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Classical Rosenzweig-MacArthur predator-prey model assumes a logistic growth for the prey population. A strong Allee effect on the prey population introduces a population threshold. The dynamics of ODE model is completely classified, with phenomena of Hopf bifurcation, unique limit cycle, and heteroclinic loop. The dynamics, bifurcations, and a priori estimates for the PDE model will also be discussed. (Received September 18, 2010)