IMPACT OF ADDITIVE ALLEE EFFECT ON THE DYNAMICS OF A INTRAGUILD PREDATION MODEL WITH SPECIALIST PREDATOR

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In this presentation, we consider a intraguild predation model in which predator is specialist, the growth of shared prey population is subjected to additive Allee effect and there is Holling-Type III functional response between IG prey and IG predator. We analyze the impact of Allee effect on the global dynamics of the system with the prior knowledge of the dynamics of the model without Allee effect. Our theoretical and numerical analysis suggest that: 1. Trivial equilibrium point is always locally asymptotically stable and it may be globally stable also. Hence, all the populations may go to extinction depending upon initial conditions; 2. Bistability is observed between unique interior equilibrium point and trivial equilibrium point or between boundary equilibrium point and trivial equilibrium point; 3. Multiple interior equilibrium points exist under certain parameters range. We also provide here a comprehensive study of bifurcation analysis by considering Allee effect as one of the bifurcation parameter. We observed that Allee effect can generate all possible bifurcations such as transcritical bifurcation, saddle-node bifurcation, Hopf bifurcation, Bogdanov-Taken bifurcation and Bautin bifurcation. Finally, We compared our model with the IGP model without Allee effect for better understanding the impact of Allee effect in the system dynamics.

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