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**D Brian Walton\*** (waltondb@jmu.edu), MSC 1911, Roop 110, James Madison University, Harrisonburg, VA 22807, and **Anthony Tongen, Phillip Andreae, Adam Falk, Sarah Mecholsky** and **Theresa Klinkhammer**. *Exploring Male Dimorphism in the Dung Beetle using a Discrete-time Stochastic Population Model*. Preliminary report.

Certain dung beetles exhibit a male dimorphism wherein some males will develop horns and then use a defensive mating behavior while other males will not develop a horn and then uses a sneaking mating behavior. The decision for whether the male develops a horn or not is based on whether the male reaches a critical threshold during development. The level of this threshold is inherited. The probability of a male in the next generation inheriting the threshold depends on the number of matings the female has with males of each type. Sneak males have a smaller chance of successful matings but a higher per-encounter potency. Guard males have a higher chance of successful mating. We develop a probabilistic model for the probability that an egg will be fertilized by a given type given the number of males of each type in the current generation. Using the ideas of adaptive dynamics as applied to difference equations, we develop analogous results for the long-term success of a given threshold. We identify an optimal threshold level that establishes the ideal balance between guard and sneak males. (Received September 16, 2008)