

Timing and Efficacy of Corn Oil and *Bt* as a Barrier to Corn Earworm

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The historic use of oils as an organic pesticide for sweet corn dates back to the early 1930s when mineral oil was applied to corn silks using an eye dropper. Recently, a gun-shaped applicator was patented and is sold commercially as the *Zea-Later*. The *Zea-Later* is able to administer a 0.5 mL solution of oil directly into the silk channel. Previous work has shown that corn oil is effective against *Helio copvra zea Boddie*, but the timing and efficacy of the treatment had not been established. This article is a report on research which determined how long the oil application was effective in controlling the corn earworm.

Treatments were 1) food grade

corn oil; 2) *Bacillus thuringiensis* subspecies *kurstaki* (brand name Dipel DF); 3) corn oil and *Bt*; and 4) an untreated control. One-half ml of treatment solution was applied on day five from first silk. Laboratory-reared corn earworm were brought to the field on silk day three, six, nine, 12, 15, and 18. Two first instar larvae were placed on the silks of six randomly chosen ears in each plot on each treatment day. There were eight replications. The entire experiment was done in 2000 and 2001. Ears were harvested four days after each larval placement and evaluated for number of live, dead, or missing larvae, and the level of damage to each ear or silk.

Results of this study show that the effect of the oil and *Bt* treatments on the earworm larvae show significant differences between the control and the other three

treatments. In year one, the mean number of dead or missing worms for the oil and *Bt* plots was significantly higher than the mean for the control plots. In the control, one live worm was found on five of six harvest dates. In year two, fewer worms were found overall in all treatments, yet the highest mean number of worms found again was in the control plots on all six of the harvest dates (Figure 1).

In terms of damage to ears in year one and year two, 91% to 100% of ears that received oil, *Bt*, or a combination of the two were graded as clean on the final harvest date. In the control plots, the percent of clean ears was much lower — 65% and 44% in years one and two, respectively. The rating was based on clear evidence of corn earworm damage to the ear or silks, noted when the ears were

Figure 1. Number of dead or missing corn earworm found in ears at harvest following treatments of oil, *Bt*, or oil and *Bt* in 2000 and 2001

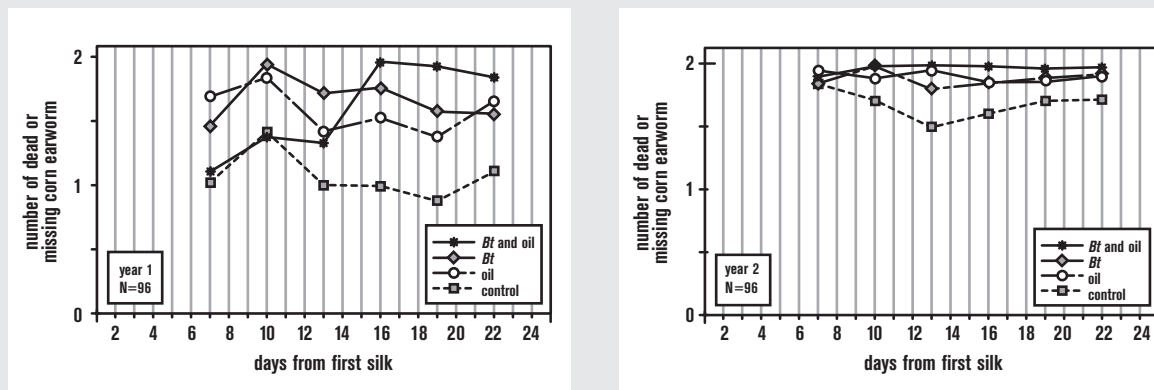
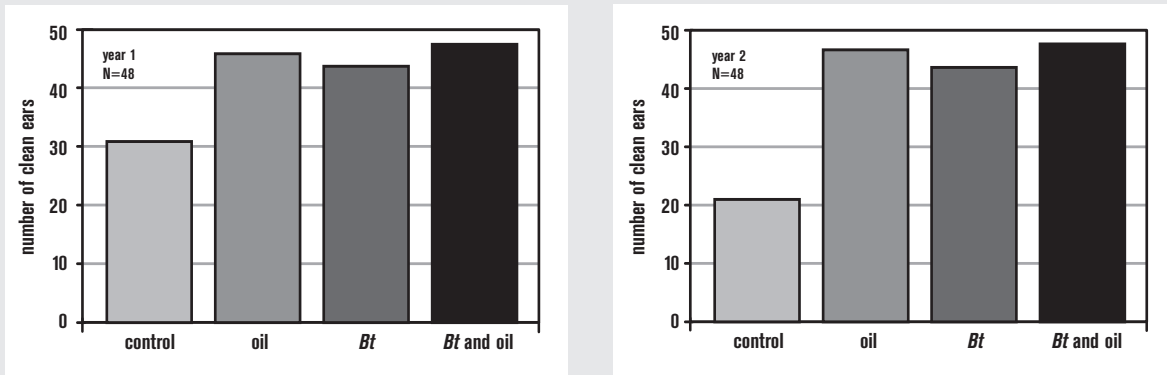


Figure 2. Number of damage-free ears found at harvest after sprays of oil, *Bt*, or oil and *Bt*



Note: Oil treatments were applied on day five of silking. Corn earworm larvae were placed directly onto silks.

husked (Figure 2).

The direct-silk application of corn oil provides an important means of corn earworm control for organic growers and an alternative method for conventional growers who need to apply pesticides after the larvae

have entered the silks. More marketable ears were consistently found in the treated plots versus the control plots. A one-time spray of oil, *Bt*, or oil plus *Bt*, offers a promising alternative to toxic chemical sprays that must be

applied every few days. These treatments were applied once, five days after first silk emergence, and still continued to be effective in killing earworm larvae all the way through the final harvest 17 days later.