1117-35-159 **Zoi Rapti*** (zrapti@illinois.edu), Department of Mathematics, University of Illinois at Urbana-Champaign, 1409 W. Green Street, Urbana, IL 61801, and **Carla Eva Caceres**.

Infectious disease in a model organism: modeling within and between host transmission and the role of the ecological network of predators and resources.

We introduce a four-population partial differential equations (PDE) model to investigate the invasibility and prevalence of an obligately-killing fungal parasite (Metschnikowia bicuspidata) in a zooplankton host (Daphnia dentifera) as they are embedded in an ecological network of predators and resources. Our results provide key insights into the role of ecological interactions that vary with the age of infection. Specifically, the virulent effects of the pathogen on host fecundity and mortality (both intrinsic mortality and extrinsic due to predation) increase with the age of infection. Using a combination of analytical results and simulations, we show that selective predation, which is known both theoretically and empirically to reduce disease prevalence, does not always limit disease spread. Second, low host resources and intense predation can prevent disease spread, but once conditions allow the invasion of the parasite, the qualitative dynamics of the system do not depend on the intensity of the selective predation. Third, a comparison of the PDE model with a model based on ordinary differential equations (ODE model) reveals a parametrization for the ODE version that yields an endemic steady state and basic reproductive ratio that are identical to those in the PDE model. (Received January 12, 2016)