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AGRICULTURAL AND MECHANICAL COLLEGE,
AUBURN.

- I. THE PEACH TREE BORER.
- II. THE FRUIT BARK BEETLE.

C. F. BAKER.

BIRMINGHAM
ROBERTS & SON.
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The Peach Tree Borer.

Of the insect pests infesting our fruit trees, the peach tree borer is one of the worst, for, while its work is not so much in evidence as that of those insects which defoliate the trees or attack the fruit, the injury is of a more serious nature and more likely to be permanent, because it is the base of the trunk itself which is attacked. The worms, or larvæ, live just beneath the bark, at and below the surface of the ground, eating away the tissues, and thus, in bad cases, eventually completely girdling and killing the tree. The injury in any case results in weakening the tree to a greater or less extent, making it far more susceptible to the attacks of other pests and to the influence of various adverse conditions.

It is too often the case that an orchard is considered similar to a paid-up investment which should yield a constant income without any outlay in either labor or money. In other words, the orchardist too often expects to receive "something for nothing." This is a great mistake always, and in the case of peach orchards the peach tree borer is one of the living evidences of that fact. An uncared-for peach orchard is almost certain to suffer, and suffer severely, from the attacks of this insect; and conversely the presence of this insect in considerable numbers in an orchard is but a too palpable reflection on the energy and thrift of the owner.

Here in the South, with our mild winters, there is abundant opportunity for owners of orchards to amply protect their property in peach trees by dealing with this pest as it should be dealt with, and this can be done at little or no expense.

This pest is not by any means confined to the South, but occurs almost everywhere peaches are grown, from the Atlantic to the Pacific. It apparently originated in the northeastern United States, having been first noticed from Pennsylvania.

All peach growers are familiar with the borer in the larval stage. For, as among most other insects, there are four stages in its life history: first, the egg; second, the larva; third,

the pupa, and fourth and last, the imago, or perfect insect, which in this case is a swift flying, bright colored little moth, measuring an inch to an inch and a half across the expanded

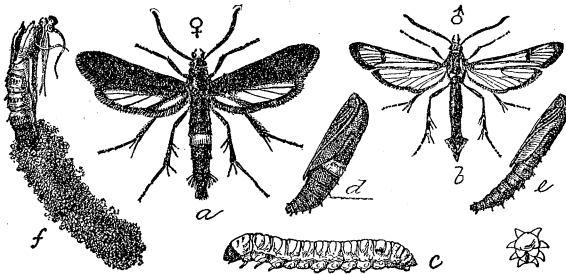


Fig. 1—The Peach Tree Borer in all its stages of growth; *a*, adult female; *b*, adult male; *c*, full-grown larva; *d*, female pupa; *e*, male pupa; *f*, pupa skin extended partially from cocoon; all natural size. (This and Figs 4, 5, 6 and 7 through courtesy of Div. of Illustrations, U. S. Dept. of Agriculture.)

wings, and strongly resembling a wasp in appearance. The moths are not often seen, and even then few know of the relation they bear to the peach tree

borer itself. The waspish appearance is undoubtedly a protection in many ways. They should be invariably destroyed

when found. These moths are very prettily colored, and the male differs most remarkably from the female. The wings of the male (see Fig. 2 *a*) are transparent and only bordered with blue, while the fore wings of the female (see Fig. 2 *b*) are blue throughout. The abdomen in both cases is blue, but that of the female is encircled by a broad orange band.

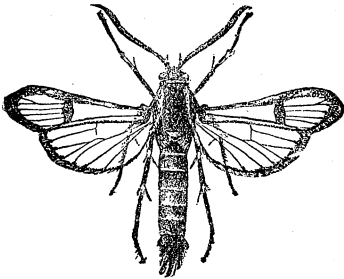


Fig. 2 *a*—Moth of the Peach Tree Borer; male. (From Smith's Economic Entomology.)

LIFE HISTORY.

