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Matthew Joshua Buhr* (matthew.buhr@coyotes.usd.edu), 2122 Highland Avenue, Albert Lea, MN 56007, Albert Lea, MN 56007. *The Flour Beetle - A Discrete Mathematical Model*. Preliminary report.

Some recent experimental studies of flour beetles (*Tribolium Castaneum*) have indicated a possibility of behavior in the laboratory that appears to be chaotic. I describe and attempt to analyze a model for such behavior, taking note of the properties of the life cycle of the flour beetle. The life cycle consists of larval and pupal stages, each lasting approximately two weeks, followed by an adult stage. Both larvae and adults are cannibalistic, consuming eggs and thus reducing larval recruitment. In addition, there is adult cannibalism of pupae. I will take two weeks as the unit of time and formulate a discrete mathematical model describing the larval population, pupal population, and adult population at two-week intervals. I begin with no cannibalism, then I modify my model to assume that cannibalistic acts occur randomly as the organisms move through the container of flour that forms their environment. Finding the equilibria of this basic model, I can find solutions corresponding to the extinction and also a solution corresponding to survival for some sets of additional parameter values. I can then manipulate parameter values to find if the dynamics are very sensitive to any changes in the cannibalism rate, and then determine any possible chaotic behavior. (Received September 02, 2014)