Dynamics of an IPM pest-predator model with impulses and stage structure on predator population

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Abstract

Integrated pest management(IPM) has been promoted as an environmentally friendly pest control approach. It utilizes a combination of control methods to control pest populations in agricultural and forestry systems. In this paper, we propose an IPM pest-predator model with impulses and stage structure on predator population, where the predator population is divided into two stages, a juvenile stage and a mature stage. The mature predator's predation conversion for production of new predators. This kind of stage-structured pest-predator model has been omitted in the mathematical models for integrated pest management. The dynamical properties for the pest-extinction solution and permanence of system (2.1) are established. The simulations are employed to support the proofs. Our results provide a good balance between the biological control and chemical control for integrated pest management.

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