

KENTUCKY FRUIT NOTES

W. D. ARMSTRONG, *Horticulturist, Editor*

HORMONE SPRAYS

The use of the hormone sprays to prevent preharvest drop of apples has proved to be profitable on varieties that have this fault. Delicious is especially subject to early drop. The spray is not recommended on varieties not subject to drop.

The spray should be applied about 10 days or 2 weeks before the normal harvest date. Hormone spray materials are handled by all the leading dealers in spray materials and should be used at the rate recommended by the manufacturer. Usually, one spray is sufficient. The spray should be thorough and with good pressure.

The effectiveness of the spray depends on adequate coverage of spray, proper timing (too early or too late may be ineffective), and the season (severity of dropping varies with the weather). The use of a spreader and sticker also helps to improve the effectiveness. These are available

from dealers and should be used as recommended by the manufacturer, or summer oil may be used for this purpose, at the rate of one quart to 100 gallons of spray. Tests show savings of as much as 5 bushels per tree.

Growers should give special attention to the need for hormone sprays this year; since they reduce the hazard of dropping and will give a longer period to safely pick the fruit when labor is apt to be scarce.

BITTER ROT OF APPLES

W. D. VALLEAU

Bitter rot occurs during periods of high temperature and high humidity at any time during the growing season after about the fifteenth of June. Experienced growers are familiar with the numerous pin-point brown spots on the surface of the fruit which rapidly develop



"Drops" under hormone-sprayed tree

"Drops" under tree not sprayed with hormone

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if the fruit is green but which may develop very slowly on ripe fruits. As the spots enlarge the tissues collapse slightly leaving the surface of the decayed portion flat.

The fungus overwinters in bark infections, mummied fruits on the trees and in fruit stems left on the tree when mummies are removed. During damp periods these sources produce spores that are scattered to the fruits by dripping rainwater and insects. After this the spread from fruit to fruit is brought about rapidly by rain, flies and other insects.

In orchards where bitter rot has not been a factor a 6-8-100 Bordeaux spray should be applied each year as a precautionary measure about the first of July. In orchards where losses have been heavy, spraying with a 4-6-100 Bordeaux mixture should be commenced about June 15 and repeated every two weeks until 4 to 7 sprays have been applied. For best control it appears necessary to build up a coating of copper on the fruits by successive applications. If you have been troubled by bitter rot in the past and have not yet sprayed with Bordeaux, begin spraying immediately and repeat at two-week intervals. It is better to prevent the disease from getting a start than to wait until it appears and then try the almost impossible job of stopping it. The latter practice usually results in heavy losses. If you find that the disease has gotten a start on one tree before you have started to spray with Bordeaux, apply a 6-8-100 or 8-10-100 Bordeaux immediately to the entire orchard and then pick all infected fruits and remove them from the orchard. They will be a total loss anyway, and if left in the orchard will be a source from which other fruits will become infected. Spray again in about one week, using a 4-6-100 Bordeaux and then spray at two-week intervals with the 4-6-100 mixture.

STUDIES IN SECOND-YEAR STRAWBERRY FIELD CARE

W. D. ARMSTRONG

For some seasons now in the strawberry sections of Kentucky there has been considerable doubt and confusion among strawberry

growers and workers as to the most profitable methods of handling the second-year strawberry field. There was so much interest and demand for this information that field tests were started in the summer of 1942. The plots were located in two uniform Blakemore fields in the Paducah-Benton section, one on the farm of Mr. Lester Harris, Kevil, Ky., and one on the farm of Mr. J. L. Brien, Benton, Ky.

The Trials

Following up some recent work by the U. S. D. A. showing the beneficial effects of heavy mowing of strawberry foliage just after harvest this was included in the trials. At each location four plots were mowed very close immediately after harvest. Two of these were then raked clean of mowed leaves and mulch and the middles were cultivated with one-horse scratching type cultivation on through the summer. The other two mowed plots were left without any cultivation or mulch removal. Four more plots had all weeds mowed off above the strawberry foliage and two of these were cultivated as above and two left uncultivated through the season.

