THE STRAWBERRY CROWN BORER

Fig. 1.—Strawberry crown borer; adult, pupa and grub (greatly enlarged).

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The Strawberry Crown Borer
LEONARD HASEMAN AND K. C. SULLIVAN

ABSTRACT.—The strawberry crown borer has become a serious pest of the strawberry industry in Missouri and is causing a vast amount of damage. The pest is single-brooded and breeds in the crowns not only among cultivated strawberry plants but also in the wild strawberry and in species of cinquefoil. It can be controlled and exterminated by the following methods. (1) Do not plant to strawberries land which has just been in strawberries or land on which the native food plants of the strawberry crown borer, wild strawberries or cinquefoil, have been growing. Use such land to some other cultivated crop for a season before planting strawberries on it. (2) In making new plantings dig the plants just as early in the spring as possible and use only certified plants. (3) Clean the plants thoroughly of all soil and rubbish before transplanting. Do not handle the plants in "the rough". (4) Make the new plantings as far removed from the old beds as is possible. (5) Plow all old beds up after the third crop is off, and plant to some other cultivated crop for a season.

In the past the commercial growing of strawberries in Missouri has been largely confined to the southern counties, but with more recent developments extensive acreages have been planted well up toward the central part of the State. This crop is relatively free from insect pests, but in the last few seasons the crown borer has been making serious inroads on the crop. It has even appeared in some of the newly developed sections.

It is possible to keep this pest under control so that it will not cause any serious damage to strawberries and it is the purpose of this bulletin to point out the habits and life history of the insect and to recommend methods of control.

DESCRIPTION

Adult.—The adult insect is a small chestnut-brown snout beetle about one sixth of an inch long. The adult is seldom seen in the field. It is small and its color blends so nicely with the soil that it is practically impossible for a grower to find it in the field. It also has the habit of curling up and feigning death when disturbed. Fortunately the adult beetle cannot fly as it possesses no real wings but only a pair of wing covers. This is very much to the advantage of the strawberry grower for, if this insect could fly, it would, in a very short time, infest every strawberry field throughout the country.

Egg.—In the early spring the adult female deposits a small whitish egg in the crown of the strawberry plant. The egg may be deposited at the base of a leaf petiole or even still lower down on the crown of the plant.

Larva.—In a few days the egg hatches into a tiny white grub with a chestnut-colored head. The grub is legless, somewhat curved and very much wrinkled. It begins to burrow into the pith of the crown and normally becomes full grown about the first of September. The full grown grub is about one-fifth of an inch long.

Pupa.—The larva pupates in the burrow which it makes in the crown of the strawberry plant. The pupa at first is white and very soft. It gradually takes on a light brownish color and becomes more rigid in structure.
LIFE CYCLE

There is but one generation of the strawberry crown borer each year. The insect passes the winter as the adult beetle under rubbish and dead leaves and in the soil in the strawberry bed. Just as soon as the soil warms up and the strawberry plants begin to grow in the spring, the adults become active and probably do more or less feeding on the young tender growth. Egg deposition is influenced a great deal by the weather, but in a normal season egg laying may start by the middle of March. Each female is capable of depositing several eggs and in bad infestations three or four eggs may be deposited in one crown. Ordinarily, however, only one egg is placed in each crown. Just as soon as the egg hatches the young grub starts burrowing downward and towards the center of the crown. As the grub increases in size the burrow becomes larger and by the later part of the summer when the grub is ready to pupate, the entire crown may be eaten out. The adult beetles begin to emerge in Southwest Missouri by the middle of August, and continue to emerge up to the first of November. The great majority, however, emerge during September. After emerging the adult may do considerable promiscuous feeding on the foliage of the strawberry plants and they may also scatter quite a little by crawling to nearby beds before cold weather begins. With the advent of cold weather the adult beetle digs under the rubbish and leaves and into the soil in the strawberry beds and remains until the following spring.

INJURY

As stated above the eggs of the strawberry crown borer are deposited very early in the season, so that only the old plants become infested. In other words, egg deposition is finished before new runners are thrown out and the young plants set. Plants which are formed during the growing season do not become infested with borers until the following spring.

The injury caused by the grub is most easily detected during the latter part of the summer, for by that time the grub has practically hollowed out the entire crown with the result that the plant takes on a sickly appearance. The lower leaves on such plants die and dry up and the upper leaves become pale and do not possess the deep green color of the leaves on a healthy plant. The infested plant stops throwing out runners. With a little experience one learns to distinguish the infested plants from the healthy ones as he walks across the bed. This is especially true with new beds. In new beds, only the mother plants which were set in the spring show infestation. In old beds the infested plants are harder to pick out but it is always in the old beds where the infestation becomes the heaviest. Where infestation by the crown borer is serious it is not uncommon to find from 75 to 90 per cent of the old plants, in a two or three-year-old bed, infested. An infested plant never produces a good crop of berries. When a bed becomes badly infested the only remedy is to plow it up.