During the spring these moths lay their eggs, which are yellowish brown in color and very small, on the bark at or near the surface of the ground. The eggs soon hatch, and the minute larva makes its way

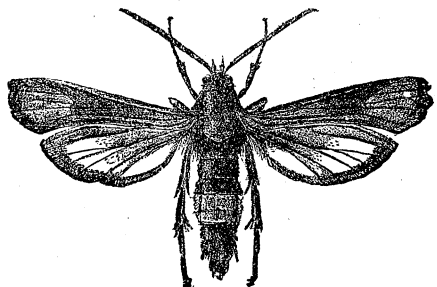


Fig. 2 *b*—Moth of the Peach Tree Borer; female. (From Smith's Economic Entomology.)

as rapidly as possible beneath the bark of the tree, where it at once begins feeding. It is at this point we look for a reason for the deposition of the eggs near the surface of the ground. We find it in the fact that the jaws of the young larvæ are too weak to pierce the tough and hardened bark above, but just beneath the surface of the ground they find entrance an easy matter.

Underneath the bark the larvæ feed through the summer, and in the extreme south off and on all winter. At the opening of the burrow there usually occurs a more or less copious exudation of gum, which is usually mixed with the droppings of the larva and with borings from the hole. This external evidence of the presence of the new worm is first observable about the middle of the summer. The larva frequently works well down into the main roots.

The next spring regular feeding is resumed, and continued until full growth is reached. In the far North this occurs in July or later. In the South the first larvæ mature very much earlier, and continue "coming on" throughout the summer. Here at Auburn larvæ of all sizes may be found in the trees at almost any time during the summer, thus rendering it very difficult to outline any well-defined brood.

As soon as full growth is attained, the larva forms about itself a protecting cell wall or cocoon of silk (see Fig. 1) and refuse, and within this changes to a pupa. In the pupal stage the larva loses largely its power to move, and takes on characters which somewhat roughly outline the future moth. It remains in this stage usually but a very few days, soon shedding its pupal skin and appearing as the moth we have already described, thus completing its life cycle.

It is very evident that with such an extended term of life allotted it, a great deal of injury is possible with even a single larva. The chances of life are indeed small for trees infested as, for instance, those of a very badly neglected orchard in Alabama examined by Prof. Earle, some of which had as many as fifteen and sixteen worms each.

REMEDIES.

In connection with remedies, two questions will naturally be asked. First, what is to be done with larvæ now in the tree and second, what must be done to prevent further attack. The method of dealing with larvæ, now most widely practiced, seems a rather heroic one, but is, on the whole, the most satisfactory. This consists in cutting the worms out with a sharp knife. To be properly done the work requires the personal supervision of the orchardist, for, when left in careless hands it will likely not only be half done, but probably result in more harm than good.

First remove the earth from about the base of the tree; then, by means of the exuded gum and refuse, locate the burrow, and by a *few* careful cuts follow it up until the worm is reached. Some orchardists prefer other measures than the employment of the knife. Removing the earth and painting the tree about the collar with kerosene has been recommended. Pouring hot water or kerosene emulsion about the base of the tree has also been mentioned. Some have removed the earth, put in a generous dressing of wood ashes, and replaced the earth over them. The ashes, by the action of water, produce a caustic lye, which, if it reaches them, will kill the borers, and at the same time will act as a fertilizer. Cutting the worms out, however, is by far the most satisfactory, certainly the most effective, method. It should be done during late fall or winter; *surely* before the middle of April in this latitude.

Just at this point comes the consideration of applications to prevent further injury, either by preventing the moths from laying their eggs on the bark, or by covering the bark with some mixture which will poison the newly hatched larva as soon as it attempts to bore in. We have some very simple applications, which combine both these qualities. This preventive measure should, as a rule, be applied before the earth is turned back against the tree. Many follow the practice of simply turning the earth back and mounding it up about the tree, doing nothing more than this. In this case the moth will de-

posit its eggs at the summit of the mound, where the newly hatched larva will usually be unable to bore through the hardened bark.

