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Research Note

Parasitic Helminths of the Little Blue Heron, *Egretta caerulea*, in Southern Florida

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ABSTRACT: Twenty-four species of helminths, including 13 trematodes, 8 nematodes, 2 acanthocephalans, and 1 cestode, were collected from 33 of 35 (94%) little blue herons (*Egretta caerulea*) from southern Florida. A mean of 2.6 (range 1–10) species of helminths per host was recorded. Seventeen species are new host records, while 5 are reported from Florida for the first time.

KEY WORDS: little blue heron, *Egretta caerulea*, Florida, helminths, trematodes, nematodes, acanthocephalans, cestodes.

The little blue heron, *Egretta caerulea* (Linnaeus, 1758) is a small ciconiiform found in fresh- and saltwater habitats in North America, the Caribbean, and tropical South America (Walters, 1980). Little information is available on the parasites of this heron. Some endoparasites have been reported from North, Central, and South America (Vevers, 1923; Travassos, 1930; Polk, 1941; Vigueras, 1944; Caballero and Hidalgo, 1955; Coil, 1955; Cable et al., 1960; Schmidt and Neiland, 1971, 1973). None of these, however, represent thorough surveys. Information on the parasites of little blue herons in Florida is restricted to the works by Stiles and Hassall (1894) and Leigh (1956), who reported cestodes of the genus *Taenia* and the trematode *Ascocotyle tenuicollis*, respectively. The purpose of the present study was to conduct the first systematic survey of helminths in little blue herons, and to determine the prevalence, intensity of infection, and abundance of each helminth species.

Thirty-five little blue herons were collected dead in Florida during November 1970 ($N = 4$) and from April through August of 1987, 1988, 1989, 1990, and 1992 ($N = 31$). Twelve of the birds were in good condition when examined at necropsy, and in the remaining 23 some degree of autolysis was found. Birds were collected from the following counties: Polk (7 birds), Okeechobee (4), Palm Beach (1), Collier (1), Dade (6), and Monroe (12). The herons collected in 1970 came from the Everglades area; however, specific locality information was not available for these birds. The sample included a total of 11 nestling males, 7 nestling females, 12 nestlings of unknown sex, 1 juvenile female, 2 adult females, and 2 birds of unknown age. Birds were separated into age classes based on bill length and plumage characteristics. Techniques for the necropsy of birds and for the collection, fixing, and staining of helminths were similar to those described by Kinsella and Forrester (1972). The terms prevalence, intensity, and abundance used in this paper follow the definitions given by Margolis et al. (1982). Given that the tissues examined for parasites differed between birds, the prevalence for each species of helminth was determined by dividing the number of birds infected with a given helminth by the number of birds in which the tissue found to harbor that given species of helminth was examined (see Table 1). Representative specimens of each species of helminth have been deposited in the U.S. National Parasite Collection, Beltsville, Maryland (USNPC 84349–84372).

Twenty-four species of helminths (13 trematodes, 8 nematodes, 2 acanthocephalans, and 1 cestode) were collected from 33 of 35 (94%) birds examined. Infected birds harbored a mean of 2.6 helminths (range 1–10). The prevalence, intensity of infection, abundance, and location of each helminth are given in Table 1. Seventeen species have not been reported previously from little blue herons, while 5 are reported from Florida for the first time.

Thirty-four percent of the birds were infected with at least 1 species of trematode (mean 3, range 1–5). Three species of strigeids were recovered: *Posthodiplostomum macrocotyle*,

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Table 1. Parasitic helminths of 35 little blue herons from southern Florida.

Helminth	USNPC no.	Sample size*	Prevalence %	Intensity Mean	Intensity Range	Abundance
Trematoda						
Posthodiplostomum macrocotyle Dubois, 1937 (2, 3, 4, 5)†‡§	84360	13	8	120	2–503	46
Echinochasmus donaldsoni Beaver, 1941 (3, 4, 5)†	84361	13	31	456	9–1,770	141
Phagicola nana (Ransom, 1920) (3, 4, 5)‡§	84351	13	31	49	22–90	15
Clinostomum complanatum (Rudolphi, 1814) (1)§	84355	19	26	2	1–2	<1
Apharyngostrigea multiovata (Perez Vigueras, 1944) (2, 3)	84356	17	24	4	2–9	1
Ascocotyle gemina Font, Overstreet, and Heard, 1984 (2, 3, 4, 5)§	84349	13	23	7	1–18	2
Phagicola diminuta Stunkard and Haviland, 1924 (3)§	84352	17	18	38	5–100	7
Microphallus turgidus (Leigh, 1958) (3)	84358	17	12	15	10–19	2
Pholeter anterouterus Fischthal and Nasir, 1974 (3)§	84354	17	12	2	1–2	<1
Ascocotyle sp. (5)	84350	13	8	14	—	1
Apharyngostrigea simplex (Johnston, 1904) (3)‡§	84357	17	6	1	—	<1
Prosthogonimus ovatus (Rudolphi, 1803) (3)§	84353	17	6	1	—	<1
Ribeiroia ondatrae (Price, 1931) (2)	84359	35	3	3	—	<1
Nematoda						
Contracaecum spp. (2)‖§	84366–84367	35	69	25	1–236	17
Tetrameres sp. (1, 2)	84372	20	35	9	1–42	3
Eustrongylides ignotus Jaegerskiold, 1909 (2)	84370	35	20	4	1–10	<1
Capillaria mergi Madsen, 1945 (3)§	84365	17	6	3	—	<1
Syncuaria sp. (1)§	84371	19	5	1	—	<1
Chandleronema longigutturata (Chandler, 1942) (2)‡§	84369	35	3	30	—	<1
Acuaria multispinosa Perez Vigueras, 1938 (2)‡§	84368	35	3	1	—	<1
Cestoda						
Unidentified proglottids (3)	84364	17	24	2	1–2	<1
Acanthocephala						
Southwellina sp. (3, 4)§	84362	17	6	2	—	<1
Neoechinorhynchus sp. (2)§	84363	35	6	1	—	<1

