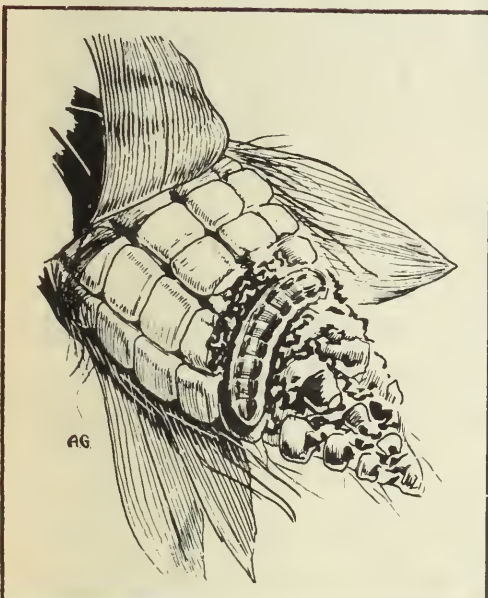



*Control of the*  
**Corn Earworm**

by D. D. POND



SCIENCE SERVICE · ENTOMOLOGY DIVISION  
CANADA DEPARTMENT OF AGRICULTURE

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# CONTROL OF THE CORN EARWORM<sup>1</sup>

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by

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## ECONOMIC IMPORTANCE

The corn earworm<sup>2</sup> is a serious pest of sweet corn in Canada, especially in the Maritime Provinces. Up to 1947, the earworm was noted only as a sporadic pest, occurring in outbreak numbers in Ontario in 1898, and in Manitoba, Ontario, Quebec, and the Maritime Provinces in 1911, when it attacked mainly late varieties of sweet corn. Since 1947 the earworm has been present every year in New Brunswick, serious damage to both early and late corn being reported in 1947, 1951, 1953, and 1955 and to only late corn in 1948 and 1952. The earworm has been found in every province of Canada except Newfoundland, usually being more abundant in New Brunswick. The "worms" in the ears are repulsive to consumers and troublesome to commercial canners. Also, molds develop quickly on damaged ears and the moldy ears may cause death to livestock.

## PLANTS ATTACKED

The earworm feeds mainly on corn, but often seriously damages tomato, tobacco, cotton, and vetch. After the corn plant matures, the "worms" may complete their growth on crab grass, beans, peas, okra, alfalfa, rose, savory, or dyer's weed. The earworm prefers corn, but it is apparently not greatly restricted by the absence of corn for it can complete its development on legumes. It also can and does, under favorable conditions, increase to great numbers on other plant species.

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<sup>1</sup> Revision of Processed Publication Series, Entomology, No. 105

<sup>2</sup> *Heliothis zea* (Boddie), formerly referred to as *H. armigera* (Hbn.).

## DESCRIPTION OF INSECT

The newly hatched "worm", or larva, is whitish and has a large black head and it is in this stage that it is often mistaken for the European corn borer<sup>3</sup>. However, the borer can be separated very easily from the earworm by gently probing the larva. The borer wiggles backwards immediately whereas the earworm lifts its head as if to ward off the probing and, if the probing is continued, curls up like most ordinary caterpillars when disturbed. After the first molt the earworm may vary from a light green or pink to brown or black with a yellow, unspotted head and dark brown or nearly black legs. There are alternating light and dark stripes running lengthwise on the back and side and two dark lines all along the middle of the back. The full-grown larva is 1 1/2 to 2 inches long.

## DESCRIPTION OF DAMAGE

In the southern part of the insect's range, damage is first noticed in the late-whorl stage of the corn. However, in Canada, the northern limits of its range, damage in the late-whorl stage has not been reported. Here, the silk is attacked first; this causes inadequate pollination and results in the formation of "nubbins". The kernels, especially at the tip of the ear, are eaten down to the cob. The ends of the ear have masses of moist castings. One of these "worms" found at the tip of the ear is detrimental to the sale of other lots of corn. As a result, corn sales are negligible during years of heavy infestation.

