FAST MOVING FRONTS - 2009

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Kevin D. Lafferty talks with *ScienceWatch.com* and answers a few questions about this month's Fast Moving Front in the field of Environment/Ecology. The author has also sent along images of their work.

Article: Parasites dominate food web links
Authors: Lafferty, KD;Dobson, AP;Kuris, AM
Journal: PROC NAT ACAD SCI USA, 103 (30): 11211-11216 JUL 25 2006
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SW: Why do you think your paper is highly cited?

Publishing in a highly ranked journal (*PNAS*) probably is a key factor for the success of this paper. In addition, we have had the opportunity to present the findings at numerous symposia and seminars, where they have been well received by ecologists.

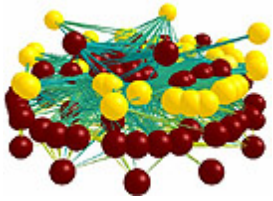
SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

The paper presents new methods and a new perspective for ecology. It also has a simple message: parasites matter to food webs.

SW: Would you summarize the significance of your paper in layman's terms?

Food webs form the conceptual background for community ecology but have rarely included parasites. Parasites are consumers that represent half of biodiversity and alter basic properties of network structure, indicating parasites should not be ignored. Including them changes the way we view fundamental patterns in ecology.

Figure 1 [+] enlarge



A food web of Carpinteria Salt Marsh. Red spheres are free-living species, yellow spheres are parasites.

SW: How did you become involved in this research and were any particular problems encountered along the way?

We are parasite ecologists trying to understand how parasites interact with ecosystems. Network theory seemed to be a promising avenue to explore the questions we were interested in, but we found we first needed to bring parasites into networks. The *PNAS* paper represents preliminary work for our broader research program.

SW: Where do you see your research leading in the future?

We are presently bringing network scientists together with disease ecologists as a working group at the National Center for Ecological Analysis and Synthesis. Incorporating parasites into food webs reveals gaps in existing network theory—particularly in terms of robustness and top-down effects—that we are trying to fill. As I write, we are at Palmyra Atoll in the central Pacific establishing a new field site where we will describe a food web from scratch, putting parasites and free-living species on equal footing.

SW: Do you foresee any social or political implications for your research?

Humans and their infectious diseases are imbedded in food webs. A network approach could be very instructive in helping to understand second-order complexities in human health that arise due to environmental change.

For instance, we are working in Senegal, where we are investigating the hypothesis that human alteration to food webs has increased human schistosomiasis. Here, damming has created barriers for prawns to move upstream. In upstream areas, snails, perhaps freed from predation by prawns, become abundant and serve as intermediate hosts for *Schistosoma mansoni* worms, leading to very high rates of infection in the local population. Restoring this food web could indirectly reduce disease.

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KEYWORDS: BIRD FINAL HOSTS; MUTUALISTIC NETWORKS; TROPHIC TRANSMISSION; INTERMEDIATE HOSTS; BODY-SIZE; EVOLUTION; TREMATODES; DIVERSITY; STABILITY; INCREASES.

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