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KENTUCKY FRUIT NOTES

W. D. Armstrong, Horticulturist, Editor

WATCH FOR RABBIT AND MOUSE INJURY

W. D. ARMSTRONG

Since practically all parts of Kentucky have been covered with snow of various depths for several weeks since Christmas, it is to be expected that many fruit trees, large and small, have been injured by mice and rabbits during this time when their other foods were scarce and hard to reach. The alert fruit man in many cases pruned off a number of small limbs on the snow so they would be eaten instead of the tree trunks. He also went to look his trees over for injury as soon as the snow went away. If this has not been done it would be well to do so.

Often rabbits and mice take off only the outer bark. On other occasions they take off the bark in splotches clear into the wood. In other cases, large sections of the trunks are entirely denuded of their bark. The first two conditions are often not serious and with some extra encouragement, if not alone, the tree will regenerate bark and cambium enough to effectively heal the scars and the tree will soon be normal again. However, in the third case, where the bark is completely removed in areas, these rarely heal over and the tree is set back, stunted or eventually dies in accordance to the severity of the injury.

In any case drying out of the injured tissues can be prevented and recovery aided by brushing a coating on the injured area at once. Several materials can be used satisfactorily. Ordinary shellac is one of the best coverings as it does not injure the exposed delicate tissues. Ordinary brushing grafting wax is well adapted to use as is ordinary melted paraffin. Some sort of portable wax heater is needed with these last two, but these are easy to devise. Asphaltum pruning paint is also used for such a covering with good results.

Treatment as described above should keep the wounds in good condition until spring. In the meantime preparation for additional repairs should be made. During February and early March long water sprouts should be taken and buried in the soil in preparation for bridge grafting. As is generally known this is a method of grafting in which a young shoot is attached below and above the injured area, bridging the healthy bark in these two regions.

Even very seriously injured trees can be repaired by a good job of bridge grafting. The work should be done as soon in the spring as the bark on the tree trunks starts to "slip". This will be about the time the leaves start out. Experience has shown that bridge grafting rarely pays on trees under two or three inches in diameter at the base. It is with the large trees that success is to be had with bridge grafting. When seriously injured, the small trees referred to above had best

be removed and replaced or if good bark is intact at the base, the tree can be cut off and grafted to another or the same variety. Due to the well established root system the newly grafted top will usually make a surprisingly fast growth.

Where mouse injury occurs low on the trunk of the tree or slightly underground, the soil must be dug away and in most cases the grafts can be placed in the upper edge of the uninjured bark of the large roots.

Directions for bridge grafting can be had from most any bulletin on budding and grafting. There is a U. S. Department of Agriculture bulletin, Farmers Bulletin 1369 on "Bridge Grafting."

Those having mouse injury might well take steps to poison these pests. Information and directions can be had from the Horticultural Department, University of Kentucky, Lexington. Those having young fruit trees, especially apple, that have not been injured and are still unprotected should thank their lucky stars and go right out and either place poultry mesh wire protectors about their trees or wrap them with heavy paper from the level of the soil up to eighteen inches or two feet above it.

ATTENTION: PEACH GROWERS

By W. W. MAGILL

The extent of injury to peach trees from the sub-zero weather throughout the state this week (January 16 to 20) cannot be determined as yet. Weather reports indicate that temperature at Paducah reached 10 below; Owensboro, 18, and Lexington, 12. Experience in the past has shown that the temperatures in the orchard were actually several degrees colder than official government reports in various towns.

Peach growers are urged to delay any winter pruning until the extent of this injury can be determined, and above all considerations not to dehorn any trees until after time for the growth to start in the early spring. Many of the peach growers still remember the sub-zero temperature of the last week in January of 1936. This week, in conversation with Joe Bray & Sons, commercial peach growers of Trimble County, they recall dehorning a certain group of trees during March, following the severe temperature of January, 1936, and mentioned the fact that all dehorned trees were killed outright, while the remainder of the orchard, left without pruning, has produced two good crops of peaches in 1938 and 1939.

