FINAL REPORT FOR 2013 WORK

PENNSYLVANIA VEGETABLE MARKETING AND RESEARCH PROGRAM
PENNSYLVANIA VEGETABLE GROWERS ASSOCIATION

TITLE: **ADJUSTING THRESHOLDS AND TIMING OF SPRAYS FOR CORN EARWORM ON PROESSING SWEET CORN**

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(i) Will one or two targeted insecticide applications improve sweet corn yield compared to traditional IPM guidelines?

In 2012, our work revealed the importance of moth interactions with stages of ear development attractive for oviposition in sweet corn. When we tallied pheromone trap catches from silk to harvest, we did not find a correlation with yield reduction. But, when we tabulated trap catch values from corn tasseling to 20% dry silk, a very strong correlation (R=0.97) between trap catch and yield reduction was observed (Figure 1).

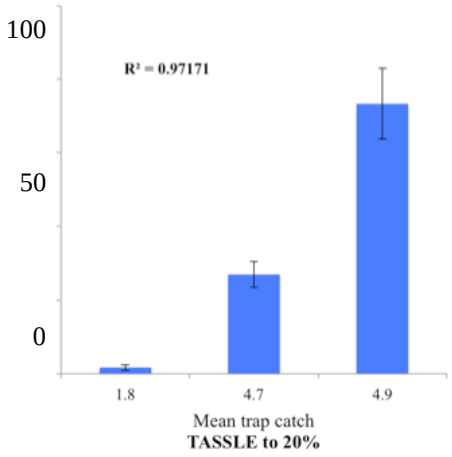

Figure 1. Correlation between yield loss and pheromone trap catch during early silk stages of ear development in sweet corn.

Female corn earworm moths are attracted to plant odors, volatiles, coming from fresh silk (Lopez et al. 1978, Archer and Bynum 1994, Bali et al. 1996). Fresh silk is a preferred site for laying eggs and subsequent development of larvae inside the ear of corn. Current IPM guidelines imply that the entire period of ear development from silk to harvest is relevant to yield loss in sweet corn. On the contrary, we hypothesize that only a narrow window of susceptibility is relevant, when developing ears produce a large quantity of plant volatiles from green silks.

We had hoped to collect data in 2013 that would support or reject our selective egg-laying hypothesis, but corn earworm populations across the northeast were at a 30-year low. We anticipate a better year in 2014 and will set up field trials to collect information we were unable to get in 2013.

(ii) Do diamide-class insecticides perform as well as industry standard pyrethroids?

New insecticide chemistries have been approved for use in sweet corn management. These new insecticides, the anthranilic diamides, have prolonged systemic activity and a higher degree of selectivity than traditional insecticides such as pyrethroids. We have evaluated diamide products since 2010 in the context of existing IPM guidelines that use threshold sprays and frequencies based on pheromone trap catches. These guidelines, however, were assembled long before new insecticides with longer activity were created. We hypothesized that diamide chemistries would be equally as effective as traditional insecticides including carbamates and pyrethroids, but with fewer treatments.

Previous results demonstrate the potential of diamide chemistries to control corn earworm as well as traditional chemistries (Figure 2). Anthranilic diamide products Belt SC (Bayer CropSciences) and Coragen SC (DuPont) performed as well as the pyrethroid Warrior (Syngenta) and carbamate Lannate LV (DuPont). We had hoped to collect data in 2013 to evaluate reduced frequency sprays, but corn earworm populations across the northeast were at a 30-year low. We anticipate a better year in 2014 and will set up field trials to collect additional information.

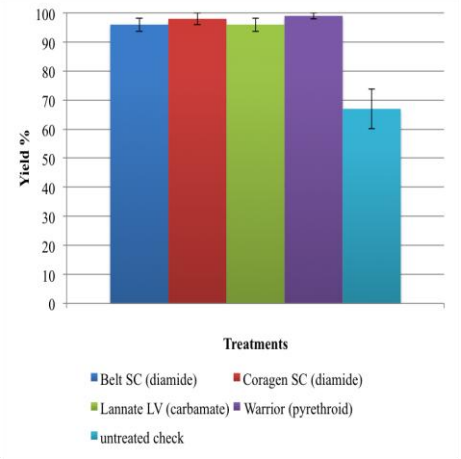

Figure 2. Diamide chemistries demonstrate equal levels of control and yield retention in sweet corn treated for corn earworm infestations..

(iii) Does insecticide treatment change the rate of oviposition on corn silk by corn earworm moths?

Based on data presented in (i) and (ii), we hypothesized that insecticide treatments, regardless of chemistry, will reduce the rate of egg deposition by corn earworm on treated ears. We had hoped to collect data in 2013 to evaluate the effect of insecticide applications on oviposition, but corn earworm populations across the northeast were at a 30-year low. We anticipate a better year in 2014 and will set up field trials to collect additional information.

Literature cited

Archer, T. L., and E. D. Bynum. **1994**. Corn earworm (Lepidoptera: Noctuidae) biology on food corn on the high plains. Environ. Entomol. 23: 343–348.

Bali, G., A. K. Raina, T. G. Kingan, and J. D. Lopez. **1996**. Ovipositional behavior of newly colonized corn earworm (Lepidoptera: Noctuidae) females and evidence for an oviposition stimulating factor of male origin. Ann. Entomol. Soc. Am. 89: 475–480.

Lopez, J. D., A. W. Hartstack, J. A. Witz, and J. P. Hollingsworth. **1978**. Heliothis zea: oviposition on corn and sorghum in relation to host phenology. Southwest. Entomol. 3: 158–165.