1014-92-292 **Jemal S Mohammed-Awel*** (jemalm@acsu.buffalo.edu), 153 Lisbon Avenue, Buffalo, NY 14214, and **John Ringlnad**. *Deterministic and Stochastic Models of Development of Resistance to Genetically Modified Pesticidal Crops.* Preliminary report.

We describe the bifurcation structure and dynamics of some simple (deterministic) population model for an insect pest on a crop divided into two parts, one consisting of genetically modified plants that are toxic to the pest, and the other a "refuge" of conventional toxin-free plants. Refuges are used with the goal of suppressing, or at least delaying, the development of a pest population that is resistant to the toxin, but we demonstrate how they can also have the opposite effect. We have also explored fully stochastic version of the model and the phenomena described in deterministic are also observed in the stochastic version. We develop the population model using a discrete probability distribution which involves Stirling number of the second kind. We computed the moments, asymptotic mean, asymptotic variance and the coefficient of variations of the distribution. In order to run stochastic simulations using this probability model, we must be able effectively to draw deviates from the distribution which we found it to be computationally expensive. We proved that under some conditions the probability distribution can be approximated by Gaussian distribution with the same mean and variance which makes the simulation much faster. (Received September 08, 2005)