## LIFE-HISTORY

To date, this insect has not been reared outdoors through the winter in the Fredericton area. There are some indications that during favorable winters it survives in the Grand Lake area. Infestations in Canada are probably caused by a migration of the adults from points farther south.

The moths are strong fliers, flying during warm cloudy days and at dusk. Each moth may lay 500 to 3000 eggs. The eggs are laid singly on the silk of the corn and are round with ridges along the sides. They are yellowish and about half as large as a common pinhead.

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<sup>3</sup> *Pyrausta nubilalis* (Hbn.).



The eggs hatch in 2 to 10 days, depending on the weather. The young larva feed on the silk and gradually work down to the kernels.

The larvae become full-grown in 2 to 4 weeks. They drop to the ground and burrow into the soil to depths of 1 to 8 inches. Each larva opens a tunnel from the deepest point of the burrow to within half an inch from the surface. The walls of this tunnel are compact and lined with silk or a cementing material produced by the insect. When the tunnel is finished, the larva returns to the deepest point, which is slightly enlarged, and pupates within a few days.

In its natural habitat the earworm overwinters in the pupal stage but it is doubtful whether the pupae ever withstand the winter north of 40° north latitude. Survival north of this latitude would depend on the protection of the pupa from precipitation and extreme ranges of temperature.

#### INSECTICIDES AND RATES OF APPLICATION

The earworm may be controlled by 2 applications of insecticide at 5-day intervals. The first application should be made when the eggs are first detected on the silk. Several insecticides are effective. Of these, DDT and DDD are outstanding. Emulsions are more effective than wettable powders. Adding mineral oil increases the effectiveness of wettable powders but not of emulsions.

On large acreages, apply one of the following:

|                                   |            |
|-----------------------------------|------------|
| DDT, 20% emulsifiable concentrate | 1 gallon   |
| Water                             | 24 gallons |

or

|                          |            |
|--------------------------|------------|
| DDD, 50% wettable powder | 8 pounds   |
| Water                    | 25 gallons |

Apply at least 25 gallons of spray per acre. Direct the spray at the tips of the ears. Adding 3 gallons of mineral oil to 25 gallons of spray makes wetttable powders somewhat more effective.

In small garden plots, use 10 ounces of 20 per cent DDT emulsifiable concentrate for each 2 gallons of spray.

Dusts are satisfactory only against light to medium infestations. Those recommended are 5 per cent DDT, 40 per cent ryania, and 3 per cent DDD applied at the rate of 35 pounds per acre.

WARNING: Stalks treated with DDT or DDD must not be fed to livestock within 30 days of application.

### EQUIPMENT

Sprayers operated by gear-type pumps attached to power take-off units are economical and effective. A three-nozzle orchard broom has been found to give the most satisfactory coverage. The spray is directed at the ears and pressure is maintained at 120 pounds.

The broom method gives adequate coverage of two rows at a time when corn is grown in hills, and of 3 rows at a time in rows. Planting 4 to 6 rows of corn and 2 to 4 rows of carrots or parsnips in alternate strips aids in the spraying; this allows the sprayer to pass without crushing the corn.

Applying dusts with a paint brush to individual ears gives good results.

In small gardens, hand-operated sprayers or dusters are economical.

### TIME AND NUMBER OF APPLICATIONS

The control of this insect in Canada is difficult as infestations apparently depend on the flight of moths from the south and these flights take place only when climatic conditions are favourable. Hence, in Canada, varying the planting date gives little or no control. For an effective control program it is important

that the first eggs be discovered immediately. Once the silk appears, it should be examined daily for the presence of eggs. At least 25 to 30 ears should be examined daily. As soon as eggs are detected, control operations should begin. If eggs are found in the silk of 20 per cent of the ears examined, then a spray should be applied rather than a dust. The best control is obtained by two applications at five-day intervals.

For further information write to the Field Crop Insect Section, Entomology Laboratory, Fredericton, N. B., or to the Entomology Laboratory in your province.

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