

Chapter XVII —Family Chaoboridae

(Phantom midges)

- (Williams & Feltmate, 1992)
 - Superphylum Arthropoda
 - (jointed-legged metazoan animals [Gr, *arthron* = joint; *pous* = foot])
 - Phylum Entoma
 - Subphylum Uniramia
 - (L, *unus* = one; *ramus* = branch, referring to the unbranched nature of the appendages)
 - Superclass Hexapoda
 - (Gr, *hex* = six, *pous* = foot)
 - Class Insecta
 - (L, *insectum* meaning cut into sections)
 - Subclass Ptilota
 - Infraclass Neopterygota
 - Order Diptera

In addition to the chironomid larvae, oligochaetes, and the small clam *Pisidium*, another major component of the profundal zone of lakes is the phantom midge *Chaoborus*. The larvae are called **phantom** larvae because of their transparency. They are unique in that their enlarged antennae have been modified for capturing prey such as insect larvae and small crustaceans. They are the only insects frequently found in the limnetic area of lakes. Adults do not feed, but their synchronized emergences may create severe nuisance problems around large lakes because adults are highly attracted to lights. Life cycles are univoltine to multivoltine, depending on species, climate, and habitat. Most larvae can be identified to species.

The life span of an adult phantom midge is very brief (<6 days). Eggs (about 500 in number) are laid on the water in rafts and most (97 per cent) hatch in two to four days. The larvae can develop to the fourth instar in six to eight weeks. The first and second instars are always limnetic and positively phototactic, and they develop rapidly in a few weeks. The third instar, mostly limnetic but also occurring in the sediments, is of much longer duration; the larvae can overwinter in this stage. After a variable period of up to several months, ecdysis to the fourth instar occurs; this instar is limnetic much of the time.

- The fourth instar of many species of *Chaoborus* undergoes strong diurnal vertical migrations. Migration does not occur as actively at temperatures below 5°C. Migration is influenced in part by oxygen tension of the water near the sediments. When the oxygen concentrations are high, most of the populations stay in the sediments; when there is less than 1 mg O₂ l⁻¹, they migrate to the surface during the night.
- Pupation takes from 1 to 2 weeks, and occurs from May to October in *C. flavicans*. The pupae migrate daily. Pupation and emergence as adults result in a reduction in the total benthic population during summer.
- In Lake Vechten (5 ha, 12 m) in The Netherlands, highest densities of larvae, 1,400 to 1,800 m⁻² occurred in November. Annual net production of the benthic part of the population was estimated to be 8 to 12.5 kg (dry) ha⁻¹ [70 to 90 kg wet weight ha⁻¹] for *C. flavicans* in this lake.

References

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