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Comparing the Impact of imposing the Allee Effect on the Predator versus Prey Populations in a Discrete Time Model

The Allee effect is a biological phenomenon in which individuals in small populations experience lower reproductive and survival rates which diminish as the population becomes larger. Several models of predator-prey dynamics have been studied which introduce the Allee effect into the prey population. We propose a discrete-time model which incorporates the Allee effect into predator-prey dynamics by imposing the Allee effect on the predator population. We analyze the stability of equilibria and explore the system dynamics over a variety of parameter scenarios through numerical simulations. We then compare these results to an existing model of predator-prey dynamics where the Allee effect is imposed on the prey population.