ABSTRACT | Krishna Pada Das

Title

Role of environmental disturbance in an eco-epidemiological model with disease
from external source

Indian Statistical Institute
krishna_r@isical.ac.in

Abstract

Das et al. [BioSystems,95(2009), 188-199] considered an eco-epidemiological model where prey population was infected by disease coming from external source through the contact of the species with environment. They assumed that the predator avoids infected prey and consumes only the susceptible ones. We modify their model by introducing nonselective predation of predator population. In such situation role of environmental disturbances is very important. Thus, the proposed model is studied both in the absence and presence of environmental disturbance. It is observed that our proposed model system is conditionally stable around the coexistence steady state both in the absence as well as in the presence of environmental disturbance. Numerical simulations showed that the system showing periodic oscillation in the deterministic situation, attains stability under stochastic perturbation. Moreover, under the same parametric situation stochastic perturbation all the species coexists in stable situation for the set of parameter values for which either the prey or the predator population goes to extinction in the deterministic situation. Thus, we may conclude that sometimes environmental fluctuation helps in maintaining the stability of the system.