

FISH PREDATION, INTERSPECIFIC PREDATION, AND THE DISTRIBUTION OF TWO *CHAOBORUS* SPECIES¹

CARL N. VON ENDE

Department of Biological Sciences, Northern Illinois University, DeKalb, Illinois 60115 USA

Abstract. In sampling 22 lakes in the Upper Peninsula of Michigan, I found that 2 species of *Chaoborus*, *C. punctipennis* and *C. americanus*, never co-occurred (von Ende 1975). *Chaoborus punctipennis* was found only in lakes with fish whereas *C. americanus* occurred alone in stained, bog lakes without fish. Third and 4th instar *C. americanus* lack extensive diel, vertical migratory behavior and are found near the surface waters in stained bog lakes. Adults of this species emerge in the middle of May. Third and 4th instar *C. punctipennis* exhibit diel, vertical migration. They are benthic during the day. This species emerges at the end of June.

In situ rearing experiments indicate that *Chaoborus americanus* larvae can survive in lakes with fish, when isolated from the fish. Fish (*Umbra limi*) added to a lake with *C. americanus* eliminated this *Chaoborus* species from the lake. It is concluded that the absence of *C. americanus* from lakes with *C. punctipennis* is due to fish predation on the older larvae of *C. americanus*.

Chaoborus punctipennis adults are able to disperse to lakes from which their larvae are absent. *In situ* experiments indicate *C. punctipennis* can survive on the zooplankton in a stained, fishless bog lake, but is subject to heavy predation by 3rd and 4th instar *C. americanus* larvae. It is concluded that because of early recruitment by *C. americanus*, as well as its lack of extensive vertical migration, this species excludes *C. punctipennis* from stained, fishless bog lakes.

Key words: bog lakes; *Chaoborus*; *Diptera*; dispersal; fish predation; *Insecta*; invertebrate predation; Michigan; patchy environment; vertical migration; zooplankton.