A Preliminary Report of Invertebrates from Hyporheic Sediments of the North Canadian River

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Received: 1992 Mar 02; Revised: 1992 May 08

The hyporheic zone is described as the interstices of stream sediments and its associated fauna is known as hyporheos. Occasional hyporheos consist mostly of aquatic insect larvae which use this zone as a refuge during their early development, while permanent hyporheos are specialized groups that go through their entire life cycle there (*1*). Most investigations of this topic have concentrated on hyporheic communities occupying rocky substrates, with much less attention devoted to softer sediments (*2,3*). This study on invertebrate hyporheos in sandy substrates of the North Canadian River in northwestern Canadian County is the first one dedicated to the hyporheic fauna in Oklahoma.

A 34-m transect line was established from the southwest bank to the northeast bank in the North Canadian River approximately 0.5 km east of the Blaine County line. At this location, water depth is usually less than 0.5 m and stream flow less than 0.35 m/s. The substrate consisted almost entirely of sand. Replicate benthic samples were taken at 5-m intervals using a petite Ponar grab (samples 1-15) in the area of the submerged stream channel. Two replicate core samples (3.5 cm diameter) were taken across the exposed sand bar at 2-m intervals to a depth of 30 cm (samples 19-33). The replicate samples were combined, preserved with formalin in the field, and returned to the laboratory where they were washed through a 0.250-mm sieve and the organisms sorted, identified, and counted.

A total of 17 taxa were collected from the hyporheic zone (Table 1). Sixteen taxa occurred in the submerged sediments and seven taxa in the exposed sand bar. Five taxa were encountered in both areas.

Some taxa, such as *Bezzia* sp. and *Cryptochironomus fulvus*, were abundant in submerged sand but were absent in the exposed sand bar (Table 1). Since immature stages of these taxa are normally associated with the aquatic biota, these results were expected (*4*). However, immature stages of several other aquatic taxa were collected from both submerged sediments and the exposed sand bar. These included *Ormosia* sp. and *Paratendipes* sp.

The youngest instars of *Ormosia* sp. were in the samples collected from submerged sediments. Individuals taken from the exposed sand bar were older instars, with the oldest being collected progressively further from the flowing water. We suspect *Ormosia* larvae migrate from submerged sediments into the damp sand bar prior to pupation and emergence, as part of their normal life cycle. This general pattern has been observed in several other species of Tipulidae (*4*).

Larval *Paratendipes* sp. showed a different distribution pattern. Younger instars occurred in damp sediments of the exposed sand bar, while older instars were found in submerged sediments. It appears that this taxon uses the hyporheic zone of the sand bar as a refugium from hazards in submerged sediments, such as predation, as suggested by others (*1-3*).

This preliminary study indicates that some aquatic taxa use the hyporheic zone in soft substrates of the North Canadian River during a portion of their life cycle. Future studies, following the sequence of events through at least a 1-yr period, should provide additional information regarding life cycles, population sizes, and possibly other taxa of the hyporheic zone.

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TABLE 1. List of taxa and number of individuals composing stream fauna in hyporheic zone of North Canadian River, 11 Oct 1991. Samples with "S" were taken from submerged sediments; those with "E", from exposed sand bar; the number with "S" or "E" indicates distance, in meters, from southwest bank to sampling point. The two replicate samples from each sampling point were combined for analysis.

	Number of Individuals in (combined) samples										
	Sample/Location Number										
Taxa	S1	S5	S10	S15	E19	E21	E23	E25	E27	E29	E31	E33
Nematoda												
Nematoda sp. 1		8		46	28	5	29	14	18	16	54	45
Nematoda sp. 2		4		19	12	4	22	14	13	18	35	47
Pelecypoda												
Corbicula fluminea	2	1	11									
Sphaerium sp.			1							1		
Collembola												
Isotomurus palustris									1			1
Ephemeroptera												
Caenis sp.	3											
Diptera												
Bezzia sp.	19	38	1	6								
Chironomus sp.	11			1								
Cladotanytarsus sp.	1											
Cryptochironomus fulvus	8	3	3	1								
Dasyhelea sp.	3	9										
Limnophora sp.								1	3			1
Lopescladius sp.				1								
Ormosia sp.	1	1		2	5	4	4	1		5	6	
Paratendipes sp.	10	23	10	28	7	17	12	17	13	11	12	5
Rheotanytarsus sp.	2											
Tanytarsus sp.	3	3	1									