Developing A Species Specific Monitoring System For Corn Earworm (*Helicoverpa zea*)

T. B. Adams, P. J. Landolt[1], R. S. Zack

Department of Entomology, Washington State University, Pullman, WA, USA 99164
[1]USDA-ARS, Yakima Agricultural Research Laboratory
5230 Konnowac Pass Rd., Wapato, WA, USA 98951

With the pheromone monitoring system currently in use, growers are often unable to accurately sort true corn earworm (*Helicoverpa zea*) from other moths including false corn earworm (*Heliothis phloxiphaga*). When these other moths are captured in corn earworm monitoring traps, confusion in identifications may sometimes lead to unnecessary pesticide sprays targeted for corn earworm. The goal of this research is to develop a more specific monitoring system for corn earworm.

In trying to develop such a system, several objectives were established. First, we wanted to find a pheromone blend that reduces the capture of false corn earworm. In trying to find the best ratio of chemicals we started with a four component Klun blend and modified two of the four components; Z-7-16:Ald and Z16:Ald were manipulated in a range of from 0-30%. Each component was changed individually and tested. Then, both components were changed together in equal ratios of from 0-30%. A second objective was to find the best rubber septum that would optimize the stability and release of the corn earworm pheromone. Five different septa were tested: West Red, West Gray, Aldrich, Israeli, and Thomas. A third objective was to find the best pheromone dose that would optimize the capture of corn earworm while minimizing the capture of false corn earworm. A forth objective was to find the best trap design for corn earworm while excluding false corn earworm. Traps tested were the Universal moth bucket trap, the cloth mesh trap, the Multipher trap, the Agrisense dome trap, and the Nadel trap. A comparison of the traditional monitoring system with our newly developed monitoring system was conducted. For the traditional monitoring system the cloth mesh trap and a commercial corn earworm lure were used, while for our monitoring system the Universal moth bucket trap and our pheromone blend, dose, and a West Red septum were used. A second part of this project was to define the seasonal phonologies of corn earworm and false corn earworm.

All tests consisted of 5 treatments replicated 5 times in a 5X5 experimental design. The universal moth bucket trap with a vapona pesticide strip in the trap was used in all tests. At each test site, traps were placed 33 meters apart in a north-south orientation, traps were placed at a height of 0.5-1.0 meter. Traps were checked twice a week and moths were counted and recorded. Pheromones were changed once a month and the vapona strips were changed every two weeks. All tests were conducted near Mattawa, WA, outside of corn fields. A system comparison test was conducted with 2 treatments replicated 10 times.

A corn earworm pheromone blend that contains 30% Z-7-16:Ald reduced the number of false corn earworm trapped by 80% (Figure 1). The best rubber septum for stability and release of the corn earworm pheromone was West red (Figure 2). A pheromone dose of 1.0 mg was optimal for corn earworm capture (Figure 3). The bucket trap is as efficient as the cloth mesh trap for the capture of corn earworm (Figure 4). The new trapping system captured fewer false corn earworm than the traditional trapping system (Figure 5). Other advantages of the new trapping system include the fact that the bucket trap is cheaper and lasts longer than the cloth mesh trap and moths trapped with the new system are killed making them easier to identify thus helping to make sound management decisions. Seasonal phenology studies of 1999 (Figure 6) and 2000 (Figure 7) show that false corn earworm appeared about two weeks before true corn earworm.

