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First Report of Western Bean Cutworm (*Striacosta albicosta*) in Pennsylvania

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The western bean cutworm [*Striacosta albicosta* (Smith); Noctuidae] (Fig. 1) is a lepidopteran species native to western North America; however, this occasionally serious pest of corn (*Zea mays* L.) and dry beans (*Phaseolus vulgaris* L.) has been expanding its range eastward (1,2,3,4). From 1998 to 2004, it was reported invading Minnesota, Illinois, and Missouri (2,3,4). Moths were first reported from Indiana in 2005, Wisconsin, Michigan, and Ohio in 2006 (2), and in Ontario, Canada, as well as Wayne Co., OH, less than 150 km from Pennsylvania, in 2008.

Fig. 1. Male western bean cutworm moth captured in Franklin Co., PA, 2009.

In 2009, we established a statewide trapping network to determine whether western bean cutworm was present in Pennsylvania. We deployed 30 traps among 25 counties (1 to 3 traps per county) weighting the distribution of traps more heavily in the western portion of the state because we hypothesized moths would be dispersing eastward from Ohio. Our network used two types of pheromone traps to detect male moths: milk-jug (2) and tricolor (green, white, yellow) universal traps (Great Lakes IPM, Inc., Vestaburg, MI). We are not aware of previous attempts to capture western bean cutworm with universal traps, which produce a better specimen than milk-jug traps and are simpler to use because they do not require an antifreeze solution. Universal traps contained insecticidal strips (Vaportape II; Hercon Environmental, Emigsville, PA) as a killing agent. Both trap types were placed at the edge of corn fields (~1.2 m high), and baited with synthetic female western bean cutworm pheromone (Suterra, Inc., Bend, OR). The closest traps were separated by approximately 4 km. Pheromone lures were changed every two weeks. We initiated our network on 1 July and discontinued our concerted trapping efforts on 22 August, though some individual traps remained in place longer.

Our survey revealed that western bean cutworm moths were widely distributed in Pennsylvania, but focused in three parts of Pennsylvania: the Northwest, South, and Northeast (Fig. 2). We captured moths in 12 of the 25 counties where we had traps deployed (Fig. 2). We also discovered moths in two additional counties (Lehigh and Montour) outside our trapping network. In Leigh Co., a moth was captured by hand by an observant cooperator; whereas

in Montour Co. an extension educator hung a trap in a residential area after 22 August. Captures started on 10 July, peaked on 10 August, and continued until 26 September (Fig 3). Approximately two-thirds of the moths were found in the two universal traps positioned near the shore of Lake Erie (Erie Co.) in northwestern Pennsylvania (Fig. 2). All of the moths captured after 18 August were found in southern or northeastern Pennsylvania, possibly indicating spread from the higher density Northwest, but the sample size is too small to draw definitive conclusions. Of the 92 moths captured, 85% (78 of 92) were recovered from universal traps, possibly indicating that universal traps may be very effective for monitoring western bean cutworm. Our network, however, was not designed to directly compare the two trap types and more directed efforts will be needed to determine the influence of trap design on capture efficiency.

