
XIAOQIANG ZHAO, Memorial University of Newfoundland

Spatial Dynamics of Species with Annually Synchronized Emergence of Adults

In this talk, I will report our recent research on the spatial dynamics of species growth with annually synchronous emergence of adults by formulating an impulsive reaction-diffusion model. With the aid of the discrete-time semiflow generated by the one-year solution map, we establish the existence of the spreading speed and traveling waves for the model on an unbounded spatial domain. It turns out that the spreading speed coincides with the minimal speed of traveling waves, regardless of the monotonicity of the birth rate function. We also investigate the model on a bounded domain with a lethal exterior to determine the critical domain size to reserve species persistence. Numerical simulations are illustrated to confirm the analytical results and to explore the effects of the emergence maturation delay on the spatial dynamics of the population distribution. In particular, the relationship between the spreading speed and the emergence maturation delay is found to be counterintuitively variable.