An early issue of Kentucky Fruit Notes will carry a summary showing winter injury to buds and wood of peach trees as it shows up in Kentucky. All peach growers in the state will be interested in hearing the report of the extent of injury and live buds that may have come through in our variety test block here at the Experiment Station where such varieties as the South Haven, Halehaven, Belle of Georgia, the four Canadian varieties, and especially the Hardee and the Polly which are supposed to be extremely hardy of bud, are under trial.

A FIELD MICE CONTROL PROGRAM

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The relatively high infestation of field mice prevailing in orchard areas during the past year has

resulted in severe injury to trees in many orchards.

Various factors favored the increase of mice during the fall months a year ago, resulting in the carry-over of a large number of mice during the winter and spring. Conditions have been more or less ideal for mice to breed and increase this year and at this writing a warning is in order to bait and rebait the orchard particularly during the next few months.

During the period when the population of field mice is approaching or at the cyclic peak of abundance, it is obviously desirable to bait more freuently than during periods when the infestation is at a fairly low point. However, it would pay to lay out a program of field mice control and follow it consistently from year to year. If such a program is not followed, there is a tendency to apply control measures only when mice are numerous and in the majority of cases these applications are made after the greater part of the damage has been inflicted. I have suggested to many growers that it would be worth while to bait the orchards in the early summer and fall months, thereby reducing the resident mouse population, following with another thorough covering to destroy mice that migrate to the orchard just before the extreme cold weather sets in.

It is common to find certain heavily infested areas in an orchard where soil drainage and other conditions are to their liking. Such locations should be rebaited one or more times. I cannot emphasize too strongly the placement of baits in active runways and dependence largely on this method rather than the use of bait containers. Containers are of the greatest value to protect bait during the winter but in other periods it is advisable **to bait the mouse runways.** If holes are evident, drop bait in them. Two to four bait placements in active runways near a tree should be sufficient.

Rolled oats is a preferred food for mice. Steam crushed oats and wheat are taken readily although the latter two seem to be more readily accepted by meadow mice than pine mice. A bait consisting of rolled oats and wheat has proved very acceptable and it would be advisable to use it in late summer or early fall, following with steam crushed oats.

A seasonal program, involving the use of poisoned baits as follows, would be worth consideration:

Fall. Make a thorough coverage with rolled oats and wheat or with steam crushed oats the last week in October. Rebait a week later with poisoned apple, sweet potato or carrot. Grain bait may be placed in asphalt paper tubes and left in the orchard during December and January. Place paper bait stations in runways and cover them lightly with grass. One station per tree will suffice.

Winter. Between the third week in January and the middle of February, make a careful inspection of the orchard to observe the degree of infestation and treat areas where mice seem to be numerous. Use steam crushed oats or a bait combination of rolled oats and wheat.

Summer. Mice breed and increase most rapidly during the spring and summer months. In many orchards damage has been noted during early summer when food conditions appear to be optimum and there was no obvious reason for an attack of fruit trees by mice. In view of the pro-

lificacy of these pests, it would be helpful to make a summer or early fall exposure of steam crushed oats and apple or sweet potato baits. The latter task can be undertaken as time permits up to the latter part of August.

Following are formulas for the preparation of grain and vegetable baits:

Rolled oat bait. Mix together, dry ⅛ ounce of powdered strychnine and ⅛ ounce of baking soda. Sift the strychnine-soda mixture over 1 quart of rolled oats, stirring constantly to insure an even distribution of the poison through the grain. Thoroughly warm the poisoned rolled oats in an oven and sprinkle over them 6 tablespoonfuls of a mixture of 3 parts of melted beef fat and 1 part of melted paraffin, mixing until the oats are evenly coated. When the grain is cool it is ready for use.

If larger quantities of the bait are needed, use in the proportion of 1 ounce of strychnine, 1 ounce of soda, 8 quarts of rolled oats, and 1¼ pints of beef-fat paraffin mixture. In applying the coating it is very important that the beef-fat paraffin mixture be hot and the poisoned rolled oats thoroughly warm, otherwise it will not be possible to obtain an even coating.

Starch-coated wheat bait. Mix 1 tablespoonful of gloss starch in ½ teacup of cold water and stir into ¾ pint of boiling water to make a thin clear paste. Mix 1 ounce of powdered strychnine with 1 ounce baking sode and stir into the starch to a smooth creamy mass free of lumps. Stir in ¼ pint of heavy corn sirup and 1 tablespoonful of glycerine. Apply to 12 quarts of wheat.

