Departmental Colloquium

Dr. Yijun Lou,
The Hong Kong Polytechnic University, China

Friday, August 4, 2017
2:00pm, HH-3017

Modelling Diapause in Mosquito Growth

ABSTRACT:
Diapause (or named as dormancy traditionally) as a process of physiological rest is widespread in insects and other invertebrate organisms, which serves as a key survival mechanism in response to adverse environmental conditions. In this paper, a novel modelling framework is proposed to investigate the effects of diapause on population growth, where diapause period is taken as an independent dynamic process, during which the population dynamics is completely different from that in the normal developmental and post-diapause periods. To explicitly describe population growth with different diapausing stages, either immature or adult ones, two different delay differential equation models are constructed with an emphasis on mosquitoes. These two models can be further unified into one with different death rates during the diapause period. In addition to the theoretical analysis, numerical simulations are performed to investigate the seasonality of population abundances of two temperate mosquito species and the sensitivity analysis of the diapause-related parameters, which validate theoretical models and further identify the key role on population persistence that diapause plays.