Discrete-time, discrete stage-structured predator-prey models

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ABSTRACT

Two discrete-time, discrete stage-structured predator-prey models are presented and analyzed. For these models it is shown that both populations go to extinction when the intrinsic growth rate of the prey is less than one. The prey population dynamics exhibits synchronizing phenomenon in the absence of its predator if the prey population is stage-structured with juvenile and adult classes. A unique interior steady state exists for both models when boundary equilibria lose their stability if Beverton-Holt type functional is adopted. This conclusion is not valid if Ricker type functional is used. The results demonstrated that Ricker type equation has more complicated dynamics than that of Beverton-Holt type equation for the stage-structured predator-prey models studied.

Key Words: predator-prey model, Beverton-Holt equation

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