Vegetable or fruit bait. Cut 2 quarts of apple, sweet potato, or carrots into half inch cubes. Mix ⅛ ounce of powdered strychnine and ⅛ ounce of baking soda and, using a box with a perforated cover (like a pepper-shaker), sift this over the freshly cut bait, stirring.

Prepared oats bait. Ready-mixed, steam-crushed oats bait is available, as usual, but at a slight increase in price this year. The price is as follows: In 25-pound bags @ $2.80 per bag, in 10-pound bags @ $1.25 per bag.

Editor's Note.—The crown borer continues to be one of the big problems in profitable production of strawberries in Kentucky. Late winter and early spring is the time to make plans for its control. In order that Kentucky growers might have the latest information on this insect, we are printing the summery of this recent Kentucky bulletin. The results and findings here reported are based on work recently done by Dr. P. O. Ritcher, in Western Kentucky.

Summary of Kentucky Bulletin 389

THE STRAWBERRY CROWN BORER

P. O. RITCHER

The strawberry crown borer, Tyloderma fragariæ (Riley) has been a serious pest of strawberries in western Kentucky for the past forty years. In this state, in addition to the cultivated strawberry, crown borer was found breeding in common cinquefoil and the wild strawberry. Common cinquefoil is abundant and often is the source of crown-borer infestation for nearby berry patches. Other investigators have reported that the crown borer has a single generation a year. In 1937, a small second generation was reared at Princeton, Kentucky.

The strawberry crown borer usually passes the winter in the adult stage under trash or in the soil. A very few crown borers pass the winter within infested plants and mature in February and March. It is concluded that no crown borer eggs are laid until early March. It is also concluded that the simplest way to secure data

on early egg-laying is to follow egg development by dissection of a sufficient number of females and correlate this with air temperatures. Egg laying continues from March until September. Eleven females laid an average of 62.7 eggs each during 1937. Some female crown borers laid eggs a second year. Total maximum egg production for a female which laid during the seasons of 1937 and 1938 was 142. Crown-borer eggs are always laid in the strawberry plant. They are usually deposited in excavations made in the crown or old leaf bases slightly above the origin of the lateral roots and close to the soil surface.

Plants attacked by crown-borer larvæ are killed, stunted, or may show no other effects except a reduction in number of runners and runner plants. In dry years, entire fields are often wiped out by crown-borer. Pupation of borer larvæ began between June 10 and June 16 in 1937 and 1938 in western Kentucky. First generation adults began emerging late in June. One parasite. Microbracon analcidis, Ashm. and two predators, Monocrepidius auritus Herbst and Hister americanus Payk. were found attacking the crown borer. Tyloderma foveolata (Say), a close relative of the crown borer, was common in strawberry patches. It breeds in Oenothera laciniata Hill and is not a strawberry pest.

Insecticides and barriers were tried as means of crown-borer control. Results of the tests do not warrant their recommendation.

Certain recommendations for crown-borer control are made as a result of this investigation.

1. New strawberry patches should be set at least 350 yards from a source of infestation. Field tests with 1,038 marked crown-borer adults showed that the beetles can crawl 300 yards without a source of food.

2. Plants for new patches should be dug between December 1 and March 1. Plants dug after December 1 rarely contain crown-borer larvæ, pupæ, or adults, and when dug before March 1, will contain no eggs. Plants dug too early for setting should be heeled in at a distance of 350 yards from a source of infestation.

3. Certified plants are preferred for setting new patches. Plants from infested patches can be used for starting borer-free patches provided they are dug before March 1 and properly cleaned and washed to rid of adhering adults. Plants from patches found to be free of crown-borer are preferred. Even certified plants should be dug early and cleaned.

4. Set strawberry patches only on land in cultivation for one or more years.

5. Destroy all berry patches after the second year of picking.

6. Destroy the common wild host of the crown-borer, common cinquefoil (five finger).

Editor's Note.—Strawberry growers who stay in the business year after year are the backbone of the industry. The growers that make the greatest profits are the ones that have a well-rounded production program regarding acreage, soil fertility, mulching, variety selection and insect control. In order to bring some of these items to mind it was considered worthwhile to publish the summary of the following bulletin, which is based on an intensive study of commercial strawberry growing in Kentucky, by Mr. W. W. Magill who has spent 17 years in strawberry work in Kentucky.

