

KENTUCKY FRUIT NOTES

W. D. Armstrong, Horticulturist, Editor

SPRAY SERVICE NOTICE

Spray service letters are going out regularly to county agents in tree fruit sections of the state. Tree fruit growers who spray or dust for the control of insect and disease pests should find these notices of insect and disease development and spray material suggestions helpful. Every effort is being made to make this a valuable part of our horticultural program and a real service to growers.

Such growers as are interested in receiving these notices should contact their county agents and request this service. All county agents will receive these spray letters where there is a demand for the service in the county, and he reports these requests to the Experiment Station.

APPLE SCAB

W. D. VALLEAU

The apple scab fungus should be of interest to every apple grower who is trying to produce good fruit. Without a knowledge of the fungus it is not possible to understand when and why sprays for prevention should be applied.

A short statement of the method of overwintering of the fungus and the means by which infections take place may help in planning a spray program.

In the fall as soon as cool weather commences, numerous infections occur on leaves most of which do not develop sufficiently to become evident. After the leaves fall, the

scab fungus penetrates into the leaf where it produces groups of small, black fruiting bodies just evident to the eye on the surface of the leaf which is uppermost. During late winter or early spring some of these fruiting bodies grow larger than others during warm, wet periods, and in these spores or seed-like bodies are developed. These are arranged in groups of 8 in sacs which are shaped like sausages. Under a sufficiently high temperature and when the overwintering leaves are wet, these sausagelike bodies stretch out thru an opening in the black fruiting body and discharge the 8 spores into the air. These are then carried about by air currents, some finally lodging on new young leaves which are just unfolding. Here a scab spot quickly develops and, in about 8 days more, spores are produced which in turn may be washed or splashed to the young flower bud stems or other parts causing the flowers to drop. Later in the season the spores from the early spots may cause scab spots on the developing fruits.

During the spring new fruiting bodies on the dead leaves continue to ripen and to discharge spores during or following every hard rain.

If the late winter is cold and the spring dry, it is not likely that spores will be mature at blooming time or until after a hard rain, so that spraying may easily prevent scab. But following an open winter such as the present one, scab spores are likely to be mature when

the first green shows in the buds and be discharged with every heavy rain. On February 23, ripe spores were found in dead leaves at Princeton and it is likely that scab spores have already matured in many other orchards in western Kentucky.

This fact would seem to indicate that the early sprays recommended in the spray schedule may be necessary this year if the early and most dangerous infections are to be prevented. Therefore, growers should be prepared to put on the first scab spray as soon as the green of the buds is distinctly evident unless the early blooming period is warm and dry when the first spray may be delayed until rain threatens or until the cluster buds have separated.

SPRAY FOR RASPBERRIES

W. D. ARMSTRONG

The raspberry does best in cool weather and short summers, when diseases do not have an opportunity to build up to the destructive proportion that they do farther south. That is why they grow to such perfection in sections of Minnesota, Michigan, Pennsylvania, New York, and other northern regions. As they are grown farther south it becomes increasingly more difficult for them to succeed due to the warm weather and increased disease problems. This is particularly true of Kentucky, especially in the southwestern portion. Growth in Kentucky would be excellent if it were not for diseases.

Much experience, particularly with red raspberries, has been had in this section; and most of it has been sad experience for the grower. Leaf spot generally causes the loss of a great many leaves during the summer, and Anthracnose (or gray bark) and the leaf spot organism make further attacks on the weak-

ened canes during the summer and fall. Many of them emerge from the winter dead, and the verdict is that "*winter injury*" did it. In reality it is a combination of the several factors, and very often winter injury plays a very minor or no part at all in it.

It is generally recognized among horticulturists that summer spraying for the control of these diseases is a necessity if one intends to keep his patch alive over several years and make a profit. This was again expressed by our Mr. W. W. Magill, Dr. W. D. Valleau, Dr. J. B. Jordan, and Dr. G. M. Darrow of the U.S.D.A. at the recent Kentucky Horticultural Convention. Weather conditions, during the summer and winter, play a big part in the effectiveness of a spray program. Following a dry season benefits from spraying may be very small or cannot be noticed at all; but following a wet season such as 1938 it may be expected that very great effects will be noticed, often enough to mean the difference between the loss of a complete crop and a good harvest. The sprays are of comparatively little benefit to the crop of fruit to which they are applied but keep the leaves of the new canes clean and free from disease so that they may produce a crop the following year.

