

CORN EARWORM CONTROL— TIMING AND NUMBER OF APPLICATIONS¹

WALTER H. THAMES, JR.²

The ears of sweet corn require about eighteen to twenty-two days to mature from the time the first silks appear, based on observations of variety trials planted in March at Belle Glade, Florida. This period may be slightly longer or shorter, depending on the variety, cultural conditions, temperature during growth, time of planting, and area in which planted.

Sweet corn must be protected with insecticides for a part of this maturation period in order to obtain a high percentage of ears free from infestation by the corn earworm, *Heliothis armigera* (Hbn.). Throughout most of the year, with the exception of winter and early spring, DDT-mineral oil emulsions are the most effective insecticides, but there is evidence that these mixtures reduce yield. For this reason, as well as to reduce the likelihood of a residue problem and lower the cost, it is desirable to know the minimum number of applications required for effective control.

The following report of a trial conducted at Everglades Experiment Station in May, 1951, gives some information on control of corn earworms obtained by: (a) increasing the number of applications from three to six; (b) initiating a series of applications on the third, fifth, seventh and ninth days after the first ears are in silk; and (c) varying the interval between applications in a series from forty-eight to seventy-two hours.

In this trial Ioana sweet corn was planted in five blocks of forty-eight four-row plots. The corn was thinned to twelve inches. A DDT-mineral oil emulsion was prepared by mixing three quarts of 25 percent DDT emulsion with 2.5 gallons of a white mineral oil (Blandol) to which water was added to make fifty gallons. This insecticide was applied with a compression type sprayer fitted with a No. 6501 TeeJet nozzle to each side of the center two rows of the plots. The rate of application was fifty gallons per acre and the pressure was 60 pounds per square inch. The nozzle was held about nine inches above the top ears

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² Assistant Entomologist, Everglades Experiment Station, Belle Glade, Florida.

TABLE NO. 1.—CORN EARWORM CONTROL, EVERGLADES EXPERIMENT STATION, MAY, 1951. PERCENT WORM FREE EARS, NUMBER OF APPLICATIONS, INTERVAL BETWEEN APPLICATIONS, DAYS IN SILK WHEN APPLICATIONS WERE STARTED AND STOPPED, AND THE AVERAGE YIELD FOR EACH TREATMENT ARE SHOWN. MATERIAL APPLIED IS DDT-OIL UNLESS OTHERWISE INDICATED.

Treat- ment	No. of Applica- tions	Interval Between Applica- tions	Days After When Started	1st Silks When Stopped	Percent Worm- Free Ears	Average Yield in Pounds
1.	6	48 hours	3	13	96	37.7
2.	6	48	5	15	68	35.15
3.	6	48	7	17	39	37.9
4.	6	48	9	19	37	35.75
5.	5	48	3	11	92	37.25
6.	5	48	5	13	65	38.85
7.	5	48	7	15	55	37.05
8.	5	48	9	17	20	39.6
9.	5	72	3	15	83	38.35
10.	5	72	5	17	68	36.15
11.	5	72	7	19	50	37.55
12.	4	48	3	9	70	38.45
13.	4	48	5	11	79	36.35
14.	4	48	7	13	47	36.4
15.	4	48	9	15	18	38.9
16.	4	72	2	11	87	34.7
17.	4	72	5	14	63	39.2
18.	4	72	7	16	41	35.45
19.	4	72	9	18	15	35.45
20.	3	48	3	7	47	36.7
21.	3	48	5	9	55	36.75
22.	3	48	9	13	30	38.7
23.	3	72	3	9	70	39.05
24.	3	72	7	13	43	40.55
25.	3	72	9	15	19	38.7
26.	5	24	3	7	65	35.95
27.	4	24	3	6	45	40.85
28.	3	24	3	5	43	38.7
29.	2	24	2	3	0	37.7
30.	2	72	3	6	44	41.75
31. 5% DDT dust	6	48	3	13	37	40.85
32. 5% DDT dust	6	72	3	18	20	42.20
33. No treatment	—	—	—	—	0	36.70

L.S.D. at 19:1 20.4
at 99:1 27.2

of the stalks with the spray directed towards the ears at an angle of about forty-five degrees. The effectiveness of the DDT-mineral oil emulsion was compared with no treatment and with six applications of a 5 percent DDT dust at 35 pounds per acre, applied by hand with a rotary duster.

