

KENTUCKY FRUIT NOTES

W. D. ARMSTRONG, *Horticulturist, Editor*

WARTIME FRUIT PRODUCTION

Fruit production under present wartime conditions presents some of the most serious problems our growers have ever experienced. With shortages existing or expected in labor, spray materials, machinery, fertilizers and containers it will be more important than ever to know exactly *what* needs to be done and to do it in the best manner possible. Fruit growing is generally classified as one of the most complicated business enterprises, in or out of agriculture. Also, two growers rarely have identical problems.

It is therefore of real importance for the fruit grower to know his own problems. If he has apple varieties that are very subject to bitter rot, he should know which ones they are so that he can give them special attention. He should also know what bitter rot is and the best control measures for it. Growers with a serious codling moth problem should take necessary control measures. It is needless to spray for diseases or insects that are not present. On the other hand, it is very costly to have a serious insect or disease problem and, not knowing it, fail to take control measures.

Apples

Susceptibility or resistance to disease.—To help growers recognize their problems, we publish below a list of apple varieties and their susceptibility or resistance to apple scab, bitter rot, blotch, fire blight and San Jose scale. Of course, it is generally known that some varieties are more subject to bitter rot when the trees are thick and are in a low, moist location.

In the following table, S—slightly susceptible, M—Moderately, V—very, and R—resistant.

Variety	Scab	Bitter Rot	Blotch	Fire Blight	San Jose Scale
Ben Davis	V	V	V	S	M
Black Twig	V	V	V	S	M
Delicious*	V	M-V	R	S	M
G. Delicious	M-V	V	R-S	S	M
Grimes	S	V	S-R	M-V	V
Jonathan*	R	V	R	V	M-R
King David	M	V	R	M	M
McIntosh	V	V	V	S	M
Maiden Blush	S-M	V	V	V	M
Polly Eades	S	V	R	V	M
Paducah	M	M	R	S	M
Rome Beauty*	V	M-V	M	M	R
Stayman*	V	M	R	S	R
Turley	V	M	R	M	M
Wealthy	S	R-S	R	V	M
Winesap	V	R	R	S	M
Y. Transparent	S	R	R	V	V
York*	M	R	R	S	M

* Red Sports generally have same susceptibility as parent variety.

Spraying.—It has been proved over and over again that spraying fruit has to be well and wisely done to be successful. There are very few safe short-cuts to good spraying. With new spray equipment *frozen*, the old ones will have to last for the *duration*, in most cases. Repair parts, ordered well in advance may be obtained; good care will be needed to keep the spray in operation.

Spray materials will probably meet 1943 needs, but use them wisely and waste nothing. Secure and study the spray programs needed; then do a good job of spraying.

In all spraying, the right mixture, properly timed and well applied usually gets good results. The printed spray programs and the spray service letters will help in all three of these points.

In spraying trees, first spray the inside from near the trunk. This covers the *inside* cheek of the fruit that is often left untouched when trees are

sprayed from the outside only. The remainder of the tree should then be sprayed; top first, then bottom. Thus the drip from the top part of the tree falls on dry foliage below, wetting it, instead of glancing on to the ground as it does when lower limbs are sprayed first. Any water storage device or large water outlets that will speed up the tank-filling operation are wartime aides that should be added where possible.

Pruning.—Do not over-prune young trees. They will generally do best with very little so-called shaping and training and will reach bearing size quicker if only very lightly pruned. Do not be disturbed by what you think is a *thick* young tree. You will be surprised how much these trees will *open up* after they bear a crop.

Pruning this year should be confined to older, non-vigorous and very thick trees. Wherever there is a codling moth problem, the grower should thin out his trees, so that the spray material can easily penetrate to all parts of the tree. Top limbs that are difficult to spray should be removed. Also a few low limbs should, in many cases, be removed so that the spray man can easily walk to the trunk and spray the *inside* of each tree.

Peaches

Pruning. — Many peach growers wait until they see how heavy the fruit is set before they prune. This is a safe practice where danger exists from late frosts. With a possible labor shortage this season, it will be risky to put off pruning too long for fear the trees will not get pruned.

