

Fecundity and Egg Laying in *Helicoverpa armigera* (Hübner) (Lepidoptera: Noctuidae): Model Development and Field Validation

Authors : Muhammad Noor Ul Ane, Dong-Soon Kim, Myron P. Zalucki

Abstract : Models can be useful to help understand population dynamics of insects under diverse environmental conditions and in developing strategies to manage pest species better. Adult longevity and fecundity of *Helicoverpa armigera* (Hübner) were evaluated against a wide range of constant temperatures (15, 20, 25, 30, 35 and 37.5°C). The modified Sharpe and DeMichele model described adult aging rate and was used to estimate adult physiological age. Maximum fecundity of *H. armigera* was 973 egg/female at 25°C decreasing to 72 eggs/female at 37.5°C. The relationship between adult fecundity and temperature was well described by an extreme value function. Age-specific cumulative oviposition rate and age-specific survival rate were well described by a two-parameter Weibull function and sigmoid function, respectively. An oviposition model was developed using three temperature-dependent components: total fecundity, age-specific oviposition rate, and age-specific survival rate. The oviposition model was validated against independent field data and described the field occurrence pattern of egg population of *H. armigera* very well. Our model should be a useful component for population modeling of *H. armigera* and can be independently used for the timing of sprays in management programs of this key pest species.

Keywords : cotton bollworm, life table, temperature-dependent adult development, temperature-dependent fecundity

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