



## Selective predators and their parasitized prey: Are epidemics in zooplankton under top-down control?

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**ABSTRACT:** Seasonal change in the intensity of fish predation affects succession in lake zooplankton communities. Predation affects not only the zooplankton prey, but also their parasites. Because the ability of a parasite to spread depends in part on the death rate of the hosts, seasonal reductions in the intensity of predation on zooplankton could lead to parasite epidemics. We examined seasonal population dynamics, mortality rate, and incidence of parasitism in lake populations of *Daphnia* to determine whether parasitism displayed seasonality and synchrony among lake populations and whether any such patterns are consistent with seasonal changes in predation rates. Infections of a bacterial parasite (*Spirobacillus cienkowskii*) in *Daphnia dentifera* populations were seasonal with epidemics in many lakes occurring synchronously in autumn. In situ foraging behavior of the dominant fish planktivores, bluegill sunfish, is highly selective on infected *Daphnia*. Mortality rates on the *Daphnia* drop just prior to the initiation of epidemics. An epidemiological model shows that this magnitude of decrease in mortality rate, if driven largely by a reduction in predation, can account for the seasonal occurrence of epidemics in our *Daphnia* populations. Together, these results suggest that parasitism in *Daphnia* populations may be seasonally restricted by fish predation.

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