Summary of Kentucky Circular No. 295

COMMERCIAL STRAWBERRY GROWING IN KENTUCKY

W. W. MAGILL

Kentucky grows 6,000 to 10,000 acres of commercial strawberries

annually. The berries are shipped by refrigerator express and trucks to many northern and eastern markets, including Canada.

Marketing thru cooperative associations has been found to be the most satisfactory plan.

The dread of picking is the outstanding obstacle confronting the prospective grower. This can be overcome by depending on hired help to do the picking.

Any good tobacco land will produce strawberries. Soil building with green manure and superphosphate is advisable.

Preparation of the land in late fall is desirable.

The Aroma variety leads in Kentucky. Blakemore and Premier also are important. Everbearing varieties have not proved successful

Strawberry plants should be set in March or early April. Early runner plants are many times as productive as those formed in late August and September.

When plants are received they should be unpacked and heeled in as soon as they arrive.

The roots should be pruned before the plants are set, and the soil should be firmed around them, in setting. Blooms should be picked from the newly set plant as soon as they appear.

Frequent cultivation and hoeing the first year are essential.

Mulching is necessary to keep the fruit clean and conserve soil moisture.

Grading berries by the pickers is the most economical plan and is used by a majority of Kentucky growers.

A definite contract should be made between tenant and owner.

Yields of 100 24-quart crates per acre can be expected. A production cost of $54 per acre up to the beginning of harvest, and $1.25 per crate for picking, grading, packing container and marketing expense are fair estimates.

The crown-borer is the most destructive strawberry insect in Kentucky. After a field becomes infested there is no control measure. Infestation can be prevented by setting clean plants some distance from old plantings.

Grub worms can be prevented by using land that has been cultivated two years before strawberries are set.

THE VEGETABLE GARDEN

JOHN S. GARDNER

Although admitting that this will fall under the eyes of men engaged in the business of fruit-growing, it is nevertheless fitting that it should appear here, for a good garden is good business. In fact, a good garden may easily be the most important piece of business on any farm, if not for the money it may earn, certainly for the real money it will save. Because the savings are day-by-day savings they are not always appreciated, but taken in the gross, over the year, they are found to be not inconsiderable.

Now, gardens, like orchards, are "good" only to the extent they are planned, and tended by program. A good garden can not more "just happen" than can a successful fruit venture. But, gardens are so often judged by what takes place in one that was planted pell mell, and tended as time permitted, or as mood dictated. Such a garden must behave spottily; there must be periods of glut and waste, also times of scarcity and famine, and then one wonders whether a garden pays for all that has gone into it. While a person who had such a garden might not really find himself "in the red", his profits would be meagre.

It would have been so much

better to plan, starting with the making of a list of the vegetables the family likes or will use, proceeding with a schedule of times a week they are to be used in season, and through the winter, together with amounts used, finally to arrive at total amounts needed for the year. A short cut to all this is to use the list of winter vegetables shown in the back of Kentucky Canning Circular 314 and doubling it, for all-year totals. Next comes translating these totals into bushels by aid of another late page in this circular. Then from a table in the forepart of Kentucky Home Garden Circular 309, the feet of row of all the vegetables can be worked out. This total may seem greater than the garden can accommodate at one time, but all the vegetables do not occupy the garden together. Late crops may follow early ones and later crops of some, as for example, beans and sweet corn, replace earlier plantings of the same.

In the same circular are given row-spacing and seeding rates and other help in making the seed list. It is of advantage to do this early, especially with reference to the special varieties of tomatoes and cabbage, for these cannot always be had handily and time may be lost waiting for them. A good idea is to make a paper map of the garden on which to mark the rows, but they may be pegged out in the garden and memoranda made as to what they are to contain later. Again in circular 309 are given hints as to row arrangement and examples of ''companion'' and ''succession'' planting.