Four more plots were selected and two of these were barred-off and worked out on June 2, immediately after harvest, and the other two were barred-off and worked out one month later. This was to compare early and late working-out and consisted of barring off each row to a six-inch strip and then chopping out six-inch chunks of this row every foot or so. Fertilizer was then applied to the barred-off rows and the middles then cultivated back down at once. Fertilizer was applied to all of these plots when the treatments were started, at the rate of 300 pounds per acre, using a 4-16-4 fertilizer.

June and July of 1942 were very hot and dry in this section. New, crisp, clean, green foliage quickly grew on the plots that had been mowed close and cultivated. These were the thriftiest looking plants all summer. In the non-cultivated plots there was much wilting of foliage on some of the hot days, especially in the unmowed plots. When weeds and grass crowded in later in the summer, a number of the plants in these plots died.

1943 Harvest Records—24-quart crates per acre (Average of similar treatments at the two fields)

Treatments	Ave. crates per acre	Ave. No. berries per 24-oz. qt.
Foliage mowed— middles cultivated	175	121
Foliage mowed— middles not cultivated	139	145
Weeds only, mowed— middles not cultivated	142	139
Weeds only, mowed— middles cultivated	159	129
Barred off, early June	135	122
Barred off, early July	122	123

NOTE: These figures were assembled quickly for this edition and may be subject to certain adjustments, but in general show the trend.

Discussion

In addition to the total yield, the size of the berries from the plots is very important. The berries were larger through the season on all cultivated than on uncultivated plots. This is an important consideration with the Blakemore variety that naturally tends to run small near the season's end. It should be pointed out that in both fields there were more cat-faced or deformed berries in the barred-off plots than in any other. The barred-off plots also required a far greater amount of labor in the original working out and in the follow-up cultivation, weeding and grass pulling than any other plots.

These results, showing heavy mowing, followed by the cultivation of the middles, to be more fruitful than barring off, are in line with some recent work done in North Carolina. If these trends hold true in other years, it will be a means of producing high strawberry yields on the second fruiting year, with less labor outlay than has been necessary in the past, using the barring-off system. There is undoubtedly considerable seasonal effect and local reactions to these various treatments; hence it is planned to carry this work on for several years to collect more information on the methods of renovation.

1943 STRAWBERRY MULCH TRIALS

Another Victory for Early Mulching

W. D. ARMSTRONG

Following up the outstanding results of mulching during the winter of 1939-'40, additional mulch plots were staked out in the fall of 1942 in the Paducah section of Western Kentucky. The results were again outstanding in favor of early winter mulching.

Earlier trials had included different plots treated with 1, 2, or 3 tons of mulch per acre. Part of these were mulched in mid-December, part in early February, and part in late March, with several plots left unmulched. One ton per acre had proved too little; three tons seemed too much for Western Kentucky conditions. The February application was dropped because the records showed that in most years severe winter temperatures were had before that date. The 1942 treatments decided on were the comparison of 1½ and 2-ton applications made in December and the same treatments made to other plots late in March, with no plots left unmulched. The treatments were made in triplicate on first-year Blakemores.

1942-43 Winter

Starting early in December cold spells, about 10° to 15° above zero, came about a month apart and were accompanied by high winds. In early March a severe cold spell went to about zero. This was followed by two hard frosts on April 15 and 16, and a light frost on April 22.

1943 Records

Averaged together, the December mulched plots (1½ and 2 tons combined) produce 124 crates per acre, while the March mulched plots produced 80 crates per acre. This was an increase of 44 crates per acre in favor of December mulching. In a small test on Tennessee Shipper near by, a similar increase of 50 crates per acre was had in favor of the December mulch.

In both varieties and for both the December and the March applications, the plots mulched with 1½ tons per acre yielded slightly more

than the plots where 2 tons were applied. This adds further evidence that over-wintering mulch in the latitude of Western Kentucky should be heavy enough to give reasonable protection, but not too heavy. For winters with heavy sub-zero temperatures, the heavier mulches would likely be justified, as in 1939-'40.