Results of each treatment were compared on the basis of the average percent of worm-free ears from a sample of twenty top ears harvested at random from each of the five blocks. Possible effects of number of applications on yield were determined by comparing average yield in pounds for each of the treatments.

The number of applications, time with relation to silking that a series of applications was started, and intervals between applications are shown in the table, together with percent worm-free ears and yield for each treatment. Some treatments, for which applications could not be made according to schedule, are omitted. All treatments were used in calculating the confidence limits shown.

The infestation of corn earworms was uniform and severe for the period of this trial, as shown by counts of eggs on silks of one hundred ears. This number increased from sixty eggs on 100 ears on May 11 to 190 eggs by May 18.

DISCUSSION OF RESULTS: A higher percentage of worm-free ears was obtained when the corn was protected to the twelfth day after silking. There was no significant difference in worm-free ears between four applications made at seventy-two hour intervals and six applications made at forty-eight hour intervals provided the series of applications was started on the third day after the first silks appeared in the trial.

The forty-eight hour interval appeared superior to the seventy-two hour interval when five applications were made, but the extended period of protection provided by the seventy-two hour interval resulted in better control when three or four applications were made.

Two factors were observed to introduce error in the results. The most important of these was uniformity of silking. Plots in which most of the ears were in silk by the second application showed a higher percentage of worm-free ears than those in which the ears developed silks slowly. The other factor was the variation in the number of ears with leaves in a position that deflected all or a part of the spray away from the silks. In one plot over 12 percent of the ears were partially covered by a leaf.

The yield in pounds of corn per acre was not significantly

affected by the number of applications in this trial, although highest yields were obtained with the dust applications.

Dust applications are not effective in controlling corn earworms when the infestation is moderate to severe.

It is concluded that a series of five applications of the DDT-mineral oil emulsion used in this trial, applied at two-day intervals starting as soon as the first silks are seen in the field, will give a high percentage of worm-free ears.

BOOK NOTICE

HANDBOOK OF TURTLES. THE TURTLES OF THE UNITED STATES, CANADA, AND BAJA CALIFORNIA, by Archie Carr. xv + 542 pages, 37 figures, 82 plates, 15 tables. 1952. Comstock Publishing Associates, Ithaca. Price \$7.50.

Although a book about turtles is far removed from the primary interests of entomologists, it was felt that a notice of its publication would be a service to the members of the Florida Entomological Society. This outstanding work, written by Professor Carr, Department of Biology, University of Florida, is a monument to his perseverance over many years.

Seventy-nine species and subspecies of turtles that inhabit the United States, Canada, and Lower California are treated in considerable detail. Though some may think that turtles are prosaic creatures, Dr. Carr soars to heights of rhetoric in describing their evolutionary history. "They [turtles] remained unimpressed as *Pteranodon* cruised the skies and another strain of slim and athletic archosaurs devised *Archaeopteryx* and the birds, and as the Squamata dabbled in mososaurs and snakes. They remained turtles; they even began to prosper as never before, while the dinosaurs bellowed and pounded down through the Jura toward their utter and senseless doom in the Cretaceous, when the last *Brachiosaurus* laid down his fifty tons to rest and the final tyrannosaur gasped out the anticlimax to nature's greatest venture in mayhem. . . ."

The turtles are discussed in general in Part I, the introduction. Part II gives accounts of the species, including keys. For each species there is a discussion of the range, distinguishing features, description, discussion of habitat and habits, breeding data, feeding habits, and economic importance.

The book is excellently written, well printed, illustrations and photographs clear, and the distribution of each species is mapped. *Handbook of Turtles* should be on the bookshelf of all zoologists interested in the field of natural history.—L. B.