* Number of organs examined differed between birds.

† Numbers in parentheses indicate location in host: (1) oral cavity/esophagus, (2) proventriculus/ventriculus, (3) small intestine, (4) large intestine, and (5) cloaca.

‡ New record for Florida.

§ New host record.

‖ A complex of larvae and adults of 2 species: *C. multipapillatum* (Drasche, 1882) and *C. microcephalum* (Rudolphi, 1809).

Apharyngostrigea multiovata, and *Apharyngostrigea simplex. Posthodiplostomum macrocotyle* was the most prevalent trematode (38%), and represents the first record in little blue herons and in Florida. Specimens of *A. multiovata* were described originally from little blue herons in Cuba by Vigueras (1944), and have been reported also in Florida from reddish egrets (*Egretta rufescens*) (Conti et al., 1986) and roseate spoonbills (*Ajaia ajaja*) (Sepúlveda et al., 1994). *Apharyngostrigea simplex* was collected from a single nestling from Dade County and is the first report of this parasite in the United States. It was reported previously from herons from Australia and Argentina (Dubois, 1968; Ostrowoski de Nuñez, 1989). Ostrowoski de Nuñez (1989) reported the snail *Biomphalaria straminea* and fishes of the families Poecilidae and Cichlidae as the first and second intermediate hosts, respectively, of *Apharynostrigea simplex.*

Heterophyids were represented by the species *Ascocotyle gemina, Ascocotyle* sp., *Phagicola nana, Phagicola diminuta,* and *Pholeter anterouterus.* The flukes identified as *Ascocotyle* sp. may belong to the species *A. gemina,* since the distribution of the organs, vitellaria, and oral appendage was identical in both flukes. *Ascocotyle* sp., however, harbored large numbers of eggs

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which made them much longer (1.6 mm vs. 0.64 mm) and wider (0.6 mm vs. 0.15 mm) than *A. gemina*. More taxonomic work is needed for a better understanding of these differences. Trematodes of the genus *Ascocotyle* and *Phagicola* frequently utilize fishes of the families Centrarchidae, Cyprinodontidae, Mugilidae, and Poeciliidae as second intermediate hosts (Lumsden, 1963). In Florida, metacercariae of *P. nana* develop in the centrarchiids *Micropterus salmoides, Lepomis microlophus, L. macrochirus,* and *L. humilis* (Font et al., 1984), while those of *Phagicola diminuta* have been reported from *Gambussia affinis* by Stein (1978).

Specimens of *Pholeter anterouterus* have been described in Florida from cystic cavities in the small intestine of brown and white pelicans *Pelecanus occidentalis,* and *P. erythrorhynchos,* respectively (Pearson and Courtney, 1977). In the present study, single specimens of *P. anterouterus* also were found buried inside nodules (2–3 mm wide) in the small intestine.

The families Microphallidae, Prosthogonimidae, Clinostomidae, Psilostomidae, and Echinostomatidae were represented by a single species each: *Microphallus turgidus, Prosthognonimus ovatus, Clinostomum complanatum, Ribeiroia ondatrae,* and *Echinochasmus donaldsoni,* respectively. *Microphallus turgidus, P. ovatus,* and *C. complanatum* have been reported in Florida from a number of avian hosts (Yamaguti, 1971; Heard and Overstreet, 1983).

Heard and Overstreet (1983) originally reported *Microphallus turgidus* from little blue herons collected in Mississippi. This microphallid utilizes snails of the genus *Littoridinops* as first intermediate hosts, and the crustaceans *Palaemonetes paludosus, P. pugio,* and *P. vulgaris* as second intermediate hosts in South Florida (Heard and Overstreet, 1983). Dragonfly larvae and centrarchiid fishes have been reported as the intermediate hosts for *P. ovatus* and *C. complanatum,* respectively (Boddeke, 1960; Torres and Price, 1971).

