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Maturation delay for the predators can enhance stable coexistence in prey-predator model with Allee effect

We consider a prey-predator model with Allee effects in prey growth and Michaelis-Menten type functional response to describe the grazing pattern. We obtain the conditions for stable and oscillatory coexistence of prey and their specialist predator in case of strong and weak Allee effect in prey growth. Main objective of the present work is to show the stabilizing role of maturation delay in the presence of Allee effect in prey growth. We construct the delayed model by incorporating maturation delay parameter and juvenile predators death rate into the growth equation of predators. Apart from the analytical results for the non-delayed and delayed models, we perform extensive numerical simulations to construct the relevant bifurcation diagrams. We provide the biological implications. We discuss on some problem to construct Lyapunov functionals.