At the winter fruit meetings this year, it was pointed out by several good growers that they intended to do a lot of their peach *thinning* when they pruned. This is an economical viewpoint; for well pruned trees are generally easier to thin. It is certain that with a heavy crop set, considerable thinning will have to be done to insure fair size and to prevent overloading and tree breakage. Bulk thinning could be done very rapidly with pole pruners or lopping shears soon after the crop is set.

Thinning.—At the Mayfield meeting special interest was shown in a discussion of the peach thinning practice developed by Mr. C. R. Eison and Sons of Ledbetter, Kentucky near Paducah. For several seasons they

have been successfully thinning peaches, using a stiff 5 or 6-foot dry wooden stick about the size of a tobacco stick. The stick was slightly flattened on one end to insert easily into clusters and, with a quick twist push off some of the fruit. Where fruit is thick on twigs, a quick scraping motion is used to remove the fruit from one side of the twig. In all cases peaches are pushed off—not knocked off in a manner that would bruise the foliage and twigs. Eison and Sons are well pleased with the practice and state that a few careful workers can cover more territory than a much larger crew using the old hand method.

Control of Codling Moth

Codling moth is the most serious pest to apple production in many Kentucky apple orchards. At the recent fruit meeting at Mayfield, Dr. L. F. Steiner of the Federal Codling Moth laboratory at Vincennes, Indiana, gave a very helpful and informative codling moth discussion. The following statements about codling moth were taken from his talk.

Life history of Moth.—The pests pass the winter as worms. In late April or early May they pupate and grow into adults that mate and then lay eggs which hatch into small worms when apples are very small. Northern Kentucky usually has two full generations a year, while Southwestern Kentucky usually has three generations a season. About 75 percent of these overwintering worms spin up in cocoons under the loose scaly bark of apple tree trunks within five feet of the ground. About 25 percent spin up in rubbish, weed stems and corn stalks near the base of the trees. Where as many as 50 worms go through winter on one tree the problem is very serious but where as many as 100 worms per tree pass the winter, the situation is almost beyond control.

Orchard sanitation.—While spraying is still the main control method for codling moths, orchard sanitation such as banding, scraping trees, and screening packing sheds is of great value. Scraping the scaly bark from trees during winter, and catching it on a tarpaulin removes many worms and is recommended. Burn these scrapings as soon as removed. Banding of trees in early summer to furnish places for worms to spin up is

also recommended. Treated bands should be used only on rough (tough) barked trees. Untreated bands can be safely used on young trees. Kill the worms collected at weekly intervals.

Used baskets, crates and orchard props should be stored in a screened packing shed or dark basement so that moths emerging from them cannot fly back to the orchard, but will perish. Moths that emerge from packing sheds are usually a week or so later than those emerging from the orchard. Dr. Steiner pointed out that one grower destroyed 35,000 codling moths by screening his packing shed so the moths could not escape to the orchard.

Early thinning and breaking up of the fruit clusters also helps in worm control since a favorite worm entry place is between two apples that touch.

Lead arsenate sprays.—*The Calyx Spray is important!* Since 60 percent of the early worms and 35 percent of late worms try to enter the calyx, a well-applied calyx spray plus a calyx top-off is generally the most valuable codling moth spray used. *This top-off spray is simply another spray applied to the upper half of each tree as soon as the calyx spray has been applied to all trees.* Most early codling moth eggs are laid on foliage and the young worms feed slightly on foliage before trying to enter fruits. The moths lay more eggs in the upper portion than in the lower portion of the trees. An all-over, complete poison coverage pays big dividends.

It was pointed out by Dr. Steiner that it takes 2 or 3 cover sprays in rapid succession to build up a real coverage on all leaves and young fruits. One spray gives very little protection unless followed by another to complete the coverage. Two sprays using half-strength materials are better than one spray of full-strength material. The *twice-over* does the trick by hitting the spots that were missed the first time.