HOST PLANTS

The strawberry crown borer is a native of the Mississippi Valley and before the cultivated varieties of strawberries were introduced it undoubtedly lived on the wild strawberry together with other plants which are closely related to the strawberry. In Missouri the wild strawberry grows profusely...
in waste places and the strawberry crown borer has been found breeding extensively in these uncultivated plants. There are also several species of cinquefoil (*Potentilla spp.* ) commonly called five fingers, which grow extensively in timber land and in waste places, and which develop an underground crown similar to the strawberry. We find the crown borer breeding in these plants and undoubtedly in many cases where new ground has been cleared and set to strawberries, which is a very common practice in South Missouri, the infestation comes from these native wild plants.
CONTROL

The control of the strawberry crown borer depends entirely upon definite field practices, and if these practices are carried out the insect can be thoroughly controlled and all injury prevented. After the crown borer once gets into a field of strawberries there is no way of exterminating it without plowing up the entire field for there is no spray or chemical known at the present time with which we can reach the grub. A spray of arsenate of lead, 2 pounds to 50 gallons of water, applied in the early spring and late fall to the foliage may destroy some of the adult beetles, but such a procedure is not an effective remedy. The only effective method of control, therefore, is to prevent the infestation of the new beds.

First.—It is important to remember that the strawberry crown borer must have one of its natural food plants, the strawberry or cinquefoil, upon which to feed and breed. Without a natural food plant it very soon starves out. It is therefore not advisable to set land to strawberries on which strawberries were grown during the past season. Neither is it wise to set new ground to strawberries on which wild strawberry plants or cinquefoil plants have been abundant. Such land should always be used for some other cultivated crop, such as tomatoes or corn for a season and then it can safely be put to strawberries. Also serious infestation may develop where wild strawberry plants and cinquefoil are allowed to grow along neglected fence rows. It is well to keep such fence rows plowed out and cultivated.

Second.—In making new plantings the plants should always be dug and transplanted just as early in the spring as possible. The adult female begins depositing eggs in the crown of the plant very early in the spring so if plants are dug after the middle of March they may harbor eggs and young grubs and carry infestation to the new plantings. Plants should always be dug before egg laying begins in the spring.

Third.—Just as soon as the plants are dug they should be thoroughly cleaned. All dirt should be shaken or washed from the roots and the lower leaves and trash removed. As has been pointed out the adult beetle is very small and since it harbors in the soil and trash in the berry beds it is very easily carried to new fields on uncleaned plants. The thorough cleaning of the plants is of great importance, therefore, in preventing the spread of the crown borer. It is a common practice in South Missouri to dig the plants in "the rough" as it is called. The plants are spaded or plowed out and thrown into sacks without any cleaning whatever. In this way much soil and rubbish is carried along with the plants, and it is undoubtedly due to this practice that the strawberry crown borer has become widely distributed over much of the strawberry growing district.

Fourth.—Make new planting on land as far removed from old berry beds as possible. The adult beetle cannot fly and it does not crawl far. New plantings made at a distance of from one fourth to one half a mile away from old berry beds, are not likely to become infested due to the adults crawling from the old bed.

Fifth.—A berry bed should not be fruitful longer than three years. After the third crop is off it should be plowed under and the field used for some other crop for a year or more. An old infested bed is a continual menace to all nearby
beds and it is never wise to leave an old bed for more than three years. One
year's cultivation to some other crop is sufficient to starve out the strawberry
crown borer and if desired the land can then be put back to strawberries.

![Strawberry crown borer; pupa in feeding tunnel made by larva.](image)

Infestation by the crown borer has become so serious that the Missouri
State Plant Board has taken over the inspection of all strawberry beds from
which plants are distributed commercially. Strawberry growers setting new
beds should, therefore, use only plants which have been inspected and certified
as free from crown borer infestation. With clean, uninfested plants set on 
uninfested ground and away from old infested beds or fence rows one should 
have no trouble with the crown borer for the two or three years the new bed 
is kept for fruiting.

![Fig. 4.—Old strawberry plant showing earlier injury by crown borer.](image)

The Missouri College of Agriculture at Columbia is prepared, through its 
department of Entomology, to assist strawberry growers in protecting their 
crop from the crown borer or other strawberry pests.

For a list of the certified strawberry plant growers address the Missouri 
State Plant Board, Columbia, Missouri.