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Positive solutions for ratio-dependent predator-prey interaction systems. (English)

Zbl 1330.35478

J. Differ. Equations 218, No. 1, 117-135 (2005).

Summary: We study the dynamics of predator-prey interaction systems between two species with ratio-dependent functional responses. First we provide sufficient and necessary conditions for positive steady-state solutions, and then we investigate the relationships between positive equilibria and positive solutions of the system over a large domain. Furthermore, we deal with the uniqueness and the stability of positive steady-states solutions with some assumptions. In addition, we discuss the extinction and the persistence results of time-dependent positive solutions to the system.

MSC:

- 35Q92 PDEs in connection with biology, chemistry and other natural sciences
- 35K60 Nonlinear initial, boundary and initial-boundary value problems for linear parabolic equations
- 35J65 Nonlinear boundary value problems for linear elliptic equations
- 47N20 Applications of operator theory to differential and integral equations
- 92D25 Population dynamics (general)

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