Starting one week after calyx spraying, many Kentucky, Indiana, and Illinois growers have found it advisable to apply 3 or 4 sprays at weekly intervals. This is designed to keep the foliage and fruit covered while the first brood worms are active and thereby try to clean them out. The use of $\frac{1}{2}$ percent of a light oil (called summer oil) with the 2nd, 3rd, and 4th cover spray kills quite a few cod-

ling moth eggs and also aids in the spreading and sticking of the spray, and is generally recommended.

In lightly infested orchards, heavy first brood spraying followed by one second brood spray generally gives good control. In most heavily infested orchards in Southwestern Kentucky, heavy first brood spraying followed by second brood and even third brood spraying is required. In these orchards good first brood control is vital or the crop is often eaten up by the second brood attack in late June or early July, or by the third brood in August. Late sprays also run into spray residue problems. Every apple grower must find the control measure which best suits the problem in his own orchard, making certain that worms are killed early in the season by every means possible.

Fixed nicotine sprays.—Dr. Steiner also pointed out some developments with the fixed nicotine spray. It leaves no poisonous residue and also causes less spray injury to fruit and foliage. This spray has given good results in some Kentucky, Indiana and Illinois orchards where codling moths are severe. The cost is usually greater than when the arsenate of lead sprays are used, but results in certain cases seem to justify the expense.

The Kentucky spray service deals with the seasonal development of this pest in several parts of the state.

Control of Apple Scab

For many apple growers, apple scab is the most serious fruit disease. This disease lives over winter on old apple leaves lying on the ground under the trees. When early spring rains come the small over-wintering spores mature and are discharged into the air, floating about until they come to rest on the small apple leaves, buds, flower parts or small fruits.

Microscopic examinations have shown that in most years spores are mature and ready to be discharged into the air by the time the delayed dormant or early pre-pink (closed cluster) bud stage is reached. Spores generally mature over several weeks time. Where no special notices are available, experience has shown that growers can assume that scab infections take place at the early pre-pink bud stage and scab sprays should be started then depending on the weather. For Red Delicious, a variety

seriously injured by scab, a spray in the green-tip stage is suggested. The pre-pink and pink sprays are generally the most important in scab control. It is a well known saying among apple men that scab has to be hit early and hard and that it has to be controlled before the blossom period.

Cool, wet weather favors the early maturity and discharge of scab spores. This explains why wet springs give more scab trouble than dry springs.

It takes a soaking rain to cause scab spore discharge. A wet surface is also required for the spores to germinate and start a scab infection. Lime sulphur has proved the best control for scab, but it should be applied before infection starts. Surfaces that are well covered with sulphur resist infection. Since growth is rapid in early spring, several sprays are needed to keep the expanding leaves and fruit parts covered with a protective coating. This is especially true when rainy weather is just ahead of or present during blooming. In such seasons some growers go over their trees every 5 to 7 days. In most cases a good spray should give protection for 6 to 8 days. Since rains wash off some spray material as well as cause more spores to discharge and furnish moisture for spore germination, we can readily see why rains cause the apple man to worry. Generally, sprays applied 2 to 3 days after a rain, will control spores discharged by the rain.

Also since scab is less active in dry springs, less spraying is needed during a dry pre-bloom period. These facts about scab, when understood, will help the apple grower make a wiser use of his spray time and material. Also by knowing varieties, he realizes that Grimes, Jonathan and Paducah do not require as many scab sprays as Red Delicious and Winesap.

Control of Brown Rot

Red Bird, Champion, J. H. Hale and Heath Cling peaches are very subject to brown rot. They, therefore, need more brown rot sprays or dusts generally than Elbertas. Some states have found it very helpful to apply a spray of wettable sulphur to the Red Bird variety (or any other one seriously affected) in the pink bud stage to help reduce the blossom blight stage of this disease. The destruction (outside the orchard) of all dry mummied fruit hanging on the

trees over winter and on the ground is also strongly urged. The disease lives over for several years in these old dried mummied fruits. Disking, about blossom time, an orchard that suffers from brown rot will help retard the disease by disturbing and covering many old mummies.