By an annual spray program of 3 or 4 Bordeaux sprays, 4-6-100 (4 pounds of copper sulfate (blue-stone), 6 pounds of lime, and water to make 100 gallons) a number of growers have kept fields alive and productive over a period of years. These sprays are generally started as the leaves are first pushing out in the spring, another following when the fruits are half grown, and two applications are given after harvest. One pound of calcium caseinate per 100 gallons of spray

is usually added as a spreader for the Bordeaux.

A recent examination of a Latham red raspberry planting at Princeton showed that fully 90% of the overwintering canes on a block receiving three summer Bordeaux sprays were alive. If none of the berries had been sprayed, one might have called it winter injury; yet the winter has been very mild so far. There is much gray and checked bark, particularly on those unsprayed. The same plots were treated during 1937, and the unsprayed portion came through that winter in good condition; and there was only 8 crates per acre difference in 1938, in favor of the sprayed plots. The difference from the 1938 sprays will be much more marked, however, as there will be practically no crop from the unsprayed portion; and the sprayed portions should yield a satisfactory harvest in 1939, judging from the present live canes.

In 1935 the sprayed plots showed an increase of 90 24-pint crates per acre over the unsprayed, a yield of 300 crates compared to 210. That winter, however (1935-36), all of the canes on the sprayed and unsprayed alike were killed. There was more disease than usual on both lots in the fall of 1935. However, the extremely cold weather of early 1936 could have been expected to and did cause a great deal of actual winter injury to the raspberry canes as well as fruit trees.

We can sum this up by saying that growers in Kentucky who are growing raspberries or are intending to grow them can well afford to give serious consideration to spray protection to their plantings.

Some plants of the Flaming Giant variety treated the same as the Lathams are showing consider-

ably fewer dead canes in the unsprayed portion. This seems to be in line with the general performance of the two varieties in this state. The fruit of the Flaming Giant is also smaller and poorer in quality than the Latham; however, it ripens a week to ten days ahead of the Latham, and some favor it because of this earliness. Trials of the Chief red raspberry at the Kentucky Experiment Station have shown it to suffer so severely from leaf spot defoliation and injury that it has proven practically worthless for this state.

STRAWBERRY YIELDS

Below we are listing figures released by the U.S. Department of Agriculture, Bureau of Agricultural Economics, which show the yield per acre of 24-quart crates of Kentucky and a number of the surrounding states that are shipping berries from a bit before to considerably after the time Kentucky berries are going on the market. These figures show that while there are five states in the group that had an average yield from 1927 to 1936 less than Kentucky, there are nine states listed that had an average yield higher than that of Kentucky; and the general trend seems to show slightly lower yields in the southern sections and higher yields as we go further north. With this picture of where Kentucky stands in relation to the other adjoining strawberry producing states it would seem that Kentucky growers could increase their average production considerably by paying more attention to recognized better production practices and by observing just how some of the other successful berry growers in their communities are handling their berry problems.

AVERAGE YIELDS PER ACRE OF STRAWBERRIES IN 15 STATES

State	Yield per Acre, 24-qt. Crates		
	10-Yr. Av. 1927-1936	1937	1938
Arkansas	43	35	60
Tennessee	47	57	45
Virginia	70	90	70
Delaware	59	65	45
Illinois	52	40	50
Kentucky	57	41	55
Maryland	66	80	55
Missouri	39	30	60
New Jersey	82	95	100
Indiana	65	70	80
Iowa	56	55	60
Michigan	60	110	40
New York	77	80	80
Ohio	59	80	75
Pennsylvania	65	100	70

SOME SUGGESTIONS FOR CORRECTION OF ALTERNATE BEARING IN APPLES

One of the big problems in apple production is the tendency for the trees of many varieties to bear a heavy crop one year and a light crop or no crop at all the next year. This alternate bearing brings many problems in marketing and production in general. The heavy crop of 1937, with all its serious marketing losses, has tended to spur efforts to aid the trees in producing lighter annual crops.