Figure 1

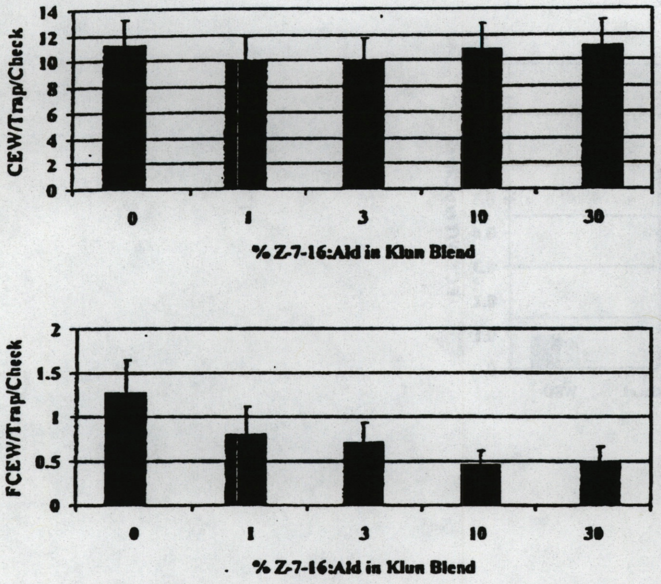

Figure 2

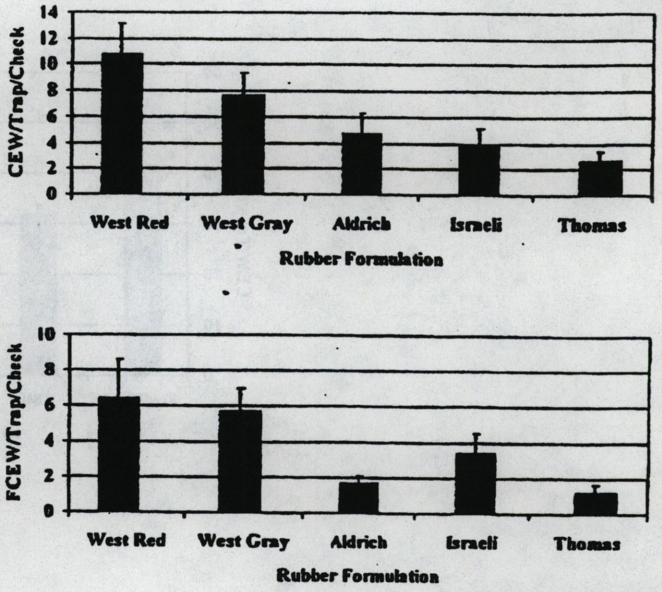

Figure 3

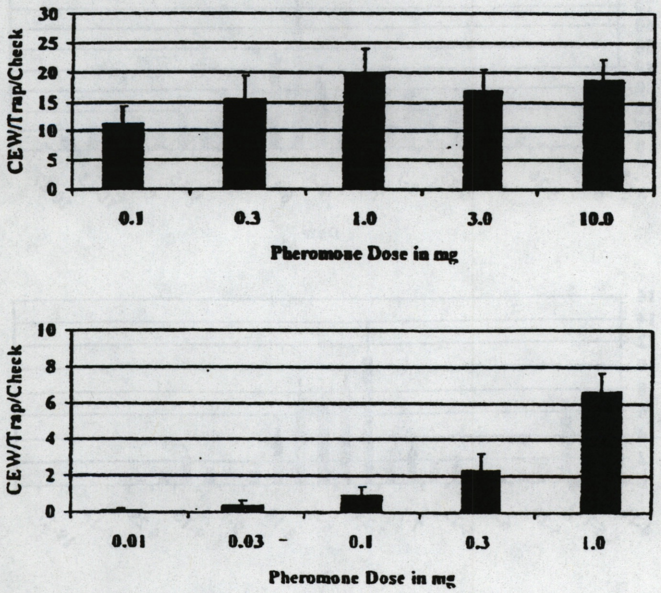

Figure 4

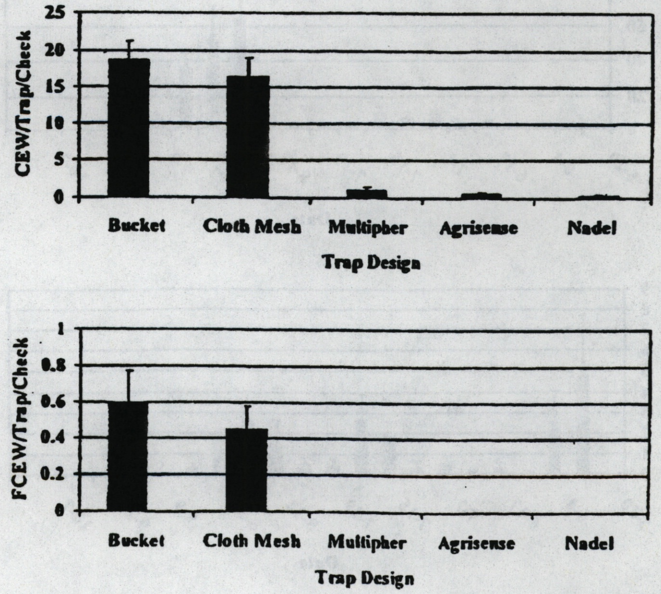

Figure 5

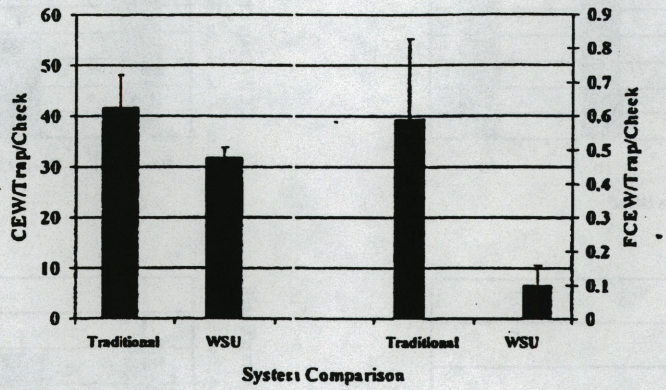

Figure 6

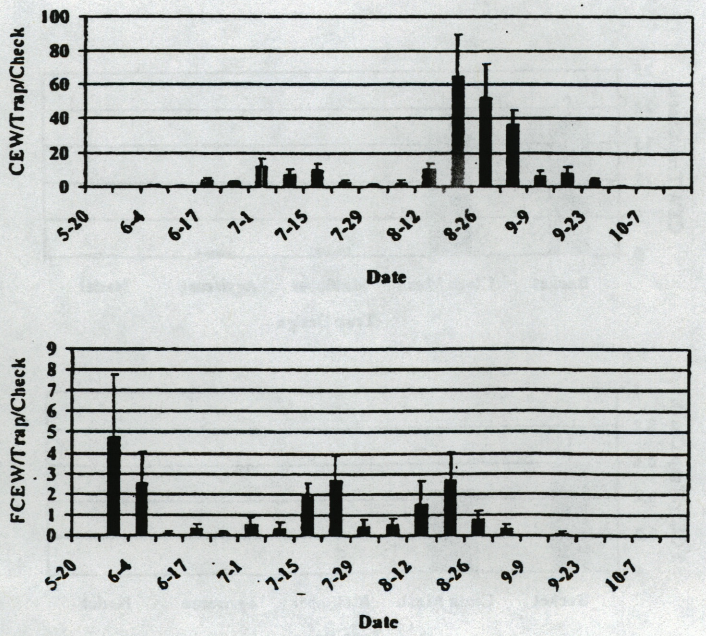

Figure 7