DIFFERENCES IN PARASITE BURDEN IN TWO SPECIES OF FISH THROUGHOUT THE DARBY CREEK WATERSHED.

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INTRODUCTION

We studied the abundance of parasites in eastern blacknose dace (*Rhinichthys atratulus atratulus* n = 55 at each site) at five sites and mummichogs (*Fundulus heteroclitus* n= 55) at two sites throughout the Darby Creek watershed, hypothesizing that fish living in poor quality habitats expend more metabolic energy to survive, and thus would be less able to combat parasites than fish in less impaired waters (Sure and Knopf, 2004; Sures, 2006). Although the relationship is not simple, the degree of urbanization (and thus population density) can provide some indication of habitat impairment (Lee et al., 1996).

We studied three trematodes: the white grub *Posthodiplostomum minimum*, the black grub *Uvulifer ambloplitis*, and the yellow grub *Clinostomum marginatum*. We also studied the nematode parasite *Eustrongylides* sp . and an acanthocephalan . All use two to three hosts in their life cycles (Figure 2).

SITE NAME	BEAUMONT	WAYNE	ITHAN	GLENOLDEN	NORWOOD
LOCATION	1ST order tributary to main stem of Darby Creek in Easttown, Chester Co., PA;	3rd order Little Darby Creek in Radnor, Delaware Co., PA.	3rd order Ithan Creek in Bryn Mawr, Delaware Co., PA. Aquatic life use attained	3rd order Muckinipattis Creek in Glenolden, Delaware Co., PA.	3rd order Muckinipattis Creek in Norwood, Delaware Co., PA. near John Heinz National Wildlife Refuge
303 (d) and protected water use designations Reference: CCPC, 2002 and	Cold water fish protected waters and migratory fish; aquatic life use attained	Cold water fish protected waters and migratory fish; ; aquatic life use attained urban runoff/storm sewers	Cold water fish protected waters and migratory fish	Warm water and migratory fish; habitat modification, siltation, water flow variability; urban runoff/storm sewers; metals	habitat modification, water flow variability; urban runoff/ storm sewers; metals

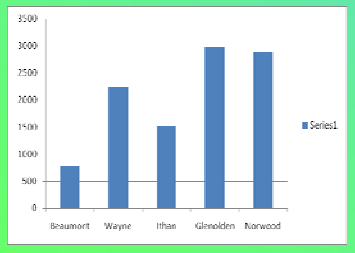


Table 1 and Figure 1: Habitat descriptions and surrounding population densities. Information from PA DEP and township websites.

Male Eastern Blacknose Dace *Rhinichthys atratulus atratulus*

http://www.colonialprep.org/Black%20Nose%20Dace.jpg

Male *Fundulus hetroclitus*
The banded killifish

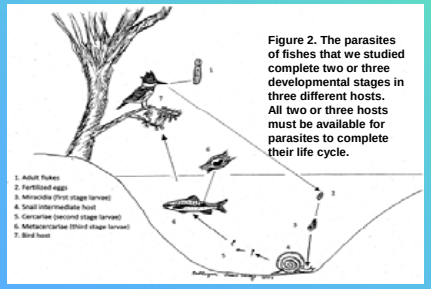


Figure 2. The parasites of fishes that we studied complete two or three developmental stages in three different hosts. All two or three hosts must be available for parasites to complete their life cycle.

METHODS

The fish were completely dissected and examined for parasites by eye and at 400x under the microscope. Separate chi-square tests were performed for each species of parasite in each fish species to test whether there were significant differences in parasite abundance between geographical sites.

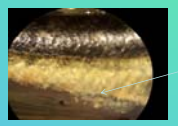
RESULTS

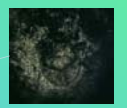
There were significant differences in parasite abundance between stream sites.

		COMMON PARASITES IN BLACKNOSE DACE						
Parasite found		**Beaumont**	**Wayne**	**Ithan**	**Glenolden**	**Norwood**	**p-value**	**other hosts in life cycle**
White Grub	mean:	0.620	1.520	0.680	0.180	1.580	0.006	great blue heron
	total:	31	76	34	9	79		and physid snail
Yellow Grub	mean:	0.000	0.020	0.020	0.000	0.000	0.060	great blue heron
	total:	0	9	1	0	0		and planorid snail
Black spot	mean:	0.080	0.080	0.640	0.080	1.740	0.000	belted kingfish
	total:	4	4	32	4	87		and planorid snail
Acanthocephala	mean:	0.000	0.000	0.000	0.220	0.000	0.000	crustaceans
	total:	0	0	0	11	0		

		COMMON PARASITES OF BANDED KILLIFISH			
Parasite		**Glenolden**	**Norwood**	**p-value**	**other hosts in life cycle**
White Grub	mean:	0.098	6.460	0.000	great blue heron
	total:	5	323		and physid snail
Yellow Grub	mean:	0.000	0.020	0.315	great blue heron a
	total:	0.000	1.000		and planorbid snail
Black spot	mean:	0.118	0.900	0.003	belted kingfisher
	total:	6	45		and planorbid snail
Acanthocephala	mean:	0.740	0.040	0.000	crustaceans
	total:	37	2		
Eustrongylides	mean:	0.000	1.040	0.028	egrets and herons
	total:	0	52		and worms

Black grub on a black nosed dace





Acanthocephalan

Found: Gills, liver, GI

White grub

Found: Liver

Eustrongylides nematode

Found: GI

Figure 3. Examples of parasites studied

DISCUSSION

The abundance of the parasites that we studied does not seem to be differ in abundance due to habitat impairment. The principle factor that appears to account for black spot and white grub, and *Eustrongylides* abundance is the availability of bird hosts—The black spot was more abundant in fish from the Ithan Creek and the Muckinipattis Creek at Norwood; the most common bird host, the belted kingfisher, was repeatedly sighted on sampling trips to these sites. The white grub was highest in abundance in fish from the Little Darby at Wayne, PA. and in the Muckinipattis Creek at Norwood, both sites at which great blue heron were sighted more than once. *Eustronglyides* was also more abundant at Norwood where great blue herons were seen. Neither bird species was seen at any of the other sites over four years of repeated trips to these sites.

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