Western Bean Cutworm Pheromone Trap Network and Scouting Advisory System

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Introduction

The western bean cutworm (WBC), *Richia albicosta* (Smith) (Lepidoptera: Noctuidae) is an insect that causes larval injury to corn (maize) and dry beans. Historically, economically damaging populations have occurred in western states, especially Colorado and Nebraska. During the 2000 growing season, western Iowa producers observed cornfields with yield-reducing ear damage consistent with WBC feeding. Pheromone trap captures confirmed WBC populations in the following years.
Iowa State University extension partnered with Pioneer Hi-Bred International, DuPont Midwest and University of Illinois crop sciences to establish a 4-state network of traps to monitor WBC populations.

Biology

Western bean cutworm is univoltine (one generation per year), shown in Figure 1. Adults (1) emerge from pupae in mid-summer, mate and place eggs (2) on host plants. After 5 to 10 days, eggs hatch (3); larvae feed for a few days on leaf tissue and pollen before they crawl to silks and enter young ears (4). In the ear, larvae feed on developing kernels. When larval development is complete (5), they emerge from the ear, drop to the ground, then burrow under ground and form overwintering cells, pupating the following summer (6).

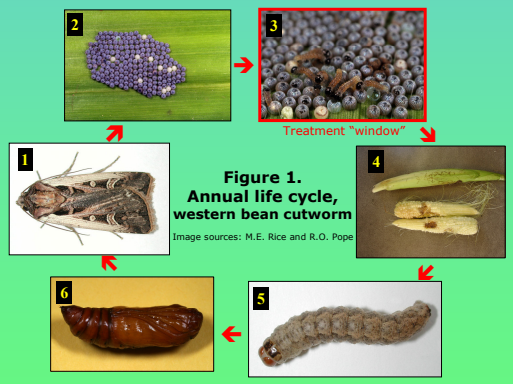

Figure 1. Annual life cycle, western bean cutworm
Image sources: M.E. Rice and R.O. Pope

Methods

A network of pheromone traps was established to monitor when peak adult emergence occurred by region so that scouting efforts could be targeted.

Traps were constructed from empty, one-gallon plastic milk cartons that had windows cut in the sides and a reservoir of propylene glycol antifreeze for moth capture and preservation (Figure 2). Traps were baited with WBC pheromone (Scentry Biologicals, Inc., Great Lakes IPM, Vestaburg, MI).

The objective was to monitor intensity of emergence chronologically to estimate adult emergence patterns for the trap's geographic area.

Figure 2. A reservoir trap with an active night's capture. In 2006, the peak one-night capture from all traps was 537 moths in Benton County, Iowa.

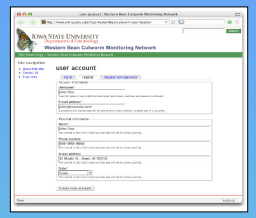

Figure 3. User set-up page for a trap site.

The site URL is:
www.ent.iastate.edu/trap/westernbeancutworm

Internet Reporting

Cooperators were provided with WBC pheromones and instructions about establishing an account for reporting to the web (Figure 3). Once a site was established, the cooperator was encouraged to enter data as they were collected. The web preserved the data and the table below shows on site's data by calendar date.

Use of Data

The data were public, and interested people could check traps within their area for WBC emergence progress. Scouting was encouraged when moth flights neared a peak. Figure 4 shows data from an Ida County Iowa trap displayed with a peak flight on July 21. Egg masses are most commonly placed on upper surfaces of the ear leaf or the leaf immediately above or below the ear leaf (Step 2 of Figure 1). Egg masses typically range from the size of a dime to that of a quarter, and eggs are cream colored when fresh, and within a few days turn purple as hatch nears.

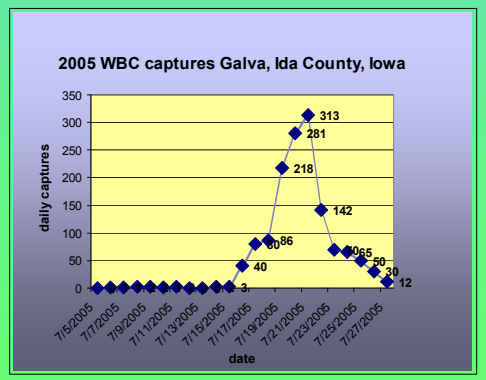

Figure 4. 2005 trap capture data from the Duane Babcock farm, Galva, Iowa.

Results

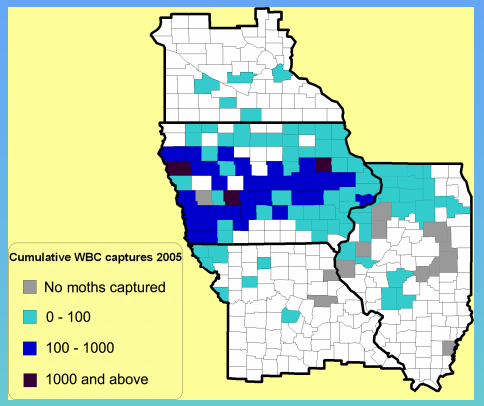

Figure 5. WBC moth cumulative captures in the 2005 season.

Figure 5. shows data collected from 198 traps placed in 126 counties in Illinois, Iowa, Minnesota, and Missouri. One trap in Woodbury Co., Iowa and all the Minnesota traps were light traps. These data illustrate the presence of reproductive populations of WBC present in most of the central Corn Belt that warrants continued monitoring.

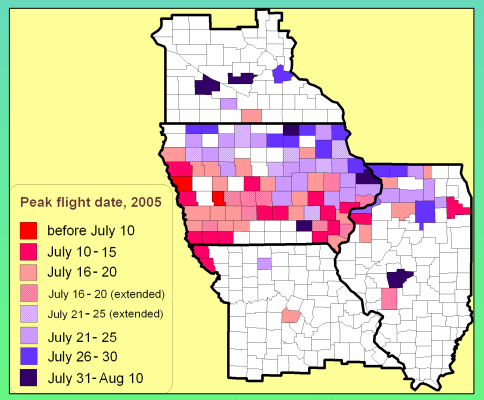

Figure 6. Approximate peak WBC moth flight in 2005.

Figure 6. shows the approximate peak moth flight by county that occurred in 2005. The "extended hatch" (hatched) counties represent flights that either had a broad peak over several days, or had multiple peak numbers over that week instead of a singular peak as shown in Figure 4. Peak flights progressed from the second week in July in southern and western counties, to early August in the northeast.

Acknowledgements

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