Commercial Observations

Over the whole Paducah-Benton-Mayfield section many first-year strawberry fields were not mulched early, chiefly because provisions had not been made for straw. The rainy weather in November and December, and subsequent freezes and thaws, made straw hauling and spreading during winter very difficult. Straw was scarce and sold from \$12 to \$15 per ton. Moreover, some growers are not yet convinced of the need for early winter mulching and others do not mulch for fear of the great amount of wheat and cheat that often comes up when poorly threshed straw is used for mulch. This last objection can be gotten around by hauling straw to fields in October and stacking in small piles or breaking bales so that the fall rains will sprout the seeds before the straw is spread.

Over the district most unmulched first-year fields contained many plants that showed internal browning and root injury from the cold. Also many plants failed to bloom and these started vigorous growth and early runner formation. While not as numerous as in some years, these are the same so-called "he" plants that fail to bloom because their fruit buds are injured by the cold.

It is now thought that strawberry prices will be good for several years and growers are urged to use all the best methods to get heavy yields. While there is a chance to gain 40 to 50 crates per acre of \$5 to \$8 berries by getting the mulch together and applying it in mid-December instead of delaying until March, it seems like bad business not to get this done.

The above discussion refers entirely to southern and western Kentucky, where mulching practices and times vary. In central and northern Kentucky growers have long since found they could not afford to tempt fate by leaving fields unmulched.

There they do a good job of early winter mulching and also use 2 to 3 tons or more per acre.

A CASE OF BORON DEFICIENCY IN WESTERN KENTUCKY

W. D. ARMSTRONG

Considerable mention has been made in several sections of the United States regarding boron deficiency symptoms in apples. To date a majority of this work has been done in the East, in the Far West and to some extent in the Midwest.

Ordinarily, soils contain enough boron, one of the minor rare elements that is needed only in small quantities, for satisfactory tree and fruit growth. It has been found, however, that when boron is lacking in the soil the fruits of the apple often become bumpy, have internal brown areas and internal and external corky spots. The surface of such fruits is also often badly russeted with an external corky area that often cracks. As for the tree, twigs are often caused to be rough and a certain amount of dieback of twigs may be present. These conditions have been corrected by the addition of small quantities of boron in the form of Borax or boric acid.

Following the severe winter of 1940, slight dieback was noticed in some Yellow Transparent trees on the grounds of the Western Kentucky Experiment Substation at Princeton. There was also noticed some slight disorder in the fruit on certain of these trees. In 1941, this disorder of internal and external cork of the fruit was more pronounced on certain trees and in 1942, the fruit from some trees had so much internal cork and browning that their entire crop had to be discarded. The trouble was definitely identified as being typical of severe boron deficiency. Experimental treatments of these trees known to be suffering from boron deficiency, were made this season but at this time it is too early to check the results.

It is suggested that others examine their fruit and if any of these symptoms are observed, to communicate with the Horticulture Department of the Kentucky Experiment Station, as the extent of this trouble is not generally known.

ORCHARD VITALITY THREATENED

A. J. OLNEY

Many orchards have not received the usual treatment with nitrogen fertilizers this year. Since continued production is dependent on a sufficient supply of nitrogen to the trees, growers should give the matter special attention at this time.

During the period when commercial nitrogen fertilizers are short, some other means should be found if possible. If available, manure may be used to supply this need. It should be recognized that the action of the nitrogen in manure is slow and application should be made in the fall or early winter to give the desired effect. Usually at least 200 pounds are needed to furnish nitrogen equivalent to 5 pounds of nitrate of soda.

A legume cover crop is another means of adding to the nitrogen supply. The kind of legume to be grown will vary with the situation and experience of the grower. Usually one of the clover family or a mixture of clovers gives best results. In many orchards lespedeza has proved most satisfactory. Where needed, lime and phosphate should be used to stimulate the growth of the cover crop.

An orchard that has a heavy sod has a good supply of nitrogen that can be made available to the trees by cultivation. One or two thorough cultivations in the early spring probably would take the place of a moderate application of sulfate of ammonia.

This should be followed by re-seeding to a legume cover crop.

It should be pointed out that cultivation over a considerable period is undesirable because of erosion and should be avoided.

On rough land or where erosion is serious and the land must be cultivated, strip cultivation and cover cropping should be practiced.

In old orchards where the shade is heavy, legumes will not succeed as well as grasses.