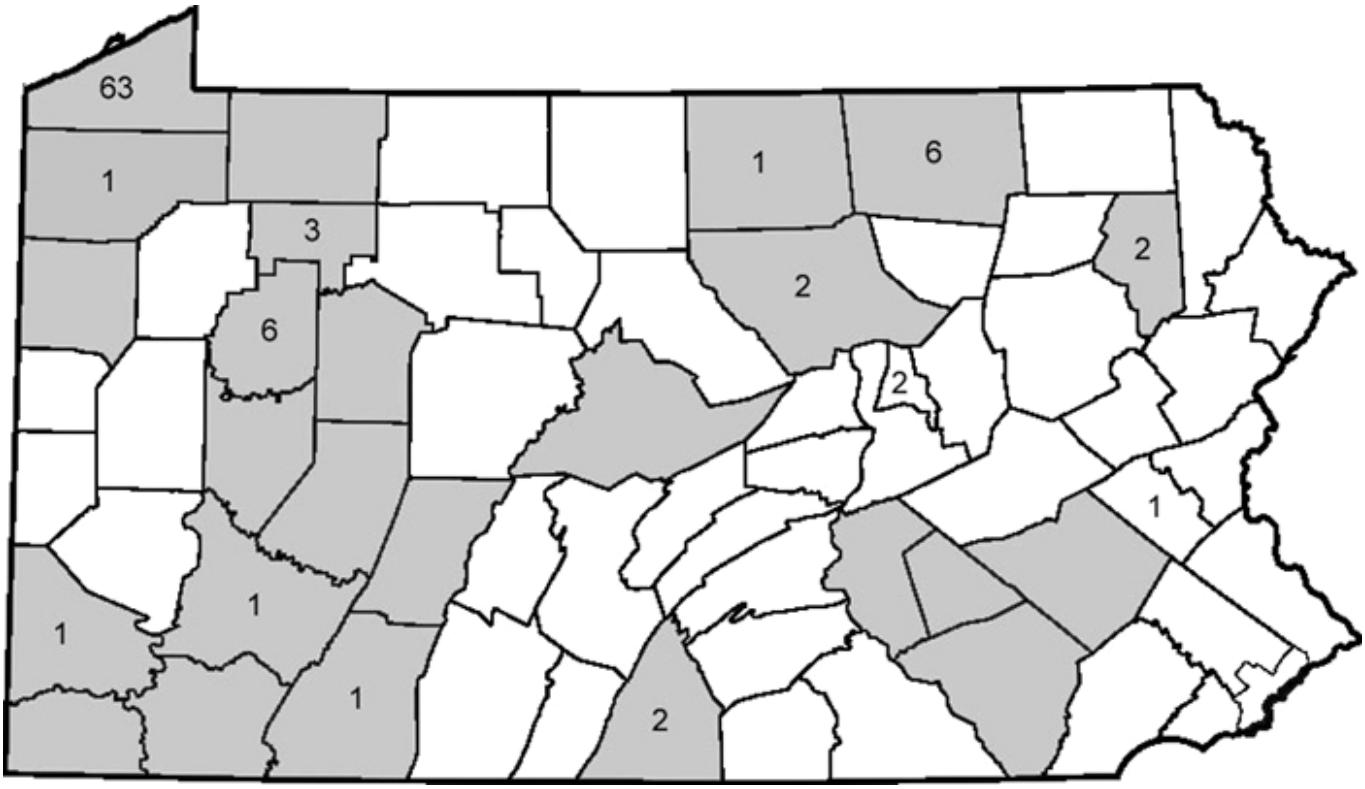

Fig. 2. Distribution of male western bean cutworm moths captured in Pennsylvania in 2009. From 1 to 3 pheromone traps per county were maintained in shaded counties and digits indicate the number of moths captured in each county (absence of a number in a shaded county indicates zero capture in that county). Numbers in unshaded counties indicate moths that were captured outside our trapping network (see text for details).

