THE PARASITE FAUNA OF THE AMERICAN ALLIGATOR *(Alligator mississippiensis)* IN SOUTH CAROLINA[1]

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Abstract: Twelve American alligators *(Alligator mississippiensis)* were obtained from three different areas of South Carolina. One species of pentastome *(Sebekia oxycephala)*, two species of nematodes *(Dujardinascaris waltoni* and *Multicaecum tenuicolle)*, four species of trematodes *(Polycotyle ornata, Acanthostomum coronarium, Archaeodiplostomum acetabulatum* and *Pseudocrocodilicola americaniense)* and one species of hemogregarine *(Haemogregarina crocodilnorum)* were recovered. *Polycotyle ornata* was observed only in alligators from Par Pond while *P. americaniense* was found in Par Pond and coastal hosts, *A. acetabulatum* from Kiawah Island and coastal alligators, and *A. coronarium* only at Kiawah Island. These patterns suggest disjunct distributions for the trematode species in South Carolina alligators. The other parasites were found in alligators from all three locations. The only parasite observed to initiate damage or lesions in the alligator was the pentastome.

INTRODUCTION

Few studies[3,4,5,6,7,8] have focused on the parasite fauna of the American alligator, *Alligator mississippiensis*. The death of several coastal alligators as well as several from Par Pond, a South Carolina cooling reservoir, presented the opportunity to compare the parasites of alligators representing disjunct populations.

MATERIALS AND METHODS

Alligators were taken from three locations. The first was Par Pond, an 1012 ha cooling reservoir near Aiken, South Carolina approximately 190 km northeast of Charleston. The second group was from coastal areas near Charleston while the remaining alligators were from Kiawah Island, a small coastal island about 20 km from Charleston.

All aligators were necropsied within 24 h of death, or quick frozen at -20 C for subsequent examination. Immediately after death, blood was taken from the heart with a heparinized vacutainer. Samples of blood were diluted 1:50 with modified Dacie's fluid for leukocyte, erythrocyte and hemogregarine density estimates.[2] Counts were made from 11 fields at 43x, using a modified Levy counting chamber. Hemoglobin was determined using the cyanmethemoglobin method. Per cent cell volume was determined using the microhematocrit method. Blood smears were stained with Wright's-Giemsa and examined for blood parasites. The gastrointestinal tract was

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removed *in toto* and separated into esophagus, stomach, small intestine and colon. The lungs, kidneys, liver, urogenital tract and heart also were isolated and thoroughly examined for parasites. Stomach contents were identified for possible correlation with the parasite fauna present. All helminths were fixed in acetic acid, formalin and alcohol (AFA) and later stained with semichon's acetic carmine. Pentastomes were not stained, but mounted directly. Tissue was taken from each organ, fixed with Bouin's fixative, processed routinely, stained with hematoxylin and eosin, and examined for evidence of parasite-induced lesions.

RESULTS AND DISCUSSION

Stomach contents were variable, with fish being the most common food item. However, birds, small mammals, crayfish and insects also were found. Nonfood items included shotgun shells, dog tags, sinkers, buckshot, fishing line, gastroliths (rocks), pieces of wood, chunks of coal, nuts and assorted steel nails. A relationship between stomach contents and the qualitative nature of the parasite fauna was not apparent.

Two species of nematodes were found in the stomach and upper small intestine, *Dujardinascaris waltoni* Sprent, 1977 and *Multicaecum tenuicolle* Rudolphi, 1819 (Tables 1 & 2). Measurements of *D. waltoni* agreed with Baylis'[1] description of *D. helicina* Molin, 1960; Sprent,[8] however, recently assigned a new name *(D. waltoni)* to this species in the American alligator. *D. waltoni* was found in 67% of the alligators examined, with a mean density of 169 per host. Measurements of *M. tenuicolle,* agreed with those by Walton[9]; 83% of the alligators examined harbored *M. tenuicolle,* with a mean density of 235 per animal. Both nematodes are new records for South Carolina.

