	High
Early Harvest	Hardy	Medium	High
Ozark Beauty	Tender	High	Moderate
Brainerd	Tender	High	High
Young	Tender	High	Moderate
Boysen	Tender	High	Moderate

In January, 1940 and again in January, 1942 this planting experienced temperatures of between 10° and 20° below zero and on these occasions all of the canes of the varieties listed as tender were killed to the ground with resultant total loss of crops. The varieties listed as hardy had some cane tip killing; however, this did not materially effect their fruitfulness. The prostrate canes of the Boysen and Young varieties, often classed as dewberries, have also been winter killed when no sub-zero weather was experienced, even when having a straw mulch covering. These varieties have produced a satisfactory harvest only during the spring of 1941 and cannot be considered as reliable in this section for either home or commercial production. The Brainerd seems less tender than the last two named varieties but has frequently lost so much of its fruiting wood from winter injury that it cannot be depended upon here. Where this variety comes through the winter, it can be depended upon to produce large quantities of late berries over a long period that develop good to large size and excellent quality if allowed to remain on the vines until fully ripe. The Early Harvest has been very satisfactory except for its small sized fruit which is a characteristic of the variety. This variety contained one plant that regularly produced fruit twice the size of the others and otherwise typical of the variety. However, this plant was one of the very few of this variety to take orange rust. As for productiveness, quality and large fruit size, the Alfred has been the most outstanding but the plant

losses from orange rust have been heavy. Ozark Beauty, a variety of some consequence in Arkansas has had no orange rust but has suffered from winter injury and is not exceedingly fruitful.

The Eldorado plants were secured from a well-known nursery and were, of course, supposedly true-to-name. The lot, however, contained a considerable number of unfruitful plants. At the first harvest these plants were marked with stakes. Each year, since that time, the same individuals have failed to produce normal fruit. All berries on these plants are abortive and contain only 2 to 10 drupelets. Such plants are worthless and, should they occur in commercial plantings, would seriously curtail production. It has been suggested that these might be affected with a fungus disease that interferes with pollination. If this is the case, the disease had not spread either to regular Eldorado plants alongside or to any of the other varieties. Similar samples of berries have been sent in from other Eldorado plantings in Kentucky and reports have been received of commercial plantings that contained a high percentage of plants behaving in this manner. Normally, the Eldorado is an excellent variety over a wide territory and those selling or distributing plants should know that they have only the fruitful sort rather than a very undesirable mixture.

The rust rating of Eldorado in the table is subject to the following question. This variety is normally highly resistant to rust and, due to the close proximity of the plants and the intermingling of roots and sprouts, it has not been exactly determined whether all the rust is in the Eldorado or the unfruitful mixture.

SOME THOUGHTS ON PRUNING

A. J. OLNEY

Pruning is a subject that never fails to interest fruit growers and any discussion about it almost always results in arguments pro and con, because it is not a simple matter.

The effect pruning has on the growth and productiveness of a tree depends on many things. Health and vigor, kind and variety, and

how, when and where pruning is done are all important factors. Furthermore, the effect is proportional to the severity of the pruning.

Since soil and the fertilizers used also affect tree growth, pruning and tree nutrition should be made to supplement each other. The average soil in Kentucky is low in nitrogen, and fruit growers universally use nitrogen fertilizer to stimulate growth. Pruning also stimulates growth but it does so by reducing the number of growing points, so that those that remain receive a large share of nutrients from the soil. Thus, pruning invigorates a tree, but makes it smaller than it would have been.

In starting off young peach and apple trees, the grower is anxious to produce top growth to fruiting size as quickly as possible. To do this he will make the soil as good as possible and prune as little as he can during the early years, and still develop the form and framework that is desired. Of course, the only time a definite tree form can be developed is while the tree is young, and some pruning is necessary to do this even though it does reduce the size of the tree somewhat.

During the past decade most fruit growers have followed this practice of pruning as little as possible while the trees were young and until after bearing began. The result has meant a marked improvement over the older practice of severe pruning during the formative period, and the trees have borne earlier and larger crops.

After the trees reach mature size and are bearing well, pruning can be practiced to maintain vigorous fruiting wood and desirable tree size. Sometimes, the trees become too tall for economical spraying and harvesting. There is no general agreement as to how large or how tall a fruit tree should be. A large tree can produce more bushels than a small tree. However, if one observes the crops in a number of orchards, he will be impressed with the idea that bushels per tree is not the whole answer to the problem of making profits. Worms did most damage this year in the tops of tall trees because sprays did not reach them effectively, and the percentage of cull fruit was too high. It is unfortunate to have the fruit in the top of the tree go bad because this

is the place we should expect to find the best size and color. These tall trees also require tall ladders and extra labor at harvest time, and break-down of large limbs often occurs. After trees have grown too tall, pruning back is about all one can do about it, but if the pruning must be severe, the result may be rather unsatisfactory. How much better it would be to maintain the height desired by annual pruning.

In recent years the tendency to maintain fruiting wood on lower branches reaching almost to the ground, has been a good one, but too often these branches have been allowed to become too thick. Under these conditions, much of the fruit is small and poorly colored.

