AQUATIC OLIGOCHAETA OF MUD LAKE, AND ITS INLET AND OUTLET STREAM

Aquatic invertebrates of Wisconsin have been studied extensively, but until recently, little work has been done with aquatic oligochaetes (segmented worms). Much of the previous work was primarily concerned with the tubificid fauna of the Great Lakes (Hiltunen 1967; Howmiller 1972; Howmiller and Beeton 1970; Spencer 1980). Also, Howmiller (1974) described the aquatic Oligochaeta found in the inland waters of Wisconsin, and Howmiller and Loden (1976) provided additional information which contains the most current list of species found in Wisconsin.

Very few bog lakes or streams have served as study areas for aquatic oligochaetes. In Wisconsin, Ringger (1973) collected worms from Theresa Marsh, but did not identify or quantify them. Howmiller (1974) later used worms collected by Ringger to develop a list of species for Theresa Marsh. This is the only documented collection of bog oligochaetes in Wisconsin.

A study was carried out during May and June 1980 at the University of Wisconsin - Milwaukee Field Station near Saukville, Ozaukee County, Wisconsin to determine composition and density of aquatic oligochaetes present in a bog lake (Mud Lake) and its inlet and outlet streams. These data have expanded the knowledge of aquatic oligochaetes in bog areas, and have also added to the list of species found in Wisconsin.

MATERIALS AND METHODS

Sampling sites were located in the inlet stream (station 1, Fig. 1), in Mud Lake near its inlet (station 2), outlet (station 3), and downstream of the lake (stations 4, 5 and 6).

Hester-Dendy artifical substrates, used for collecting the oligochaetes, were placed adjacent to the bottom at stations 1, 2 and 3 by flotation devices.

At stations 4, 5 and 6, the Hester-Dendy's were placed just above the stream bottom by attachment to a metal stake driven into the stream bottom. Colonization periods lasted for four weeks.

Aquatic Oligochaeta, as well as other invertebrates, were scraped off the artificial substrates, preserved in 70% ethanol, and hand sorted. Specimens were identified using keys by Brinkhurst (1964), Brinkhurst and Jamieson (1971), Howmiller and Loden (1976) and Pennak (1978). Permanent whole mounts of representative worms were made. Biomass measurements were taken by blotting the organisms dry and recording their weight to the nearest 0.1mg.

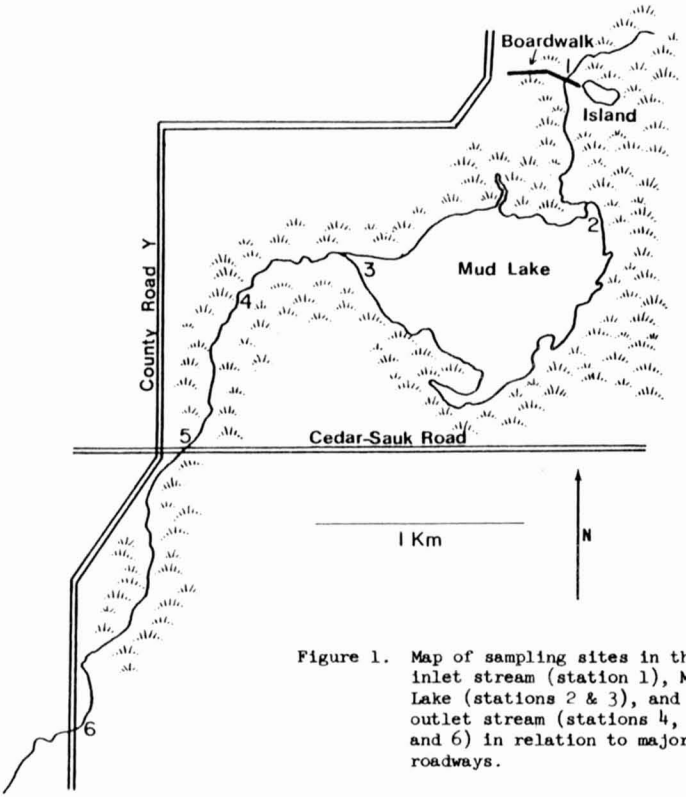

Figure 1. Map of sampling sites in the inlet stream (station 1), Mud Lake (stations 2 & 3), and outlet stream (stations 4, 5 and 6) in relation to major roadways.

RESULTS AND DISCUSSION

Tables 1 and 2 list the taxa found in the inlet stream and Mud Lake, and the outlet stream, respectively. The appearance of Slavina appendiculata (d'Udekem) constitutes a new record of this genus and species from the inland waters of Wisconsin (see Howmiller and Loden 1976 for a list of species). This genus was present at all sampling stations during May and at stations 2, 3 and 6 during June.

Table 1. Taxa list for aquatic Oligochaeta found in Mud Lake and its inlet stream - May and June 1980.