The trematodes *Polycotyle ornata* Willemoes-Suhm, 1870, *Acanthostomum coronarium* Brooks and Overstreet, 1977, *Archaeodiplostomum acetabulatum* Dubois, 1944 and *Pseudocrocodilicola americaniense* Byrd and Reiber, 1942, were recovered from the small intestine (Table 2). *P. ornata* and *P. americaniense* were the most abundant trematodes, with mean densities of 243 and 383, respectively; *P. ornata* was found in 33% of the animals and *P. americaniense* in 42% of the animals. *A. acetabulatum* was recovered from 33% of the alligators, with a mean density of 17 per host. *A. coronarium* was found in only 2 alligators from Kiawah Island; one harboured 25 and the other 118. All of the trematodes showed definite preferences with respect to site of infection in the stomach and intestine (Table 2). All trematodes represent new records for South Carolina.

All twelve alligators were infected with the pentastome, *Sebekia oxycephala* Sambon, 1922. Adults were found in the lungs while nymphs were recovered in the liver. Unlike the other parasites found in these alligators, *S. oxycephala* appeared to cause considerable necrosis and hemorrhaging in both the lungs and liver, not unlike that reported by Shotts *et al.*[7] Microscopic lesions in the liver were characterized by mononuclear infiltration and germinal centers in the tissue surrounding the pentastomes. The lesions associated with *S. oxycephala* may be sufficiently severe to cause mortality when associated with the gram-negative bacterium, *Aeromonas hydrophila* (Dr. R. W. Gorden, pers. comm.; see also Shotts *et al.*[7]).

Parasites were not found in the urogenital tract, kidneys, or heart. However, erythrocytes of all 12 alligators were parasitized by the hemogregarine, *Hemogregarina crocodilnorum* Wenyon, 1926. Between 10 and 100 erythrocytes in each 1000 examined were infected. No correlation could be found between the numbers of hemogregarines and leukocyte numbers, erythrocyte numbers, percent cell volume, hemoglobin or differen-

TABLE 1. Parasites in the American alligator from South Carolina.

				Numbers of Parasites						
Par Pond	Sex	Length(m)	Weight(kg)	Dw	Mt	Po	Pa	Aa	Ac	So
1	M	3.6	136			18	506			12
2	M	3.4	100		41	414				27
3	F	2.7	75	109	827	72	159			14
4	M	3.3	100	62	80		825			32
5	M	3.2	100	48	469		401			38
6	M	2.7	90	31	136	466				44
Coastal										
1	M	1.2	10	29	144		27	24		1
2	M	2.0	40		13		15			3
3	M	3.0	120	1020	480					18
4	M	1.0	6	38	156				6	8
Kiawah Island										
1	M	1.3	7		19			5	25	7
2	M	1.2	7	13	15			34	138	2

Dw = *Dujardinascaris waltoni;* Mt = *Multicaecum tenuicolle;* Po = *Polycotyle ornata;* Pa = *Pseudocrocodilicola americaniense;* Aa = *Archaeodiplostomun acetabulatum;* Ac = *Acanthostomum coronarium;* So = *Sebekia oxycephala*
Representative specimens USNM Helminthological Collection accession numbers 73880-73886.

TABLE 2. Distribution of enteric helminths from the American alligator, *Alligator mississippiensis.*

Nematodes	Stomach	1st*	2nd*	3rd*	4th*	Colon	# hosts	# parasites
Dujardinascaris waltoni	96.9**	1.5	0.7	0.5	0.4	0	8	1345
Multicaecum tenuicolle	86.2	8.4	8.4	3.1	1.2	0.4	11	2390
Trematodes								
Polycotyle ornata	0	8.0	37.4	51.9	2.6	2.1	4	920
Pseudocrocodilicola americaniense	0	5.0	32.7	60.2	2.1	0	6	1943
Acanthostomum coronarium	0	49.1	12.7	22.4	15.8	0	2	156
Archaeodiplostomum acetabulatum	0	92.8	0	0	7.2	0	4	69

*Quarter of small intestine
**Percent of total

tial leukocyte counts, suggesting a benign relationship.

Based on these limited observations, the trematode fauna of South Carolina alligators appears to have a disjunctive distribution (Table 1), while both nematode species and the pentastome were found in alligators from each of the three locations. Although the life history of none of these helminths (except the pentastome) is known, it seems reasonable to speculate that the pattern could be based on the disjunct distribution of obligate intermediate hosts.

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