The present prospects of a heavy apple crop in 1939 have growers looking fearfully toward more marketing troubles—and wondering what they can do to have better quality fruit this year and to have some sort of crop in 1940, too.

During the past winter much was said at the several Horticultural Society Conventions in regard to evening up the fruit load of apples from year to year.

Professor Teske of Virginia, at the Kentucky Horticultural Convention recently, advocated light pruning when a light crop was in prospect, and heavy pruning when a heavy crop was in prospect. He advocated eliminating culls by cutting out the weak wood that bears most of the small, poorly colored apples on the inside of the tree.

Dr. Roberts of Wisconsin, in discussing apple tree performance recently, stated he preferred to prune the tree out fairly heavily on the crop year, and leave it alone on the year when it had no crop—and stated that he preferred to add nitrogen on the off-crop year, and add very little or none on the on-crop year. This is because *apple trees* give a delayed response to fertilizer as far as stimulating fruit bud formation is concerned. Heavy nitrogen added in 1939 would then encourage heavy fruit bud production in 1940 for a heavy crop in 1941—the next regular heavy crop year. However, a heavy nitrate application in 1940 would increase fruit bud formation in 1941 (fruit buds for the next year's crop of apples are formed about a month to six weeks after blooming time), for a larger crop in 1942—the regular short crop year.

In writing for the March issue of *Hoosier Horticulture*, Mr. E. V. Hawkins, apple grower of Mitchell, Indiana, pointed out that he did some fairly heavy pruning in the spring of 1937 ahead of that heavy crop on some 20 to 22 year old Grimes, Rome Beauty, Delicious, Stayman, and Winesap trees. He did not get all of the trees pruned. He states: "I cut some pretty big branches in some cases. This cutting, ahead of the heavy crop of 1937, reduced my thinning job, resulted in better size and color of fruit, and I could spray those trees much better. I might have cut

away a few bushels of apples, but I know that I got rid of a lot of cull apples and that I did not reduce the number of bushels that I could sell, and I know that those bushels I got were worth more money per bushel. The reinvigorating effect upon the tree resulting from the heavier pruning caused more of the pruned trees to produce good crops in 1938 than was the case in the unpruned part of the orchard. Although all trees are fertilized well, I find it increasingly difficult to maintain sufficient vigor in these *mature* trees without fairly heavy cutting which needs to be done about every other year. I think, too, that the most desirable time to do it is just ahead of the big crop year."

Of course, the above refers to mature bearing trees. Think these suggestions over.

A NEW PREPARATION FOR THE CONTROL OF THE PEACH TREE BORER—ETHYLENE DICHLORIDE EMULSION.

This treatment was developed by Oliver I. Snapp, U.S.D.A. Entomologist, Fort Valley, Georgia, and has been experimented with satisfactorily in Georgia from 1933 to 1937 and in southern Illinois and western New York in 1937.

"The results of experiments conducted in the states of Georgia, New York, and Illinois have shown that ethylene dichloride emulsion has a number of advantages over paradichlorobenzene (P.D.B.) for the control of the peach borer, *Conopia exitiosa* (Say). Ethylene dichloride emulsion is effective at low soil temperatures and can therefore be used late in the fall and early in the spring, when it is too cold for paradichlorobenzene to be effective. The material has also

given good borer control during midwinter in Georgia. It appears to be safer on young trees, as well as more effective than paradichlorobenzene. Furthermore, the ethylene dichloride treatment requires a minimum of preparation of the soil before treatment and no attention subsequent to mounding after treatment, and just as good results are obtained by pouring it around the trees as by the use of a sprayer. The cost is a little less than that of paradichlorobenzene."

