Limnol. Oceanogr., 41(4), 1996, 794–798

Avoidance by *Daphnia magna* of fish and macrophytes: Chemical cues and predator-mediated use of macrophyte habitat

Abstract—Recent biomanipulation studies suggest that macrophytes are an important refuge from fish predation for large pelagic zooplankton. We conducted two laboratory experiments that tested the behavioral responses of *Daphnia magna* to a macrophyte (*Myriophyllum exalbescens* L.) and a sunfish (*Lepomis cyanellus* Rafinesque) and whether responses were chemically (for fish) or structurally (for macrophytes) mediated. In the first experiment, we measured *Daphnia* response to four treatments in separate 38-liter tanks. In controls without macrophytes and fish, ~15% of the daphnids were found in the central zone (~50% of the tank area); the others were found around the tank perimeter (especially in the corners). With macrophytes present, 80% of the daphnids were found in the central zone (unvegetated in all treatments). When fish or fish odor alone were present ~35% and ~45%, respectively, of the *Daphnia* occupied the central zone. Thus, chemically mediated avoidance of *Lepomis* caused *Daphnia* to increase its occupation of macrophytes. In the second experiment, we tested whether the repellent effect of *Myriophyllum* resulted from structural characteristics of the macrophyte; the results suggest that both chemical and structural cues contributed to *Daphnia* avoidance of the macrophyte. Overall, our results are consistent with the suggestion that large pelagic zooplankton may use macrophytes as a refuge in shallow lakes where vertical migration is restricted.