

Pelagic prey and benthic predators: impact of odonate predation on *Daphnia*

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Abstract. Interactions between benthic predators and pelagic prey, such as larval odonates and *Daphnia*, are often used to describe classic predator–prey relationships in laboratory studies. However, few field studies explore the potential impact of benthic predators on pelagic prey. Recent studies of cladocerans document diel horizontal migration (DHM), where large-bodied zooplankton (i.e., *Daphnia*) decrease their exposure to pelagic predators by seeking refuge among macrophytes. However, daphnids undergoing DHM may simultaneously increase their likelihood of encountering benthic predators that commonly occur in littoral zones. In laboratory experiments, we showed that dragonfly nymphs (*Epitheca cynosura*) effectively eliminated all *Daphnia* within 24 h, regardless of macrophyte presence or architecture. We also tested whether additions of larval damselflies (*Ischnura elegans*, *Coenagrion puella*, *C. pulchellum*) and dragonflies (*Somatochlora flavomaculata*) (total odonate density of 35–55/m²) significantly reduced total zooplankton or benthic invertebrate abundance in field enclosures with different macrophyte densities (20, 40, 80% volume infested [PVI]). Odonates significantly reduced *Daphnia* abundance at 20 PVI. However, the magnitude of the influence of odonates on daphnids, as well as *Ceriodaphnia* and *Polyphemus*, decreased with increasing macrophyte density. Odonate predation did not significantly affect benthic taxa abundance. Thus, daphnids undergoing DHM may lower predation from pelagic predators, but our results suggest that mortality from littoral predators may be significant. The net benefit of DHM may, therefore, differ among lakes as a function of the relative threats posed by pelagic and littoral predators.

Key words: littoral, macrophytes, zooplankton, diel horizontal migration, shallow lakes, refuge.