
Parasites affect their hosts through many ways: virulence, vulnerability, behavior and energy

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Abstract

Parasites are important components of ecosystems, altering life history trait and many interactions among species. Such modifications imply different types of mechanisms. Parasites are known for their effects on fecundity and mortality of hosts (virulence effects) that affect basic parameters of population dynamics. Parasites also modify the vulnerability to predation (interaction effects) thereby affecting ecological networks. Previous modelling works showed that these two effects may constrain coexistence and stability within trophic systems. However works rarely study these effects simultaneously. In the present study, we investigate their relative importance for a host-parasite interaction. We use *Daphnia magna*, infected by iridovirus DIV-1 that induce the White Fat Cell Disease (WFCDD), a parasite known for their virulence effects, and undergoing predation by European minnow (*Phoxinus phoxinus*). We measure how parasites modify fecundity, mortality, activity (speed, time of activity), energetic content (carbohydrate, lipids and proteins) and vulnerability to predation (preference and search time of predator) in short experiments and/or in ponds. Results show that WBD reduce survival of *Daphnia*, but have little effects on their fecundity, and reduce their activity. Thus, it may be caused by or the cause of energetic contents modifications. Therefore, we may expect that parasite increase vulnerability of host due to effects on appearance and behavior. We predict alteration in the diet of predators as prey profitability

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is affected by the parasite. Consequently, parasites may have important effects in trophic systems, involving bottom-up effects (parasited-prey becoming more or less profitable) and trophic cascades (by modulating trophic interactions). Parasite effects therefore go beyond those expected based on simple virulence effects.