

# FARM AND DAIRY

## RURAL HOME

### THE CODLING WORM, AND ITS CONTROL.

L. Casper, B.A., B.S.A., Ontario Agricultural College, Guelph.

**One Spraying, if Done Thoroughly and at the Right Time, will Control the Codling Worm in most Districts. The Ravages of This Insect Cost Ontario Farmers about \$1,000,000 last year.**

IF we except the few counties in South-western Ontario, where the San Jose scale is found, we may safely say that the Codling Worm is the cause of more loss to the apple growers of the province than any other insect, and, in fact, than all other insects combined. From numerous observations and inquiries made by the writer in different parts of the province the annual loss from this insect may be estimated at about 25 per cent. of the total crop; for while in a few districts not more than about 10 per cent. of the apples are wormy, in others as high as 75 per cent. are thus affected. If we change these figures into dollars we shall probably not be far astray in saying that at the prices which prevailed last autumn the farmers of the province lost the equivalent of about \$1,000,000 through the ravages of the Codling Worm.

Such a state of affairs naturally suggests the question whether this enormous loss cannot to a large extent at least be prevented. Our own observations and the experience of many of our best fruit growers show that this result can be brought about and that, too, without any great expense of either time or money. During the last summer the writer visited a good many orchards where fully 90 per cent. of the apples were free from worms, some of the orchards being in the district where there are two broods in the year. He also found by conversation with such well known apple growers as Harold Jones, of Matland, Mr. Grierson, of Oshawa, Mr. Jas. E. Johnson, of Simcoe, and Mr. D. Johnson, of Forest, that all these men in these widely separated districts had had excellent results in their fight against the Codling Worm, and had all secured an average of 90 per cent. of clean apples, and in some cases as high as 98 per cent.

But if we are to discuss intelligently the best methods of combating any pest we should first study the life history of that pest. We shall therefore try to give as simply as possible as much about the life and habits of the Codling Worm as is necessary to make plain the reasons for the methods of treatment that will be outlined later.

#### THE LIFE HISTORY OF THE INSECT.

**Hibernation.**—The Codling Worm passes the winter in the worm or caterpillar stage in a little nest, or cocoon under any sort of good shelter, such as a hole in any apple tree, the loose bark on the larger branches and trunk, rubbish around the base or on the ground beneath or near the tree, boards on the fence, or hiding places of any kind in storage buildings or packing houses.

**When the Moths Appear.**—When the warm weather of the spring is well under way the cater-

pillars in their cocoons pass through marvellous changes and about the first week in May some of them transform into pretty little gray moths or millers that fly about. (See Fig. 1.) All, however, do not become changed into moths at the same time, for almost two months elapse between the appearance of the earliest and the latest moths. The reason for this is that some cocoons are in warm locations where they receive the heat and light and so transform much more quickly than those situated in colder and darker places. It is important to keep this fact in mind when studying the Codling Worm as it will explain why we often find, say in July, full grown caterpillars in some apples, and very tiny, young ones in others on the same tree.

*How Long the Moths Live; Number of Eggs*

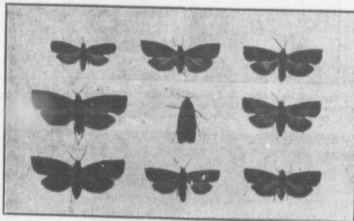


Fig. 1.—Codling Moth, Natural Size

It is estimated that a loss of from 10 to 75 per cent. of the apple crop results yearly from the ravages of this pest. This loss has a money equivalent of about \$1,000,000. Read the adjoining article dealing with this insect and its control.

**and Where Laid.**—Each female moth lays an average of about 40 eggs. The eggs of these moths that is those that come from the over-wintering caterpillars, are laid for the most part on the leaves, and not, as is commonly supposed, on the young fruit, though a small percentage is laid there. From a number of observations it is estimated that on the average a moth lives only about five days; so we may say that she lives merely to lay her eggs and then dies.

**Appearance of Eggs and Length of Incubation:** The eggs look like tiny, circular, nearly flat, white specks. (See Fig. 2.) The length of time necessary for the eggs to hatch depends partly upon the weather, and averages about eleven days.

**Habits of the Worms.**—When the young caterpillar is hatched it sometimes feeds to a slight extent upon the leaves but its main object now is to find its way to an apple. Many doubtless perish before catching it, but those that succeed find it very difficult to work their way through the tough skin without some good prop, so about 80 per cent. of them crawl around to the blossom end or, as it is commonly called the calyx,

and easily work their way down along the little leaflets there into the cavity at the base. Here they feed for some time before entering the apple proper. (This habit of the first brood of entering the calyx end and feeding in the cavity should be carefully noted, as it is largely the secret of the success of the treatment recommended.) On entering the pulp the caterpillar makes its way to the core. After feeding from three to four weeks it is full grown and either makes its way out before the apple falls to the ground or does so soon afterwards. It then at once seeks a sheltering place where it can make its cocoon.

**Number of broods in the Year.**—In most of the province there is practically only one brood in a year, but the fact that there are sometimes nearly two months between the time when the first and last moths appear naturally results in our finding caterpillars in all stages as late as August, misleading many into the belief that this indicates a second brood. There is, however, a second brood in the south western part of the province, noticeably in the Niagara district. This brood is usually much more numerous and destructive than the first. Where the second brood occurs the caterpillars of the first instead of remaining in their cocoons over winter only remain about from 15 to 20 days, and then come out as moths. More of the eggs of this brood are laid on the fruit than of the previous one, apparently about 50 per cent. being placed here. The rest are laid on the leaves and twigs. Not so large a percentage of this brood enter the calyx end although from 20 per cent. to 50 per cent. usually do so. The rest enter the side of the apple especially where two apples touch, access at such a place being comparatively easy. Caterpillars of the second brood may be found entering apples from about the first week in August to the middle of September. When these become full grown they form their cocoons in the usual type of hiding place and remain there over winter.

By the following brief calculation it is easy to understand how this brood can be so destructive. One female in the early part of the season lays 40 eggs, about 20 of which may produce female moths. Each of these laying 40 eggs there would be at the end of the season, 20x40=800 caterpillars of the second brood. Of course, in reality there never would be this number for many eggs never hatch, and many caterpillars die from disease or are killed by parasites, birds or other foes before they can enter the apples.

#### METHODS OF CONTROL.

**Birds.**—We have very valuable friends in the birds, especially the Woodpecker, Chickadee and Nuthatches, which, if not molested, would frequently our orchards both summer and winter and destroy many Codling Worms as well as numerous other insects. The writer has counted as many as 20 Codling Worm cocoons on the trunk of an apple tree from which the caterpillars had been removed last winter by Woodpeckers.

**Hogs or Sheep in the Orchard.**—Whenever hogs or sheep are allowed to run in an orchard they do much to keep down the number of Codling Worms by eating the fallen fruit before the worms