

7 Improving degree-day models for the flight phenology of western bean cutworm (Lepidoptera: Noctuidae)

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Abstract: Western bean cutworm, *Striacosta albicosta* (Smith) (Lepidoptera: Noctuidae), is a univoltine pest of corn in North America. Control with foliar insecticides requires timely application before larvae are protected when feeding within the ear. A previous degree-day model for predicting a specified percentage of yearly moth flight used heat unit accumulation above 10°C after 1 May. Because of concerns the previous model was not adequately predicting moth flight, daily data from blacklight moth traps and weather stations at four Nebraska locations (73 location-years) were used to construct degree-day models using simple or sine-wave methods, starting dates between 1 January and 1 May, and lower (-5 to 15°C) and upper (20 to 43.3°C) developmental thresholds. Dates of flight predicted from these models were compared to observed flight with independent location-years to assess model performance with the concordance correlation coefficient to concurrently evaluate precision and accuracy. The best model for predicting timing of *S. albicosta* flight used simple degree-day calculations beginning on 1 March, a 3.3°C (38°F) lower threshold, and a 23.9°C (75°F) upper threshold. The revised flight model indicated field scouting should begin at 1,432 degree-days (2,577 degree-days °F) to estimate moth egg density at the time of 25% flight. This revised model offers growers a more accurate and precise tool to predict when scouting should begin for *S. albicosta* egg masses.