KENTUCKY STATE HORTICULTURAL MEETING

The 87th annual meeting of the Kentucky State Horticultural Society, the College of Agriculture and Home Economics of the University of Kentucky cooperating, was held in Mayfield, Kentucky, on January 20, 1943. A large group of interested fruit growers attended and took part in the discussions. Speakers included Mr. Herman Yopp, Prof. W. W. Magill, Mr. Frank Street, Mr. W. D. Armstrong, Mr. Horace Cleveland, Dr. L. F. Steiner, U. S. D. A., and Dr. P. O. Ritcher from Lexington.

The officers elected to guide the society through these trying war times were Mr. Herman Yopp, Paducah, President; Mr. Wm. Fegenbush, Buechel, Mr. Fred C. Van Hoose, Mingo, Mr. C. R. McCollom, Henderson, Vice Presidents; and Mr. W. W. Magill, Lexington, Secretary-Treasurer. All members receive free of charge the national fruit magazine, American Fruit Grower. All fruit growers are invited to become active members. A representative group of Central and Northern Kentucky growers met at Lexington during the Farm and Home Week for an intensive one-day discussion of problems. At both the above meetings the growers seemed aware of their many problems and of the importance of their work, and showed determination in facing the future.

FRUIT CROP OUTLOOK FOR 1943, AS OF MARCH 1

The past winter gave us considerable cold weather scattered all through the season, at intervals without any general sub-zero temperatures. The near-zero temperature of mid-February killed some peach buds in some locations but it appears generally that most trees should have a fairly heavy blossom. This will give a good crop if they escape frosts at

blossom time. Apples bearing a light crop in 1942 should see a heavy set of fruit. Dewberry, blackberry and raspberry canes seem to have come through the winter in good condition and prospects look promising. The strawberry acreage in the state is down a bit. Wet weather during November prevented many growers from hauling mulching materials into the fields. Unmulched patches undoubtedly suffered some injury from several near-zero spells of weather. This season would have paid big dividends for the early hauling of mulch material to the fields and dumping it so that it could be scattered later by hand. Strawberry yields, however, are expected to be fairly good.

Thus in general a somewhat-above-average fruit crop is in prospect for the state as a whole. The grower is therefore faced with the many problems of producing a crop of fruit under war conditions.

CURCULIO AND ITS CONTROL

P. O. RITCHER

Department of Entomology and
Botany

One of our worst peach pests is the plum curculio, commonly called the peach worm. At harvest time in 1941 western Kentucky growers lost a great many bushels of peaches because of this insect. Part of the loss was due to curculio directly and part was due to brown rot which often starts around curculio stings.

There is promise of a fine peach crop for this year. Right now would seem an excellent time to review the known facts about curculio so we can do an extra good job of control in 1943.

Life History

The adult curculio is a small, brownish or grayish-black snout beetle, about $\frac{3}{8}$ of an inch long, with rough wing-covers. Adults pass the winter on the ground in woods, fence rows, thickets, and gulleys, under trash, leaves, and grass. They appear first in plum trees in the spring. By shuckfall time they are often abundant on peach trees and very soon begin laying eggs. The female cuts a small hole in the peach with her beak,

deposits an egg in the hole and then makes a semi-circular cut around and under the place where the egg was laid. Egg punctures are easier to see on plums, apples and cherries, than they are on peaches.

Eggs hatch in 3 or 4 days and the peach worms tunnel through the small peaches until they reach the pit. They grow rapidly and are full grown in 3 weeks. Wormy peaches fall during the June drop and continue to fall after the normal drop is over. The worms develop in the drops on the ground. When full-grown, worms cut their way out of the drops, leaving small round exit holes, and burrow into the soil to a depth of several inches. There they change to a resting stage, called the pupa, and later change to adult curculios.

A new generation of adult curculios begins coming out of the soil about a month after full-grown worms enter it. Dry weather often retards adult emergence. New curculios feed for several weeks before they are ready to lay eggs. In some years many eggs are laid by these new curculios, beginning 3 weeks before Elberta harvest. We lose a lot of ripe peaches from second brood curculio.

New Facts About Second Brood

After the heavy curculio damage of 1941 peach growers sought additional information about second brood curculio in Kentucky. They set out, in 1942, to find out if and when new adults would lay eggs for a second brood and when spraying or dusting would be needed.