The most approved method consists in either tying tightly about the tree a broad piece of tar or other building paper, or coating the tree trunk with a mixture which shall either poison the larva or prevent its boring in. These should be applied before the earth is turned back, and should extend at least two inches below the surface of the soil and two feet above it. If the building paper is used it may be removed during the winter. Where other things are lacking straw, newspapers or old cloths bound tightly about the trunk will answer the purpose. Ordinary whitewash is cheap and easily prepared, and will serve the purpose admirably. To it should be added a small proportion of Paris green and some soft soap or cheap glue to prevent cracking or crumbling. This will have to be renewed if it should break up or fall off before the summer is through. Prof. Smith recommends white lead paint in boiled linseed oil as being serviceable on old trees, but adds that it should not be used on young trees, nor should turpentine be used to thin out the lead in any case. Extreme caution should always attend the use of white lead, and the fact that only *old* trees will stand it should be emphasized. An orchardist near Montgomery attempted its use on young trees. I am told that the orchard was completely ruined.

EXPERIMENTS AT AUBURN.

The peach tree borer is abundant in the vicinity of Auburn, so that a variety of experiments in connection with it have been possible. These have been carried out under the direction of Prof. Earle, who has kindly furnished the data for the following notes. Attention will be here called to two of these which have yielded important results.

On April 7, 1896, an orchard was gone over thoroughly and carefully "wormed" with the knife, some trees yielding as many as five and six worms each. A short time before this

the orchard had been sprayed with Bordeaux mixture* for various fungous diseases. After the trees were "wormed" the rather thick and sticky "tailings" or sediment, left from this Bordeaux mixture, was painted over the trunks and lower branches of the trees. This might have been improved somewhat by the addition of a small amount of Paris green. The trunks were painted to about two inches below the surface of the ground and the earth mounded back as usual. On March 26, 1897, the orchard was again gone over and carefully "wormed," but this time the two hundred and twenty trees yielded but forty worms, and eight of these worms came from two trees, which had evidently not been properly treated the preceding year. The treatment was considered successful—complete extermination the first year was not expected.

A substance called "Dendrolene" or "Insect Lime," and which has something the appearance and consistency of axle grease, has been used for this and similar purposes, as a coating for fruit tree trunks. It has been somewhat widely recommended through bulletins from various sources, more especially those from New Jersey and the Department of Agriculture. Its use may have been attended with success in New Jersey, but our tests of it here have resulted most disastrously. On April 5, Prof. Earle had it applied in the prescribed manner on several mature peach and plum trees. It killed about one-half of these outright and very seriously injured the remainder. In consequence of these results we do not recommend its use in Alabama.

*Bordeaux mixture, much used for various rusts, leaf-spots, or other fungous diseases, is prepared as follows: Thoroughly dissolve in separate receptacles, each with 25 gals. water, 6 lbs. copper sulphate and 6 lbs. *fresh* lime. Then pour together in a third vessel. Stock solutions of each may be kept on hand, but should not be mixed until wanted for use.

The Fruit Bark Beetle.

Although not as well known as the peach tree borer, the fruit bark beetle is almost as widely distributed through the South. At Auburn it is very abundant. Inquiries regarding it have come from other portions of the state also. Dr. Riley reported it from Macon, Georgia, as early as 1883. It has proven a serious pest in many portions of the eastern United States, and has been the subject of extended investigations, especially by the entomologists of Illinois and New Jersey.

The evidences of its work are very characteristic. A badly infested tree looks as if it had received a charge of fine shot (see Fig. 3), the holes being about the size of the head of a pin and larger. This appearance has given rise to the names "shot-hole borer" and "pin-hole borer."

As far as has been observed in this section, its attacks have been confined largely to peach, plum and cherry, the first mentioned being usually most affected. However, it is known to attack most other fruit trees also, including the apple, pear, quince, nectarine, etc. A close examination only will reveal its presence, although a casual glance may show the general health of the tree to be poor. It is, however, often the case that trees apparently in perfect health are found affected.