How much to thin the branches, cannot be stated with exactness. One could say "..... enough to let in some sunlight" or to prevent close over-lapping of branches, but that is indefinite.

In any pruning to be done, one should have some knowledge of the principles, good judgment, and experience. Too often pruning is entrusted to inexperienced persons without close supervision. It has been said that more harm is done to orchards every year by ill-advised pruning than by any other cause. Perhaps this is not true, but it might be worth while to think it over.

TENNESSEE PEAR CONFERENCE

A very timely and important pear conference was held by the Tennessee Experiment Station on October 3 and 4, 1944. The purpose was to inspect and discuss the pear breeding program under way at that station and to discuss varieties and tests that might be of importance in this section of the United States. While no new varieties have been introduced yet, some very fine selections have been produced by crossing hardy and disease resistant varieties.

Representatives of the following states were present: Tennessee, Kentucky, Illinois, Ohio, Virginia, South Carolina, Georgia and Mississippi, as well as the Chief of the fruit work in the U. S. Department of Agriculture. Plans were discussed for the cooperative testing of new varieties and selections and, in general, this meeting should

prove to be of longtime importance to pear work in the lower central and southern sections of the country

HINTS AND OBSERVATIONS

By W. W. MAGILL

Mr. and Mrs. Fruit Grower

Mr. Kittering, Vice President of General Motors, offers a simple research problem within the range of every family. He says to take the time to study your own business, and write down 5 reasons why you did not make more money or were not more successful in your business in 1944. Then during the long evenings of the winter season, while you must save gas, figure out a solution to the 5 problems that caused your losses the past year. This is his definition of "personal research."

\$2500 for Apple Scab

A good Kentucky apple grower recently told me that apple scab cost him the above figure on his Winesap crop in 1944. In his opinion, one extra pink or pre-pink spray would have produced a clean crop. He says, "I plan to play safe in 1945, and, if necessary, spray on a rainy day".

Home Luxury

If strawberries cost \$1 per gallon how many would your family consume in 1945? By 1946 you may have a frozen food locker. Two hundred Blakemore plants set out this spring should produce a good family supply in 1946.

Spending

How much cash do you spend each year for "Reading Matter" in your fruit business? Also, how many hours per week, on the average, do you spend reading this kind of literature?

If your local pastor, doctor or lawyer did not spend many hours each week in his study, reading about his business, how long would he keep up to date?

The sale of three bushels of apples or peaches will pay your annual expense of at least two fruit magazines and membership fee in at least three state horticultural societies. The other fellow's opinion is always worthy of consideration. Knowing what "NOT" to do may be valuable information.

TIME OF MATURITY OF APPLES AND THE CODLING MOTH PROBLEM

(The following article appeared in the Annual Report of the Arkansas Experiment Station, June, 1944. It contains sound information that applies to Kentucky as well as to Arkansas.—Editor.)

Early production is frequently used as a means of control of multiple-generation insect pests attacking annual crops. It is not usually recommended for the control of such pests on orchard fruits. Nevertheless, early production may be a means of avoiding codling-moth injury and should be considered in planting of new orchards, and sometimes shifting the varieties may be useful in reducing damage in established orchards.

Early maturity of apples as a means of control of the codling-moth may reduce damage in two ways, reports Dwight Isely of the Department of Entomology. Fruit harvested before the middle of July is removed from the orchard long before the maximum numbers of the pest are attained. As a second advantage, the absence of fruit during the latter part of the season may result in starvation of the late generations and a nearly complete absence of surviving infestation the second season. To secure this second advantage, it is necessary that plantings of early varieties of apples be isolated from those maturing late in the season. If, however, early varieties are interplanted with late varieties, the infestation is renewed each spring by moths which developed the previous fall as worms in late fruit in the same orchard. Since ripening fruit is particularly susceptible to injury, the infestation on early fruit may be heavier at harvest than that of the unripe late varieties around it.

In blocks under observation where all fruit was harvested by mid-July,

which was before second-generation larvae of the codling-moth could become fully grown, the percentage of wormy fruit was less than 5 per cent. Two of these blocks received only a single spray application for codling-moth control, the calyx spray; and none of these blocks received the usual number of early spray applications. By isolating these plantings of early varieties, the codling-moth problem had been avoided. On the other hand, in orchards where early and late varieties were mixed, the problem of control was difficult.

In blocks of early fall varieties, which ripen before a majority of worms of the third generation have left the fruit if grown separate from later varieties, the codling-moth population tends to be less than in blocks of late fall varieties. Nevertheless, early fall varieties require adequate protection by spraying since they ripen late enough for the development of worms of the second generation, many of which pass winter. Mixing blocks of early fall and late fall varieties makes the problem of control more difficult.

In view of the dominating importance of the codling-moth problem in apple production in the southern apple regions, when planting commercial orchards it is advisable to consider the grouping together in blocks of apple varieties which are harvested at the same time. Such grouping of varieties can make the problem less difficult, and reduce spray costs.

Early production as a means of codling-moth control may be even more useful when planting home orchards. Since home orchards are seldom adequately sprayed, when they are composed of mixed plantings, they tend to produce little good fruit. Limiting the planting to early varieties only would make spraying for worm control unnecessary and should result in greater production, since the codling-moth problem is removed.