

3 Western bean cutworm feeding damage on Bt hybrids and implications for economic injury levels

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Abstract: *Striacosta albicosta*, the western bean cutworm (WBC), is a North American lepidopteran pest of maize that causes economic damage by reducing the quality and quantity of grain produced. Late instar larvae damage the ear by consuming kernels on the ear tip or by burrowing into the side of the ear to feed. Current control strategies for WBC include insecticides and *Bt* maize hybrids with Cry1F and Vip3A traits. Although economic injury levels (EIL) and economic thresholds (ET) have been developed for WBC in non-*Bt* maize, such metrics have not been developed for *Bt* maize hybrids despite their use in nearly all maize growing regions and the incomplete control observed for Cry1F proteins. In western Nebraska, 56 plots were planted in 2016 and 2017 with 4 types of maize that provide varying levels of WBC control: non-*Bt*, no control; Cry1A.105+Cry2Ab2, unlikely control; Cry1F, moderate control; and Vip3A, nearly complete control. Natural WBC infestations were adjusted on 25 plants in the center of each plot by removing egg masses or augmenting infestation by restricting live moths on the plants to achieve infestation levels of 0, 8, 16, or 32%. Ten ears were harvested from each plot at maturity and assessed for feeding damage. Varying levels of damage were observed on non-*Bt* and *Bt* hybrids infested with WBC at increasing rates during the two years. Data will be used to develop EILs and ETs for *Bt* maize hybrids and help growers use insecticides more judiciously, conserve natural enemies, and reduce environmental damage.