The fruit bark beetle is a very small dark brown beetle (see

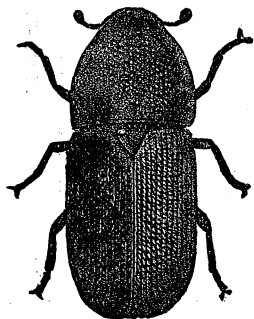


Fig. 4—Adult of Fruit Bark Beetle, greatly enlarged.

Fig. 4) about a tenth of an inch in length. The female, when ready to deposit her eggs, forces a hole through the bark, after passing which it turns sharply at right angles, and runs but a short distance farther. Along the sides of this tunnel, which has been called the "brood chamber," she lays (according to Prof. Smith) about eighty eggs. The eggs hatch in about three days though this occurs before the last eggs in the same brood chamber are laid. Each minute white grub

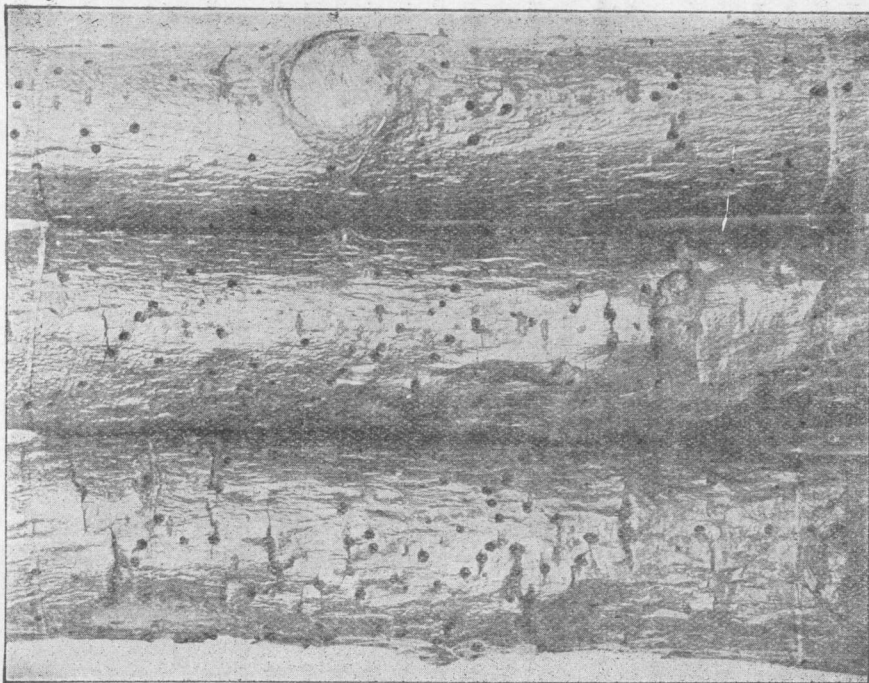


Fig. 3—External appearance of branches infested by the Fruit Bark Beetle.
(This and Fig. 2 through courtesy of Prof. J. B. Smith.)

(see Fig. 5) then begins the construction of a tunnel of its own, directed at nearly right angles away from the parent

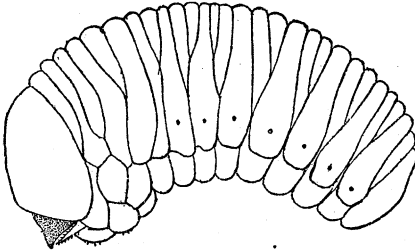


Fig. 5—Larva of the Fruit Bark Beetle, greatly enlarged.

brood chamber. These tunnels become more or less tortuous in their course, being continued to a length varying from one to two inches before the larva reaches maturity. In the slightly enlarged terminus of the tunnel the larva changes to a pupa (see Fig. 6), in which condition it continues for about ten days, at the end of which time it usually bores its way out as a perfect beetle, ready to carry on the work of constructing brood chambers elsewhere.