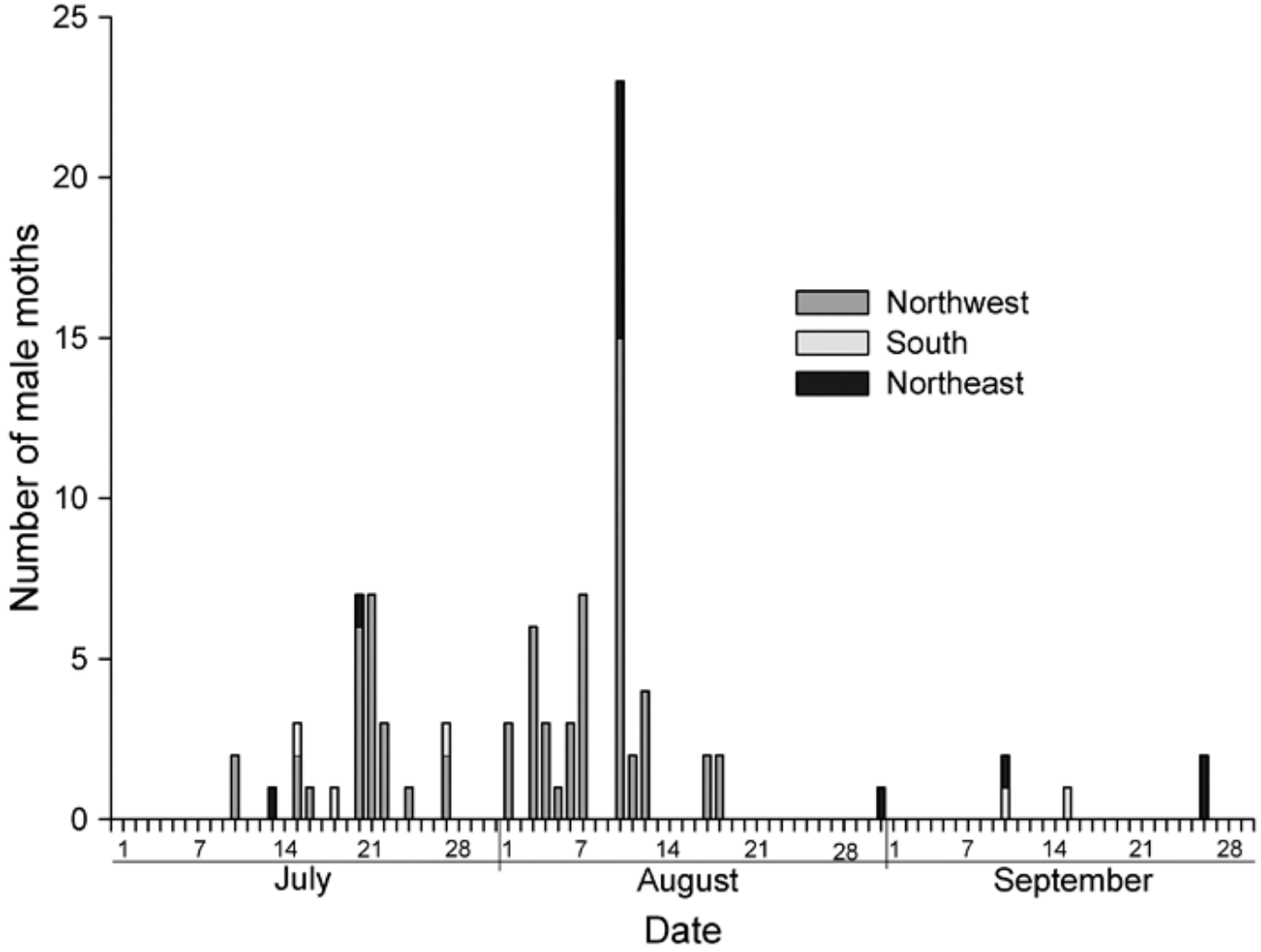

Fig. 3. Number of male western bean cutworm moths captured in traps in Pennsylvania from 1 July to 30 September 2009. The three colors represent trap catches in the three parts of Pennsylvania (Northwest, South, and Northeast) where moths were found (see Fig. 2).

Finding most moths near Lake Erie, as opposed to a more uniform distribution among western counties, was a bit unexpected and suggests active colonization may have occurred via moth dispersal across the lake from Ontario. High initial western bean cutworm moth capture in northwestern Michigan also suggested movement across the Great Lakes and it is possible that coarser soils and/or lake-effect snow cover provide better overwintering sites near the lakes (2). Moreover, some preliminary back trajectory airflow models (HYSPLIT) on days with higher lakeside trap catch indicate that air packets likely originated in Ontario (A. M. Bachmann, Penn State, *unpublished data*). The few moths found in southwestern Pennsylvania are consistent with moths flying east from Ohio, but most moths clearly appear to be arriving in Pennsylvania through the northwestern corner. The moths trapped in northeastern Pennsylvania may have entered from New York. In 2009, eleven western bean cutworm moths were trapped in milk-jug traps, and larvae have been found infesting corn ears, in northwestern New York, but to date there has not been a statewide effort to characterize the western bean cutworm population in New York (K. Waldron, Cornell University, *personal communication*).

Pristine moth specimens recovered in central and eastern Pennsylvania (Fig. 1) suggest that these moths likely emerged locally and may indicate that western bean cutworm has been present in Pennsylvania for at least one year. Long-distance travelers would not have looked pristine, but rather ragged with many lost scales. Western bean cutworm pheromone traps capture male moths, so our network has not provided any information on activity of female moths. We also have not heard any reports of western bean cutworm-infested fields in

Pennsylvania. In other recently invaded states, larval infestations in corn fields and economic damage have been detected as soon as one year following initial detection (2).

These results demonstrate that western bean cutworm moths were present in Pennsylvania in 2009, and the distribution and quality of the specimens suggest that populations have established. The data also suggest that universal traps work well for detection of low-level populations at least as well as milk jug traps.

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