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### **Western Bean Cutworm Research Done Specifically for Michigan**

LANSING, MICH. – Western bean cutworm (WBC) is a corn-damaging pest that is native to the western United States. Larvae feed on ears late in the season, causing loss in yield as well as reduction in grain quality by increasing the potential for mycotoxins. WBC also attacks sweet corn, dry beans, tomatoes, and potentially other minor crops, thus is a major concern for many growers in Michigan. WBC infestations have resulted in economic damage in certain locations and fields in Michigan since 2007.

In order to help Michigan's corn farmers understand the impact of WBC caterpillar damage and implement effective management practices, the Corn Marketing Program of Michigan (CMPM) has partnered with Michigan State University (MSU) since 2009 to conduct WBC research. The main objective of this year's study was to determine the unique aspects of WBC biology and life history specific to the Great Lakes region.

To accomplish these objectives, Dr. Chris DiFonzo, principal researcher and professor of entomology at MSU, setup a WBC sampling system throughout Michigan. The system used pheromone lures to trap WBC moths at 346 unique locations in Michigan. An online database was set up so that counts could be entered by researchers and volunteers from across the state, the results of which can be viewed online at [www.msuent.com](http://www.msuent.com).

WBC moth counts were performed weekly from June to September using milk jug pheromone traps. At 12 different locations, two types of traps, milk jugs and dry buckets, were compared. Both performed well and were sufficient for trapping however, dry buckets require some monetary investment as they are \$10 per unit whereas milk jugs are free. The moth counts were entered onto the online trapping system and totaled 78,367 moths at the conclusion of the study. While the traps caught WBC moths as early as late-June and as late as mid-August, the overall trap catch peaked during the third week of July. When compared to trap catch in 2009, peak flight was two weeks earlier in 2010 as a result of a warm spring. Since scouting should start as moth flights increase, this demonstrated the importance of monitoring flight each season to determine optimal scouting time. Direct observations of the pheromone study also noted that moths fly between peak hours of 1:00 and 3:00 a.m.

The WBC study also looked at plant maturity to see which stages were more susceptible to WBC infestation. Whorl stage corn appears to be a poor host for WBC. When plants in pre-tassel and whorl stage were compared after being infested with individual masses, the larvae survived only on the pre-tassel corn. Researchers suspect it is unlikely that larvae could survive well on leaf tissue alone without pollen or silk. As a result of this finding, growers should continue to concentrate on pre-tassel corn for scouting, as this stage is most at risk.

The 2010 WBC research also looked at genetically modified (Bt) hybrids to detect their effectiveness against WBC. These Bt efficacy trials were performed with industry partners. Ear damage and mold were significantly less and produced a greater yield with Cry1F Bt (Herculex and SmartStax) corn as compared to Yieldgard-type or non-Bt hybrids. However, growers need to be aware of both the advantages and limitations of the seed they purchase. On one hand, not all seed is created equal in terms of WBC control, but on the other, no Bt corn is totally resistant to WBC damage and fungal infection. The efficacy studies also sampled WBC egg masses weekly and found that egg-laying occurred over a three week period (15 percent, 53 percent and 27 percent of the egg masses were found on July 7, 14 and 20, respectively). These findings suggest that spray timing should be based on scouting multiple times and considering cumulative egg mass numbers, not based on a single scouting date going over the current 5 percent threshold.

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In addition to corn, WBC has several potential crop and weed hosts. During 2010, entomologists from MSU and the University of Guelph compiled a list of potential WBC hosts and tested WBC's survival on each plant species. WBC survival on corn, peas and dry beans was high, as well as on squash and several weed species. Survival on soybeans was moderate, although larvae did not grow well. Survival on peppers, tomatoes and potatoes was generally poor. By identifying alternative hosts that may create WBC refuge populations, the results may lead to modification of management recommendations so that corn crops are better protected.

“As a result of this study, Michigan’s farmers are better informed about the biology and practices of WBC, both of which will help farmers combat WBC damage through more effective scouting, better refuge choices and more knowledgeable seed selection,” said Clark Gerstacker, CMPM president, National Corn Growers Association Corn Board member and a corn grower from Midland. “We are grateful for the work Dr. DiFonzo has done regarding WBC. The results from her project will allow farmers across the state to increase their productivity and decrease their losses from the increasing threat of WBC.”

In 2011, DiFonzo plans to do a second year of research on the flight and host range work, as well as the night observations of insects. She also plans to conduct an open ‘public’ test (not tied to industry) of Bt hybrids in relation to WBC survival and damage. By collecting WBC biology information for a third year in Michigan, DiFonzo hopes to be able to modify current recommendations for WBC management to account for Great Lakes conditions.

Headquartered in Lansing, the CMPM is a legislatively-established statewide program that utilizes one-cent per bushel of Michigan corn sold. Investments are made in the areas of research, education, market development, and new uses in an effort to enhance the economic position of Michigan corn farmers. The CMPM works cooperatively with the Michigan Corn Growers Association (MCGA), a grassroots-membership association representing the state’s corn grower’s political interests since the 1970’s. Michigan’s corn industry adds more than one billion dollars to the state’s economy annually and in 2010, Michigan’s corn farmers harvested a record setting crop of more than 315 million bushels. For more information, visit the website of the MCGA and the CMPM at [w.ww.micorn.org](http://w.ww.micorn.org).

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