**A “Big Picture” view of disease: Hosts in ecosystems and as ecosystems**

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In recent years, the study of disease has increasingly moved beyond examining infection at a single host – single pathogen scale. The recognition that host-pathogen interactions are embedded within complex ecological systems has increased our understanding of disease across biological scales. In particular, conceptualizing the roles of host organisms as components of ecosystems and as ecosystems themselves can further our understanding of disease ecology and treatment. By altering host density, behavior, and physiology, pathogens can modify ecosystem processes such as primary production and nutrient cycling. Through a combination of laboratory and mesocosm studies, we show that parasites alter the ecological stoichiometry of their hosts and that alterations to these and other traits likely influence primary production in aquatic ecosystems. After exploring the role of hosts and parasites within traditional ecosystems, we ask: Can viewing a host as an ecosystem aid in our understanding of disease? Drawing from the fields of foraging and community ecology, we describe three of our studies which demonstrate that pathogens have preferences for certain hosts, that the sequence and timing of pathogen arrival in a host ecosystem influences transmission, and that the host ecosystem creates selective pressure on pathogens which may have epidemiological significance. Overall, applying the ecosystem concept to host-pathogen interactions emphasizes the importance of disease as a ubiquitous component of healthy ecosystems.