By carefully removing the bark on a portion of an infested limb or trunk, a good view can be had of the peculiar appearance (see Fig. 7) produced by these radiating galleries. When there are many brood chambers near each other, the result is a confused network in which it is difficult to trace the separate galleries. In cases of this sort, which frequently occur, the bark becomes almost entirely separated from the tree, girdling and killing it. In some bad cases observed at Auburn there have appeared on the bark from thirty to forty of these exit holes to the square inch.

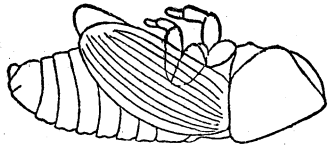


Fig. 6—Pupa of the Fruit Bark Beetle, greatly enlarged.

In the extreme South it is almost impossible to trace any broods. They seem to breed continuously through the spring, summer and fall. We have found here at Auburn in December, females in newly formed brood chambers, with males in attendance at the mouth of the burrow. We have found at this time larvæ also, so the insect must pass the winter in both egg and larval stages.

REMEDIES.

It seems very likely that the presence of this insect, as in the case of the peach tree borer, is an evidence of a lack of

proper care. It is the opinion of most observers that the fruit bark beetle will not attack trees that are in a perfectly

healthy condition. But, given a tree ill conditioned from lack of proper or sufficient food or other causes, and its liability to attack is very great. Very often such a tree might be saved by proper treatment, whereas given over to the tender mercies of this prolific little pest it soon perishes.

We have a good illustration here at Auburn of the relation of proper treatment of an orchard to the presence of this insect. In an orchard of mixed peaches, plums and cherries, which is properly pruned, cultivated and otherwise cared for, there is not a sign of this beetle. Not far distant is a similar orchard unpruned, uncultivated and uncared for. The bark of these trees looks like the top of a pepper box, and they are rapidly dying. In regions where the fruit bark beetle occurs, old, uncared for

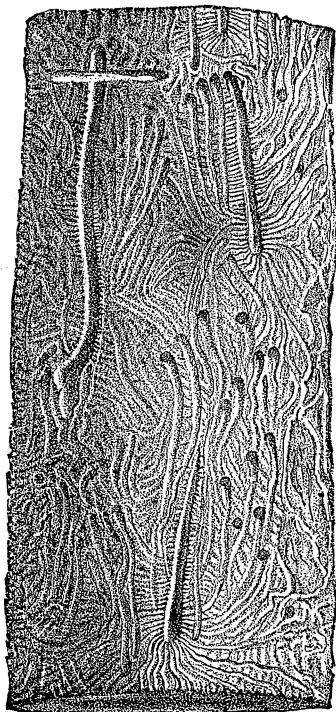


Fig. 7—Showing the peculiar appearance underneath the bark, resulting from the work of the Fruit Bark Beetle.

trees, along fence rows and in similar places, are almost sure to serve as breeding places and points of distribution for this insect.

The treatment for peach tree borer, so far as the application of whitewash is concerned, makes a good preventive measure for the fruit bark beetle also. This application should be carried above the origin of the main branches. But, further, all dead branches should be pruned out and burned *at once*. If they be allowed to lie or are piled up for use as fire wood, the beetles will escape and go on with their nefarious work. So burn them immediately. This work should certainly be done

in this latitude before the first of March. If a tree is found very badly infested cut it down and burn it up, trunk and branch. If such a tree be left, its death will shortly follow, and it will but aid in spreading the trouble. If the injury is confined to but limited portions these can be cut away and whitewashed over.

WHENEVER YOU ARE TROUBLED BY INSECTS

of any kind whatever, in the house or barn, on the farm or garden, in the orchard, in the store, warehouse, or mill, or anywhere else, send specimens at once, safely packed in a small *wooden* box, with the facts concerning them, to the Entomologist, Agricultural College, Auburn, Ala. He is stationed here at your service, and will give prompt attention to all communications, furnishing you with information regarding the insects and remedies for them, free of all charge.