A completely planned garden saves labor, fertilizer and seed. Space is saved, too, and while this may not be important in many instances, there is the saving in convenience, over harvesting the various vegetables from the several ''truck patches'' scattered over the farm. Making plans also gives the gardener opportunity to consider what his fertilizing scheme shall be. Offhand, this may be to turn under manure, but fresh manure is not balanced for all the vegetables, for it contains an excess of nitrogen which causes some of them to ''grow to top''. As it happens, phosphorus is a most important plant food for all the vegetables, but particularly for those that are raised for their fruits and seed. To balance manure, superphosphate should be broadcast over the garden after it is broken, at the rate of 30 pounds to each ton of stable manure turned under, assuming that at least 10 tons are used per acre. If not that much manure can be spared, a complete fertilizer should be used instead of superphosphate.

Another important part of the planning should be to locate and provide adequate supplies of insecticides and fungicides for combating insects and diseases when they appear, and to secure a suitable duster and sprayer with which to apply the remedies.

Cultivation tools should also be gone over, so they will be usable when the time comes. At this time, in fact, the gardner might contemplate replacing his trusty, though tedious, hand hoe with the more efficient ''garden plow'', or wheel-hoe, especially the type that is fitted with the ''side-hoes'' that scrape or ''scalp'' the soil's surface, but leave the vegetable roots undisturbed. This is the only correct way to cultivate a garden.

Still another phase of planning concerns the storage space for the vegetables that are to be used during the winter. It would be well to make repairs on the storage cellar or to make plans to build one

this year. Kentucky Circular 266 is filled with suggestions in that regard. This circular and the others named are free for the asking; the county agents and home demonstration agents in all the counties have them for distribution.

In short, "planning" means preparations made "on all fronts" The time is now, before the rush begins. Started now, and carried through faithfully, a plan should yield results, in more vegetables produced in more orderly fashion, and in answering affirmatively the question whether a garden really "pays".

TIMELY HINTS TO FRUIT AND BERRY GROWERS

Strawberry Growers

1. Read the summaries of the two Strawberry bulletins that are published in this issue.
2. Make arrangements for plants for new patches—See the patch they come from, if possible, and be sure they are dug ahead of crown-borer egg-laying time.
3. If the Blakemore variety is being set—specify "only yellows-free plants will be accepted" on the order.
4. Arrange for mulching material and spread it as soon as possible, applying about 2 tons per acre.
5. Land that is to be set to berries should be plowed and fiitted as soon as possible, to be ready for early planting.

Fruit Growers

1. Complete repairs on the spray rig and order spray materials. Scale and Peach Leaf Curl are as much a factor as ever, as are other insects and diseases.
2. Remove all mummied fruits and fruit stems that are hanging in the trees and also remove those on the ground. These mummied fruits are the chief means of carry-over of bitter-rot of apples and brown-rot of peaches; also black-rot of grapes.
3. Scraping trees: Apple growers who had heavy losses from codling moth in 1939 are likely to have a heavy carry-over of worms under the bark scales of the trees. About two minutes of scraping on a tree in a heavily infested orchard at Paducah revealed 22 worms spun up in a small area near a crotch. This tree no doubt has several hundred overwintering worms on it that will emerge next spring as adults to attack the young fruits. Many of these worms can be destroyed by scraping this scaly bark off the trunk and as far up the limbs as can be reached. A canvas should be placed about the base of the tree to catch the scrapings, and these scrapings should then be burned in order to kill the worms.
4. Grape vines should be pruned by late in February, before bleeding starts. It should be remembered that this year's fruit is borne on shoots that develop on the canes that grew the previous year. In pruning, four or six canes of this new wood should be left that have from 10 to 15 buds each.

RECENT BULLETINS OF GENERAL INTEREST

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Establishing The Orchard. T. J. Talbert. (Mo. Agr. Exp. Sta. Bul. 202, 1939) Columbia.

Apple Bitter Rot and Its Control. John W. Roberts and Leslie Pierce. (U. S. Dept. of Agriculture, Farmers' Bulletin No. 938J. Rev. 1935.

Growing Fruit for Home Use. (U. S. Dept. of Agriculture, Farmers' Bulletin No. 1001) H. P. Gould. 1938.

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