Preparation of Emulsion

Care should be taken not to breathe too much of the fumes of the ethylene dichloride; hence, the emulsion should either be prepared out of doors or in a well ventilated room. Because of its low boiling point heat should not be used in preparing the emulsion.

Stir vigorously 9 parts (measured) of ethylene dichloride into one part of a good grade of potash fish-oil soap (30% soap, 70% water). Continue stirring until a smooth emulsion is made, then slowly add 8 parts of water and stir until the whole mass is smooth. This is the stock emulsion which contains 50% ethylene dichloride; and if 18 gallons of the stock emulsion were made up, it should contain 9 gallons ethylene dichloride, 1 gallon potash fish-oil soap, and 8 gallons of water.

Dilution and Dosage

This emulsion has to be diluted further before use and different dilutions and amounts used on different aged trees. The accompanying table gives the dilutions and amounts found most satisfactory for use on peach trees of various ages in the sections where the experiments were carried on.

Age and Size of Trees	To make 10 gallons of diluted emulsion for use on different age trees Use:		Strength of the Diluted Emulsion	Dosage of the Diluted Emulsion for Each Tree
	Water	50 percent Stock Emulsion		
	Gallons or Parts	Gallons or Parts	Percent	
Six years and older..... (Average size and larger trees.)	5	5	25	½ pint
Six years and older (Small size trees.)	6	4	20	½ pint
Four and five years	6	4	20	½ pint
Three years	7	3	15	½ pint
Two years	7	3	15	¼ pint
One year	8½	1½	7½	⅛ pint

When and How to Apply

For best results the emulsion should be applied in the fall about the same time P.D.B. is ordinarily applied, while the borers are small. Good results are to be had, however, if application is made any time during the fall or the following spring. Midwinter applications in Georgia have given good results and are considered satisfactory in the South.

"The emulsion can be applied either by spraying or pouring. The quantity should be regulated rather closely, since applications much in excess of the recommended dosage may cause tree injury. Applications are made by wetting the soil immediately surrounding the tree, and the lower part of the trunk should receive some of the material during treatment. No preparation of the soil before treatment is necessary on loose, level ground. In some cases, however, cupping the soil slightly toward the tree trunk to prevent the liquid from running off, or loosening the soil around the tree sufficiently to permit the liquid to be readily

absorbed will give better results. Several shovelfuls of soil should be placed against the trunk of the tree after treatment to prevent surface loss of the fumigant. The treatment requires no later attention.

"A tin household measuring cup holding one-half pint, with marks for one-eighth and one-fourth pint, will be found useful if the ethylene dichloride emulsion is to be applied by pouring around the tree. A bucket pump or a power sprayer can be employed for applying the material as a spray. With a little practice the quantity applied with a bucket spray pump can be regulated without difficulty."

Discussion

The above information is taken from leaflet E-424 by Professor O. I. Snapp, entitled Ethylene Dichloride Emulsion for the Control of the Peach Tree Borer, which can be had by addressing the Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture, Washington, D. C.

EDITOR'S NOTE.—We are calling the attention of Kentucky growers to this material which has received considerable publicity and discussion during the last year or so. It has demonstrated its effectiveness in borer control. This new weapon in the fight against the peach tree borer should give the grower a better chance for control than when P.D.B. alone was available. Tests of this material are under way at Lexington and Princeton. Results at Lexington in the fall of 1938 gave satisfactory control of borers. Late applications in November gave excellent control by this method while P.D.B. used at the same time gave very poor control. It is in this ability of the new treatment to give satisfactory control later in the fall than it is possible to get using P.D.B. that this material offers great possibilities. Many growers who have both peaches and apples have found that apple harvest interferes with the regular program of P.D.B. treatment of their peaches. Many of these welcome the ethylene dichloride emulsion treatment because it gives them more time in which to get their work done effectively.

The prepared emulsion is available from a number of manufacturers which also furnish directions for dilutions and dosage. A list of these can be had by writing to the Experiment Station.

This treatment can be given in the spring in the same manner as fall treatments. Peach growers who did not treat their trees for borers last fall are advised to treat them this spring, if there is a brown gummy mass around the base of the trees, with either this material or with the regular P.D.B. treatment. For a complete discussion of peach tree borer control by the P.D.B. treatment, refer to the September issue of Kentucky Fruit Notes.