The use of low-nitrogen mixed fertilizers may be recommended to a limited extent to supplement the nitrogen supply. However, in most Kentucky orchards nitrogen is the only element that limits the produc-

tiveness of fruit trees and a decrease in the proportion of nitrogen in a mixed fertilizer decreases its effectiveness for orchard purposes. Mixed fertilizers are beneficial to the cover crop.

No general recommendation can be made to suit all orchard conditions. The procedure to be followed will depend on the growth and vigor of the trees. Failure to furnish a supply needed to provide adequate growth will show up in reduced crops next year and the years to follow. Hence, the importance of giving this matter serious attention now.

Fertilizer For 1944

It is hoped that the fertilizer situation may clear up so that more normal supplies may be available for 1944.

Quantities of fertilizer will be made available to different states in accordance with their needs. In order for Kentucky fruit and berry growers to get their allotment the Fertilizer Division of the Food Production Administration at Washington will have to be sent an estimate of next year's requirements.

We are asking each grower to send in a **Post Card** with the following information:

1. An estimate of kind and amount of nitrogen fertilizer needed between January 1, 1944 and July 1, 1944.
2. The acreage or number of trees to be fertilized.
3. The amount of fertilizer which will be applied this fall.

Send this information to:

Department of Horticulture
University of Kentucky
Lexington, Kentucky

HINTS AND OBSERVATIONS

By W. W. MAGILL
Field Agent in Horticulture

Bitter Rot

The alert apple grower "will not" get "too busy" to examine the crop at least twice each week for Bitter Rot appearance through late July

and August. Hand picking of infected apples followed by spot spraying with Bordeaux may give you a cash saving of \$100 per day.

Dried Apples

Influence your neighbor and friends to dry a liberal supply of summer wind falls. They will need them before another crop of fruit is produced.

New Sprayers

State your needs and demand for new spray equipment for producing the 1944 crop at once. This will give your local dealer a better chance to serve you.

Save Containers

Fruit baskets and other containers for 1943 crops are becoming almost unobtainable. To tide over this situation, all used containers should be saved and repaired, if necessary. A recent survey indicates that most Kentucky growers in the shipping areas have a fair stock of baskets on hand. In other areas the requirements are uncertain. Growers who sell on local or roadside markets probably will depend on used containers or on buyers to furnish their own containers. Paper bags suitable for handling local sales are available and will be used to some extent.

Consult your local bottling plants for empty, heavy paper 100 lb. sugar bags. They have no use for them. You will find they make an excellent apple package for your local farm sales. They are plenty tough, hold a bushel or more of apples, are easy to load into a motor car and the customers likes them. A 5c bag will therefore replace a basket.

Spray Lime

The best hydrated lime for spraying purposes is the form known as "chemical hydrated lime." Most of the so-called agricultural hydrates and those used in making mortar and plaster are too coarse to be satisfactory. These coarse limes contain small flinty particles that are very destructive to valve seats, pressure regulators, and spray nozzles. Expenses for repairs can be reduced by using the fine chemical hydrated lime.

NEW STRAWBERRY VARIETY —TENNESSEE SHIPPER

W. D. ARMSTRONG

In commercial trials over the entire state this spring the Tennessee Shipper Strawberry has shown unusual promise. This berry developed by the Tennessee Experiment Station has been tested here in the state for four years by the Kentucky Experiment Station at Lexington and Princeton. In these tests the berry showed great promise in comparison with such varieties as Premier, Blakemore, and Aroma. In 1942 the first plants for commercial testing became available and were secured by W. W. Magill, Extension Horticulturist. These plants were sent to Lexington and were fumigated with Methyl Bromide for crown borer control by Dr. P. O. Ritcher of the Entomology Department. The plants were then distributed over the state and placed with a few cooperative growers who agreed to give the plants a fair test with good commercial care and to report their results.

Some growers at Louisville and Covington reported a heavier yield from Tennessee Shipper than from Premier, and at Paducah it made a heavier crop than Blakemore. In all cases the fruit has been large through the season, very bright and attractive in color, and has stood shipping under ice. In a test shipment from Paducah to Chicago this variety went through better than Blakemore and Aroma, picked and packed in the same crate. In season, this variety ripens between Blakemore and Aroma. It blooms late and this year avoided a late frost that injured Blakemore blossoms.