In May, 1942, under the Special Horticulture Fund, Mr. W. D. Armstrong and Mr. W. W. Magill arranged with Mr. Sid Holloway at Sedalia, Mr. Fritz Beyer at Paducah, and Mr. Frank Street at Henderson, for the setting up of drop trays and emergence cages in their respective peach orchards. Similar trays and cages were run at Princeton by Mr. Armstrong and at Lexington by the writer. In each case trays with hardware cloth bottoms were stocked in May with small peach or plum drops. Full-grown peach worms falling from this fruit were caught below on a cloth-covered tray, counted each day, and dropped on the ground inside a wooden cage sunk in the soil and cov-

ered with a tight, screen wire lid. In this cage they burrowed into the soil to complete their life cycle. The ground cage was looked at each day, any adults emerging were counted and removed. Many of the early, new adults were shipped in cartons to Princeton where Mr. Armstrong fed them on peach foliage and supplied them with small fruits for egg laying. The writer helped check for the egg laying period by dissecting female curculios.

As a result of this study and other observations we obtained definite information on plum curculio activity in 1942 which enabled us to predict a second brood ahead of time. The information also gave us some vital facts needed for the coming year. These 1942 facts may be summarized as follows: The first curculio appeared in western Kentucky orchards April 15, about 9 days after full bloom on Elberta. Egg laying began April 28, about 3 to 5 days after shuckfall, continuing for several weeks. June drops began May 13. Full-grown worms began leaving drop peaches May 19, continuing to do so into June. New adults began emerging June 20 and were still coming out in early July. Adults began laying eggs for a second brood on July 14. Elbertas were being harvested between August 5 and 11.

Control Measures

Spraying.—To control curculio we must rely mainly on spraying with lead arsenate. The correct formula for 100 gallons of mixture is lead arsenate $2\frac{1}{2}$ pounds, hydrated lime $2\frac{1}{2}$ pounds and zinc sulfate 2 pounds. The last two materials form a zinc-bordeaux which reduces the foliage injury by the lead arsenate. To control brown rot and scab, 6 pounds of wettable sulphur is added in certain of the sprays.

Growers who do not practice jarring should put on at least two lead arsenate, curculio sprays following the fixed schedule given in Experiment Station Circular 356 or Leaflet 9 or Bulletin 393. Apply the first one 2 or 3 weeks after full bloom when $\frac{3}{4}$ of the shucks are off, the second 10 days later.

From the studies made in western Kentucky in 1942 it is clear that to stop second brood curculio, which occurs in some years, an additional lead

arsenate spray must be applied a month before harvest. Many western Kentucky growers put on this spray last season as a result of the spray service findings, and counts made at harvest showed very little curculio damage. Damage did occur in orchards where this treatment was not made.

Jarring.—For most effective control of curculio, growers should practice jarring both as a means of telling when to spray and also to find out what parts of the orchard need spraying.

Jarring is done by spreading a bed-sheet or large canvas under a peach tree, or, better still, two sheets, one on each side of the trunk. The trunk or limbs above are then struck several sharp blows with a padded scantling. This causes the curculios in the tree to fall to the sheet where they may be counted and destroyed. Jarring is most effective early in the morning while it is cold and the curculios are numb.

Start jarring operations soon after petal-fall of peaches and continue twice a week for the next 6 weeks. Jar first on plum trees since curculios appear there first. In jarring peach trees, first jar several trees on the edge of the orchard nearest woods and other places where curculios are likely to hibernate. Continue jarring at regular intervals. Cover the entire orchard. In this way the movement of curculios into the orchard can be followed and sprays can be omitted or delayed if curculios are scarce. S. C. Chandler, in Illinois, found that curculios are usually much more abundant on the outer row of an orchard than they are on rows farther in. As a result, more spraying may be needed on the outer rows.

