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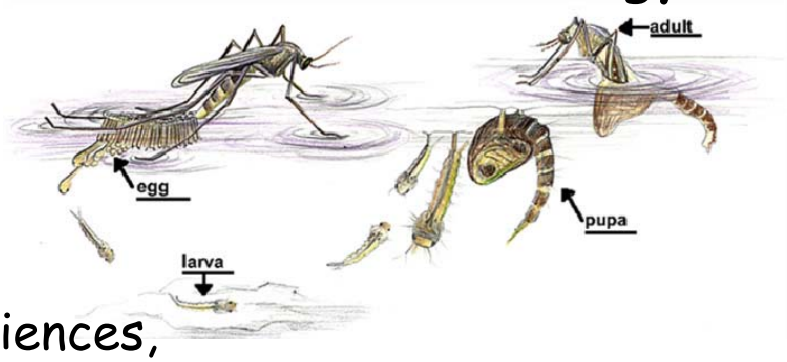

Seminar

Yoni Alcalay

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Ben-Gurion University of the Negev

Tuesday, June 12, 2017, 12:00

Seminar Room, Old Administration Building

This is Yoni's Ph.D. summary seminar and refreshments will be served at 11:40.

Multi-Scale Effects Shape the Complex Dynamics of Spatial and Stage-Structured Mosquito Populations

Understanding how patterns and processes operating at different ecological hierarchies interact with spatial scales to influence population and community dynamics remains a major challenge in ecology. My research aimed to investigate the interactive effects of local and regional scale processes on the complex dynamics of mosquito populations. I first explored the consequences of predation risk during the larval phase (local scale) on the body size, survival and dispersal of *Culex pipiens* females. I found that larvae reared in the presence of a caged larvivorous-fish metamorphosed earlier. In spite of the reduction in development time, the body size of emerging females was larger (i.e., over compensation), and their dispersal distances were longer. This accelerated growth, however, came at the expense of reduced survival during the adult phase. Next, I explored the effects of larval nourishment (local scale) on adult susceptibility to Dengue virus (DENV), and on the subsequent immune responses in the mosquito *Aedes aegypti*. I found that females reared under optimal conditions expressed higher level of immune-related genes, which did not prevent increased dissemination rate. At the regional scale, I detected temporal and spatial partitioning in the preference of the two mosquito species to a particular landscape and oviposition site. Specifically, *Culex pipiens* was much pickier than *Culiseta longiareolata* at both spatial scales, probably due to lower movement cost and stronger ability to gather environmental information. Finally, I developed a spatially explicit stage-structured model, examining the consequences of spatial heterogeneity in aquatic habitat quality on the persistence of stage-structured mosquito populations. Using this model, I illustrate that spatial heterogeneity in aquatic habitat quality can lead to increased population persistence, and that this pattern is more pronounced at intermediate dispersal rates, and in a long-dispersing species. Overall, my doctoral research illustrates that the environmental conditions mosquito larvae experience at the local scale, can strongly affect adult performance, which in turn influence the regional scale population dynamics and persistence.