NEW STRAWBERRY ASSOCIATION NAME

At the annual meeting of the Crittenden County Strawberry Growers Association on January 2, 1939, at Marion, Kentucky, it was decided to change the name of the association to Cumberland and Ohio River Growers Association. In the future it will be known by this name.

The association elected Mr. R. W. Winters, veteran berry grower, President; Mr. Rudel Price, Vice-President; and Mr. Herbert Cochran, Secretary-Treasurer. The directors elected were H. H. Clark, T. H. Fowler, and Roy Arnold, Crittenden County; R. R. Shelby, Livingston County. A director each from Caldwell and Lyon counties is to be elected in the near future. Most of the association's acreage is in Crittenden County; however, there is considerable acreage in Livingston, Caldwell, Lyon, and Union counties.

EARLY HARVEST APPLE FOUND RESISTANT TO WOOLLY APHID

In tests conducted by entomologists of the Virginia Agricultural Experiment Station the Early Harvest apple variety was found to be resistant to attacks of the woolly apple aphid. This study was started in 1935 and was conducted using twenty varieties of apples. Other varieties used in the test and found to be subject to woolly apple aphid injury were the Ben Davis, Wagener, Winesap, Mother, Stayman Winesap, King David, Northwestern Greening, Stark, Black Twig, Lowry, Jonathan, Tolman, Grimes Golden, York Imperial, Virginia Beauty, Tetofski, Duchess of Oldenburg, and Baldwin.

The Northern Spy variety again proved its resistance to this pest,

as it has been known for some time that this variety is resistant. While the Early Harvest is not considered an important variety in Kentucky, this information is very valuable, in that it gives the information as to a variety that can be grown in locations where woolly apple aphid injury is known to be severe and where other commonly grown varieties are not profitable because of it.

This woolly apple aphid is particularly injurious to young apple trees in the nursery, and in early years in the orchard. It attacks all parts of the tree but is particularly injurious on the roots where it is practically impossible to control the pest by spray applications.

EXPERT FORECASTS SPRAY RESIDUE AID

An unscheduled but interesting talk at the Washington State Horticultural Society Convention in Yakima was made by Dr. W. C. Dreessen of the United States Public Health Service. Dr. Dreessen has been in charge of the "human guinea pig" work in the Wenatchee laboratory where spray residue work is in progress.

Some 1200 persons have been examined to determine the effect of arsenate of lead material on their health, he said. Considerable time to complete the job will be required, but when it is finished, the Public Health Service will be able to determine exactly what amount of spray residue is harmful to humans; was Dr. Dreessen's opinion.

Of the 1200 examined, Dr. Dreessen said there were 700 men and 400 women and 100 children. They have been classified into groups: orchardists constantly ex-

posed to spray, consumers, and retired orchardists.

Each of these persons will be given three examinations before the work is completed, but Dr. Dreessen assured listeners there were already indications that recommendations would result that would materially aid in the spray residue problem.

It was the Public Health Service work already done that brought about last fall's tolerance changes. —Better Fruit.

ADVERTISING PROGRAMS SPREADING

C. E. Chase, Secretary-Manager of the Washington Apple Advertising commission reports—Washington growers are pleased with the advertising campaign the present season. Michigan, Ohio, Illinois, Iowa, and Kansas growers are pressing for state laws providing for compulsory payments for advertising of apples like those in Washington state.

A bill is being drafted in Michigan which provides for a tax of 1 cent per bushel to be paid by each grower for all apples he sells except those going to vinegar factories. Washington has such a law in force and they are collecting approximately \$100,000.00 annually which is being used to advertise Washington apples in a national way. Their program helps also to advertise and sell the apples from other states. Mr. Chase, manager of the Washington program, said recently at the Illinois Horticultural Society convention that the purpose of their campaign was being served as long as it stimulated the interest in, and the sale of apples; whether they were eastern apples or western apples.

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