Naididae

- Chaetogaster spp.
- Dero digitata (Müller)
- Nais spp. - probably simplex Piguet
- Pristina longiseta leidyi Smith
- **Slavina appendiculata (d'Udekem)
- Stylaria lacustris (Linnaeus)
- Vejdovskyella comata (Vejdovsky)

Tubificidae

- unidentified without capilliform setae

** Indicates new record of this genus and species from Wisconsin.

Table 2. Taxa list for aquatic Oligochaeta found in the outlet stream of Mud Lake - May and June 1980.

Naididae

- Chaetogaster spp.
- Dero digitata (Müller)
- Nais spp. - probably simplex piguet
- Pristina longiseta leidyi Smith
- ** Slavina appendiculata (d'Udekem)
- Stylaria lacustris (Linnaeus)
- Vejdovskyella comata (Vejdovsky)

Tubificidae

- Limnodrilus hoffmeisteri Claparede
- unidentified without capilliform setae

** Indicates new record of this genus and species from Wisconsin.

At stations 5 and 6 in May, S. appendiculata reached its greatest abundance (Table 3). The lack of study of stream oligochaetes (Howmiller and Loden 1976), coupled with bog worms being poorly studied in Wisconsin, may have been responsible for the unrecorded status of this genus.

Table 3 lists numbers for each taxon and total numbers and biomass for the worms during May and June 1980. Of interest is the increase in total numbers and biomass for stations 1, 2 and 3 in June, and the decrease in numbers and biomass (except for an increase in biomass at station 6) for stations 4, 5 and 6 in June.

Worms in the family Naididae showed greater richness and density during both months, except at station 6 during May where immature Tubificidae exhibited high numbers. Howmiller (1974) listed 6 species of Naididae from Theresa Marsh and only 2 species of Tubificidae. Our samplings showed 7 species of Naididae and only 1 species of Tubificidae.

The fact that Tubificidae were so poorly represented may be a result of several factors. First, little is known of naidid oligochaetes, but they are generally collected in greater abundance from running water habitats (Howmiller and Loden 1976; Brinkhurst and Jamieson 1971) like stations 4, 5 and 6, and from weedy littoral areas of lakes (Howmiller 1974), similar to stations 1, 2 and 3 where many aquatic macrophytes were present. Many Naididae are herbivorous or may graze the organisms which develop attached to aquatic vegetation (Brinkhurst and Jamieson 1971).

Secondly, the effect of the substrate may, to some extent, govern worm distribution. Tubificid worms tend to be burrowing organisms while Naididae generally grow attached to vegetation, although some naidids like Dero, live in tubes of secreted mucous material. Some species of Naididae can also swim (Brinkhurst and Jamieson 1971). The substrate at stations 1, 2 and 3 and somewhat less so at 4, was composed of dy. Dy consists of organic ooze and partially decomposed plant material with an organic content greater than 50% (Wetzel 1975).

Table 3. Numbers (number/m^2) of aquatic oligochaetes collected from Mud Lake and its inlet/outlet stream for May and June 1980.

TAXA	1[a]	2	3	4	5	6
MAY						
			Collection site			
Naididae						
Chaetogaster spp.				62		
Dero digitata			8	8		
Nais spp.			b	b	b	b
Pristina longiseta leidyi			62	23	238	15
Slavina appendiculata		23	23	23	285	100
Stylaria lacustris			15	31		
Vejdovskyella comata				8		
unidentified	15	77	69	38	31	46
Tubificidae						
Limnodrilus hoffmeisteri						23
unidentified w/o capilliform setae		31		15		1061
Total numbers/biomass (mg)	15/2.3	131/6.2	177/3.8	193/8.5	554/23.1	1245/7.1
JUNE						
Naididae						
Chaetogaster spp.			46			
Dero digitata	600	23				
Nais spp.		b		b		b
Pristina longiseta leidyi	23	85	146	8	8	85
Slavina appendiculata		23	23			23
Stylaria lacustris	23	315	477	46		315
Vejdovskyella comata		8				
unidentified			161	23		54
Tubificideae						
unidentified w/o capilliform setae		8				8
Total numbers/biomass (mg)	646/29.2	454/23.8	853/45.4	77/3.1	8/<0.1	485/20.8

[a] Sampler was buried under substrate for station 1-May and station 5-June.

[b] Original counts excluded this genus. Unidentified portions of counts presumably were largely composed of this genus.

More importantly, dy is an unconsolidated, non-compact substrate. This type of substrate is not conducive to burrowers like tubificids and may substantially decrease their numbers.

The abundances of Naididae and Tubificidae may be an artifact of sampling technique. Hester-Dendy artificial substrates probably allow greater colonization by Naididae than by the Tubificidae. However, other collections in this system, using an Ekman grab, support the contention that tubificid abundance is depressed by dy substrates.

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