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Jemal Mohammed-Awel*, jmohammedawel@valdosta.edu. *Modeling screened-refuge technique in agricultural pest control using semi-discrete modeling*. Preliminary report.

Genetically engineered crop plants that produce insecticidal toxins from the bacterium *Bacillus thuringiensis* (Bt) which are toxic to a variety of common agricultural pests were introduced in 1996 and have seen significant and increasing adoption in the intervening for 15 years. A gene from the bacterium *Bacillus thuringiensis* (Bt) has been inserted into the DNA of several crop varieties. This gene codes for the production of a protein highly toxic to many insect pests. However, extensive use of Bt crops entails the risk of promoting development of pest resistance to Bt toxin. The study considers a 'Screened-refuge' technique for sustaining control of insect pests using Bt crops. A model based on semi-discrete/impulsive differential equations is proposed to address the evolution of pest resistance. The mathematical study provide conditions under which a unique globally asymptotically stable equilibrium exists. The conditions are expressed in terms of key model parameters that should help to understand the evolution of pest resistance to Bt crops. (Received January 19, 2012)