

DIET COMPOSITION AND PREY  
SELECTION OF *CORDULEGASTER MA-  
CULATA* SEL. LARVAE (ANISOPTERA:  
CORDULEGASTERIDAE)

The larvae of *Cordulegaster* are generally found in the pools of streams where they lie in ambush, buried in the substrate, awaiting unsuspecting prey. J.G. NEEDHAM & H.B. HEYWOOD (1929, *A handbook of the dragonflies of North America*, Thomas, Springfield) suggest that they prefer large prey such as subyearling brook trout (*Salvelinus fontinalis*) which may be as large as the larva itself.

During September of 1980 *C. maculata* larvae were collected from Trucka Brook in Essex County, New York. Trucka Brook, a small low gradient stream with sand, gravel and muck bottom is located in the central Adirondack Mountains. On the day collections were made, water temperatures ranged from 8.0 to 11.5°C. A total of 62 larvae were collected in 12 standard Surber collections. Six samples were taken at 06.00 hours EST on 20-IX-80 and six more at 18.00 hours EST on the same date in order to represent both

nocturnal and diurnal feeding by the larvae. The Surbers samples were preserved in 5% formalin in the field and later were sorted, identified and stored in 70% isopropanol. The contribution of each invertebrate taxa in the environment (Surber samples) and in the diet of *C. maculata* was determined on a percentage dry weight basis. Larval anisopteran were identified using the keys of NEEDHAM & HEYWOOD (cf. above) and J.G. NEEDHAM & M.J. WESTFALL (1955, *A manual of the dragonflies of North America*, Univ. California Press, Berkeley).

The predominant components of the invertebrate fauna of Trucka Brook based on the 12 Surber collections were the ephemeropteran nymph *Litobranchia recurvata* (Morgan) (39.8%) and *C. maculata* (21.4%). The only anisopteran collected besides *C. maculata* was a single specimen of *Hagenius brevistylus* Sel. Of the 62 specimens of *C. maculata* removed from the samples, 38 were collected at 06.00 hr and 24 at 18.00 hr. In general, the larvae were nocturnal feeders as the guts of individuals collected at 06.00 hr were 3-4 fold fuller than those collected at 18.00 hr. Mayfly nymphs (70%) were the major prey of *C. maculata* with *Paraleptophlebia* sp. (51.3%) and *Baetis* sp. (15.3%) being the principal genera eaten (Tab. 1). Dipteran larvae (primarily chironomids and simuliids) and trichopteran larvae (mainly *Potamyia* sp. and *Oligostomis* sp.) each composed approximately 8% to the diet.

Ivlev's electivity equation was used to examine the utilization of various prey by *C. maculata* in relation to what was available in the environment. Electivity values range from +1 to -1 with positive values indicating selection of certain prey and negative values indicating avoidance of certain prey. High electivity values were shown for the two major prey taxa, *Paraleptophlebia* sp. (+0.82) and *Baetis* sp. (+1.00), genera which were not well represented in the environment (Surber samples) (Tab. 1). Complete avoidance (i.e. invertebrates occurring in the environment but not in the diet) occurred for the two predominant benthic species in the stream, *L. recurvata* and other *C. maculata*.

It is interesting that the major prey of *C.*

Table 1 — Percentage dry weight dietary composition and Electivity Index (E) for 62 *Cordulegaster maculata* larvae from Trucka Brook, Essex County, New York

Prey Taxon	%	E
Copepoda	0.6	+1.00
Ostracoda	0.3	+1.00
Plecoptera		
<i>Hastaperla</i> sp.	2.1	+0.50
Ephemeroptera		
<i>Baetis</i> sp.	15.3	+1.00
<i>Ephemera</i> sp.	2.8	-0.22
<i>Paraleptophlebia</i> sp.	51.3	+0.82
Trichoptera		
<i>Potamyia</i> sp.	3.1	-0.28
<i>Oligostomis</i> sp.	2.5	-0.30
Unidentified	2.2	—
Diptera		
Ceratopogonidae	0.8	+1.00
Chironomidae	3.5	+0.52
Simuliidae	2.1	+0.20
Tipulidae	1.7	-0.39
Unidentified Insecta	5.6	—
Detritus	6.1	—

*maculata*, *Paraleptophlebia* sp. and *Baetis* sp., were not well represented in the Surbers samples. It even becomes somewhat perplexing when considering the fact that the larvae of *C. maculata* used for diet analysis were obtained from the same Surber samples used in quantifying available prey in the environment. These data suggest that the larvae of *C. maculata* were not necessarily feeding in the immediate vicinity of where they were collected. G.F. EDMUNDS, S.L. JENSEN & L. BERNER (1976, *The mayflies of North and Central America*, Univ. Minnesota Press, Minneapolis) mention that the nymphs of both *Paraleptophlebia* sp. and *Baetis* sp. can be found among vegetation along the banks of streams. Because of the small average width of Trucka Brook (i.e. < 2 meters) this habitat type (i.e. shoreline vegetation) was within 1 meter of where most of the samples were taken. It is reasonable to suggest that these shoreline areas may have contained higher densities of the two mayfly genera and

that *C. maculata* forage in these areas and return to deeper areas.

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