Only one bird was infected with *Ribeiroia ondatrae,* a cosmopolitan parasite of fish-eating birds and mammals. This fluke was also reported from little blue herons in Puerto Rico (Cable et al., 1960), and from wood ducks, *Aix sponsa* (Thul et al., 1985), and raccoons (*Procyon lotor*) (Schaffer et al., 1981) in Florida.

Echinochasmus donaldsoni was the second most prevalent and the most abundant fluke encountered during this study. Most of the specimens collected were immature, which suggests that little blue herons may represent secondary hosts for this helminth. Premvati (1968) reported this fluke from pied-billed grebes (*Podilymbus podiceps*) in Florida. Snails of the genus *Amnicola* and a variety of freshwater fishes can serve as intermediate hosts for this echinostome (Beaver, 1941).

Ninety-one percent of the little blue herons examined were infected with nematodes (mean 1.4, range 1–5). *Contracaecum multipapillatum* and *Contracaecum microcephalum* (family Heterocheilidae) were the most prevalent nematodes, infecting 69% of the birds. Nematodes of this genus have been reported in little blue herons from the British Guyana (*C. andersoni*; Vevers, 1923), and Nicaragua (*C. ardeae*; Schmidt and Neiland, 1973). In Florida, *C. multipapillatum* and *C. microcephalum* have been reported from ciconiiformes and pelecaniformes (Huizinga, 1971; Courtney and Forrester, 1974; Threlfall, 1982; Conti et al., 1986; Sepúlveda et al., 1994). In Florida, the nematode *C. multipapillatum* utilizes different families of freshwater fishes (Centrarchidae, Cyprinidae, and Poeciilidae) as second intermediate hosts (Huizinga, 1967).

The family Acuariidae was represented by 3 species: *Chandleronema longigutturata, Acuaria multispinosa,* and *Syncuaria* sp. Infections with *C. longigutturata* and *A. multispinosa* were detected in a single juvenile bird from Collier County. Little and Ali (1980) listed only raccoons and muskrats as hosts for *C. longigutturata.* The finding of this nematode in little blue herons constitutes the first record of this acuariid in an avian host and in Florida. A single female of the genus *Syncuaria* was recovered from an adult breeding female collected in Monroe County.

The families Trichuridae, Dioctophymidae, and Tetrameridae were represented by a single species each: *Capillaria mergi, Eustrongylides ignotus,* and *Tetrameres* sp., respectively. In Florida, the nematode *C. mergi* has been reported from roseate spoonbills (Sepúlveda et al., 1994) and specimens similar to *C. mergi* have been reported also from brown pelicans and white ibises (*Eudocimus albus*) (Courtney and Forrester, 1974; Bush and Forrester, 1976). The nematode *E. ignotus* was collected from the ventriculus of 20% of the birds. This parasite has been reported from several species of ciconiiformes in Florida, including little blue herons (Spalding et al., 1993). These authors also reported 10 species

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of freshwater fishes (families Centrarchidae, Cyprinodontidae, Lepisosteidae, and Poeciliidae) as intermediate hosts for this nematode in southern Florida.

Tetrameres sp. was the second most prevalent nematode recovered during this study. Only males were collected from the esophagus and stomach of infected birds.

Infections with cestodes occurred in 24% of the herons. Only proglottids were recovered in each case, and thus identification to genus or species was not possible. There are 3 previous records of cestodes from little blue herons in America. The cestodes *Taenia* sp. (Stiles and Hassall, 1894), and *Dilepis hillis* (Polk, 1941), have been identified from little blue herons in North America (Florida, Oklahoma), while Schmidt and Neiland (1971) found *Parvitaenia aurita* in birds from Central America (Nicaragua).

Six percent of the birds were infected with the acanthocephalans *Southwelllina* sp. (family Polymorphidae) and *Neoechinorhynchus* sp. (family Neoechinorhynchidae). In both cases, the parasites could not be identified to species because their proboscides were retracted. In Florida, members of the genus *Southwellina* have been identified from brown pelicans (Courtney and Forrester, 1974), white ibises (Bush and Forrester, 1976) and roseate spoonbills (Sepúlveda et al., 1994). Definitive hosts for *Neoechinorhyunchus* spp., however, are fishes and turtles (Petrochenko, 1956), which suggests that the finding of this acanthocephalan in little blue herons may be accidental. These represent the first records of infections with acanthocephalans in little blue herons.

With the exception of infections with *P. macrocotyle, E. donaldsoni, Contracaecum* spp., and *E. ignotus,* the prevalence and mean intensity of parasites found in this study were relatively low and probably not associated with significant pathological changes. *Contracaecum* spp. have been implicated as pathogens in several species of aquatic birds (Huizinga, 1971), and infections with *E. ignotus* have been estimated to cause at least 80% mortality among ciconiiform nestlings in southern Florida (Spalding et al., 1993).

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