SECOND-YEAR CARE OF STRAWBERRY FIELDS

What is the best method of caring for the second-year strawberry field in Kentucky? Many good growers have different ideas and follow different practices. Because of the need for this information and the general interest of strawberry growers, some plots were set up for the study of these problems immediately after harvest in 1942. The plots were on commercial strawberry fields of the Blakemore variety and were located

on the farms of Mr. Lester Harris, near Kevil, and of Mr. J. L. Brien, Benton, Kentucky.

Various treatments are being compared such as mowing, working out middles, early and late renewing by barring off. These combinations include most of the common practices, except just "turning out" the field after the first harvest is finished.

The 1943 harvest in these plots should show some interesting results. During the dry season that prevailed after harvest in 1942, there was less wilting and less suffering from drouth in the plots that were cultivated or mowed than in those not cultivated or mowed. The plots that were renewed (barred-off) developed a great deal of crab grass and weeds in them and this required more work to keep them clean.

Interested growers are welcome to visit these two plots to examine this work. Meetings at these two places are being planned just ahead of the harvest season and the exact time will be announced later.

HINTS AND OBSERVATIONS

By W. W. MAGILL
Field Agent in Horticulture

Overtime Pay

Kentucky fruit growers are now working 8 hours per day, twice each 24 hours, and 6 days per week, but with the big demand for fruit for the armed forces, for lend-lease and for local consumption and with indications for prices above average, I believe that fruit growers will have an opportunity this year to get "time and a half plus" for all their overtime.

Fruit Demand

Will there be a good demand for canning and drying peaches this year? Just loaf around the canned fruit counter of your local grocery for an hour some Saturday afternoon or night and listen to the comments,

then draw your own conclusion. Really, such a visit will be a real recreation and inspiration to a fruit grower.

Grow Your Nitrogen

With the shortage of commercial nitrogen for the duration, the fruit grower will be obliged to help out his own cause. A liberal application per acre of limestone and superphosphate to any orchard plan, both apples and peaches, will, in most cases, more than double the tonnage of lespedeza or other legumes that can be grown per acre. When allowed to remain on the land as a mulch to decompose, the trees will be benefited from the nitrogen.

Used Fruit Packages

Bushel baskets may be in demand at harvesting time. Any used baskets that you can pick up at a reasonable price may come in handy. Used orange boxes make a very satisfactory field crate and farm storage. Most grocery stores are glad to sell these boxes at 5 or 10 cents each.

Spray Letters

Are you on the mailing list to receive the Kentucky spray service letters? These letters contain timely information on codling moth, peach curculio, apple scab and bitter rot development in various parts of the state. On request, your county agent will see that your name is on the mailing list for these letters. No charge.

Top-off Spray

Are you familiar with the "top-off" spray? It furnishes the "key" to successful control in a bad codling moth situation. See page 3, this issue.

No efficient farmer will be "too busy" to raise a good fruit and vegetable garden in 1943.

THE GARDEN CAMPAIGN

The nation needs the help of every citizen to grow food crops for his own use if he can possibly do so.

The need for food in the war pro-

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gram is greater than the total that can possibly be produced, and a large part of the crops raised in the large commercial centers will be retained for war purposes.

This means that the civilians will be more and more dependent on local production supplemented by supplies grown themselves. The greater the amount of home grown stocks, the greater the amount of food products that can be released for the war from local commercial growers.

The fruit and vegetable garden provides one of the ways most families can help to raise their own food supply and help in the war effort at the same time. Because of this situation, it is imperative that there shall be no waste. If a garden is planted, good care should be given so that a good crop will be produced. The crop should be gathered and used either fresh or preserved for winter. It is desirable that those who can, plant fruit trees and small fruits for home use.

Garden Essentials

1. Gardens require good soil and the use of fertilizers to produce good crops. Inexperienced gardeners should get information on the use of fertilizers.

2. Careful consideration should be given to the size of a garden that can be cared for and the amount of essential garden crops needed by the family. The essential vegetables include tomatoes, greens, carrots, salad crops, and beans.

3. Provision should be made to control garden pests. Otherwise, attempts to grow vegetables are likely to result in failure.

4. Approved methods of use, canning, preserving and storing should be employed to avoid waste and spoilage.

5. Additional information may be obtained through the County Extension Service.