In a mulch trial at Paducah this year Tennessee Shipper showed average hardiness. Plots that were mulched in December produced at the rate of 50 crates per acre more than plots that had no over-winter mulch.

Another new variety of the Aroma season, Tennessee Beauty, was also commercially tested in a limited way and is also showing great promise.

Plum Curculio Trends

In recent years the plum curculio has caused considerable damage to commercial peach production in Western Kentucky. In most seasons the chief concern has been with the early brood that appears just after the peach petals fall in the spring. In 1941 a heavy second brood also appeared that caused serious loss to the crop at harvest. Since that time the Special Horticultural Program has spent much time on this insect through the spray service and has received valuable help and guidance from the Entomology Department and Federal Entomologists.

As was pointed out in April Kentucky Fruit Notes by Dr. P. O. Ritcher, there was a second brood of curculio adults that appeared in late June and early July 1942. These started egg laying and a month-before-harvest spray was recommended in Western Kentucky. Most peach growers having a crop applied this spray and had very little injury from these late worms.

1943 Work and Trends

In May, curculio emergence cages were set up and stocked with wormy peach drops at Mayfield, Paducah, Princeton, Henderson, Bedford and Lexington. Mature worms started leaving the drops by May 15 at Mayfield and Paducah and by June 3 at Lexington in north central Kentucky.

In approximately one month after the first worms entered the soil to pupate, the first **adults** of the second brood began to emerge. This was true from Mayfield where the first, second brood curculios emerged on June 17 to Lexington where the first ones came out on July 2. Heavy rains over Western Kentucky about mid-June speeded up the emergence of many of these second brood adults. It has been known that

rainy summer seasons encouraged the emergence of the summer brood of curculio, while dry seasons encouraged the adults to remain longer in the ground before emergence. This fact was strikingly brought out at the Princeton emergence cage this year where only 4 to 6 adults were emerging each day, however, after a hard rain on the night of June 24, twenty-six adults emerged the following day. There was another hard rain on the afternoon of the 26th and eighteen adults emerged the next day. Since that time, emergence has been comparatively slow. All of this lends evidence to the fact that late curculio damage is apt to be much worse in summers where there is heavy rainfall during late June and early July.

In jarring for summer adults on June 28 and 29, large numbers were found in orchards near Paducah that have received a heavy early season spray and dust program. As in the spring, the greatest number of adults were found in the outside rows in the same locations where the most early adults had been found. As evidence that cleaning out fence-corners aids in control, one grower cleaned out and burned off all shrubs and rubbish on one side of his orchard but did not clean off a like location on the other side. In spring jarring, curculio were abundant on the trees on the uncleaned side while on the opposite side they could scarcely be found. Likewise, in late June jarring, second brood curculio were abundant next to the uncleaned fence row while they were still very scarce on the opposite side.

In another location near Mayfield, one grower had allowed a great number of pigs to range in his orchard and eat drop peaches during the early drop period. A few heavy fruiting trees in his yard corner were fenced out of the pig range. Many wormy drops could be found

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under these few trees in mid-May, while they were scarce in the regular orchard. On June 29, jarring in this orchard showed that curculio adults were plentiful on the 3 or 4 trees outside the pig range but they were very difficult to find in the large orchard, even on nearby trees. This is a splendid example of how the destruction of early season wormy drops can cut down the amount of late brood curculio.

Since a period of 3 to 4 weeks is generally required for eggs to develop in the summer brood curculio, no mature eggs have yet been found in the recently emerged adults. It is expected that egg laying will start during the second week in July in Western Kentucky and growers have been advised to apply another

arsenical spray about one month before Elberta harvest is scheduled to start.

Additional developments in this curculio study will be reported later.

Arsenical Injury to Foliage

Many fruit growers have remarked that they have an unusual amount of yellow and dropping foliage on their peaches and to some extent on apples and are wondering why. In most cases this is due to arsenical injury from the spray schedule. On very wet and rainy seasons like this year to date more of the arsenic becomes soluble and has a burning effect that causes many leaves to drop after turning yellow.