

Research Note

Parasites and Commensals of the West Indian Manatee from Puerto Rico

ANTONIO A. MIGNUCCI-GIANNONI,^{1,2,4} CATHY A. BECK,³ RUBY A. MONTROYA-OSPINA,^{1,2,5}
AND ERNEST H. WILLIAMS, JR.²

¹ Red Caribeña de Varamientos, Caribbean Stranding Network, P.O. Box 361715, San Juan, Puerto Rico 00936.

² Department of Marine Sciences, University of Puerto Rico, P.O. Box 908, Lajas, Puerto Rico 00667, and

³ U.S. Geological Survey, Biological Resources Division, Sirenia Project, 412 NE 16th Ave., Gainesville, Florida 32601

ABSTRACT: Metazoan parasites and commensals were collected from dead manatees salvaged in Puerto Rico. Thirty-five manatees were examined between 1980 and 1998. Parasites and commensals were identified in 20 (57%) manatees and included 3 species of helminths, 1 nematode (*Heterocheilus tunicatus*) and 2 digeneans (*Chiorchis fabaceus* and *Cochleotrema cochleotrema*). Two species of commensals were also associated with manatees: a barnacle (*Chelonibia manati*) and a fish (whitefin remora, *Echeneis neucratooides*). The 3 species of helminths found in manatees constitute the first records of these parasite–host relationships for the study area. The record of *C. manati* is the first for the Caribbean, and thus the species is not endemic to the Gulf of Mexico as previously described. The speculation that West Indian manatees closer to the center of their geographic distribution would have a greater diversity of parasites was found not true for these insular specimens but perhaps could be true for continental South American specimens.

KEY WORDS: Sirenia, *Trichechus manatus*, helminths, nematodes, digeneans, barnacles, remoras, Caribbean.

After reporting on the prevalence of parasites in West Indian manatees (*Trichechus manatus* Linnaeus 1758) from Florida, Beck and Forrester (1988) proposed that an examination of manatees recovered near the center of the species distribution may yield a greater diversity of parasite fauna than had been reported previously. Several references to the helminths of manatees in the Caribbean and South America exist (see Beck and Forrester, 1988; Coy-Otero, 1989), but the parasite and commensal fauna of manatees inhabiting the waters of Puerto Rico has not been described.

To assess the parasite and commensal fauna of manatees in Puerto Rico, helminths and symbionts were collected from dead manatees salvaged by the U.S. Fish and Wildlife Service (USFWS) between 1980 and 1988 and by the Caribbean Stranding Network (CSN) between 1989 and 1998 (Mignucci-Giannoni, 1996). When the condition of the animals allowed, carcasses salvaged or necropsied were examined for metazoan endoparasites by searching the entire gastrointestinal tract, major organs, blubber, and nares. The skin was searched for external parasites and commensal associates. Specimens of each parasite or commensal collected were initially fixed with 10% buffered formalin and then stored in glass vials in 70% ethanol. Representative helminth specimens were deposited in the United States National Parasite Collection (USNPC), Beltsville, Maryland.

Thirty-five manatees were examined. Parasites and commensals were collected from 20 (57%) of these animals. Three species of parasites were identified: 1 nematode (*Heterocheilus tunicatus* Diesing, 1839) and 2 digeneans (*Chiorchis fabaceus* (Diesing, 1838) and *Cochleotrema cochleotrema* (Travassos and Vogelsang, 1931)) (Table 1). Two species of commensals were associated with manatees: 1 cirriped barnacle (*Chelonibia manati* Pilsbry, 1916) and 1 fish (whitefin remora, *Echeneis neucratooides* Zuiew, 1789) (Table 1). No cestodes, acanthocephalans, or cyamids were observed.

Heterocheilus tunicatus was collected from 10 manatees (29%), mostly in the stomach and rarely extending to the intestine. The paramphistome fluke *C. fabaceus* was found in 14 animals (40%) in the duodenal diverticula, ileum, cecum, large intestine, and colon. *Cochleotrema coch-*

⁴ Corresponding author (e-mail: mignucci@caribe.net).

⁵ Present address: 405 Keaninani St., Kailua, Hawaii 96734.

Table 1. Parasite and commensal fauna collected from manatees (*Trichechus manatus*) in Puerto Rico.

Date of collection	Host			Parasite	Location in host	USNPC
	Sex	Length (cm)	Locality			
19 Sep 1980	M	313	Vega Baja	<i>C. fabaceus</i>	Cecum	
1 Nov 1982	M	295	Cabo Rojo	<i>C. fabaceus</i>	Intestine	
2 Oct 1982	M	210	Salinas	<i>H. tunicatus</i>	Stomach	
13 Aug 1984	F	151	Peñuelas	<i>C. manati</i>	Skin	
7 Jun 1989	F	208	Salinas	<i>C. fabaceus</i>	Cecum, colon	
14 Jan 1990	F	329	Ceiba	<i>H. tunicatus</i>	Stomach	87830.00
4 Oct 1990	F	206	Luquillo	<i>C. fabaceus</i>	Ileum	
				<i>C. cochleotrema</i>	Nares	
				<i>H. tunicatus</i>	Stomach, jejunum	87821.00
11 Apr 1991	F	210	Toa Baja	<i>C. fabaceus</i>	Cecum	87811.00
31 May 1991	F	300	Cabo Rojo	<i>C. fabaceus</i>	Ileum	87812.01
				<i>C. cochleotrema</i>	Nares, trachea	87812.02
				<i>H. tunicatus</i>	Stomach	87812.03
				<i>C. manati</i>	Skin	
18 Apr 1992	M	294	Ceiba	<i>C. fabaceus</i>	Cecum	87813.01
				<i>C. cochleotrema</i>	Nares	
				<i>H. tunicatus</i>	Stomach	87813.02
				<i>E. neucratooides</i>	Skin	
26 Aug 1992	M	258	Ponce	<i>C. fabaceus</i>	Colon	78643
				<i>C. cochleotrema</i>	Nares	78642
				<i>H. tunicatus</i>	Stomach	78641
24 Mar 1993	M	296	Fajardo	<i>C. fabaceus</i>	Intestine, colon	87814.01
				<i>C. cochleotrema</i>	Nares	
				<i>H. tunicatus</i>	Stomach	87814.02
28 Aug 1993	M	273	Guayanilla	<i>C. fabaceus</i>	Intestine, colon	87815.01
				<i>C. cochleotrema</i>	Nares	87815.02
				<i>H. tunicatus</i>	Stomach, ileum	87815.03
14 Sep 1993	F	331	Rincón	<i>C. fabaceus</i>	Small intestine	87816.00
15 Jul 1994	M	307	Ceiba	<i>H. tunicatus</i>	Stomach	87822.00
9 Jun 1995	M	229	Aguada	<i>C. cochleotrema</i>	Nares	87823.00
10 Apr 1996	F	207	Juana Díaz	<i>C. fabaceus</i>	Colon	87818.00
10 Feb 1997	M		Humacao	<i>C. fabaceus</i>	Colon	87819.01
				<i>C. cochleotrema</i>	Nares	87819.02
				<i>H. tunicatus</i>	Stomach	87819.03
21 Jan 1998	F	148	Juana Díaz	<i>C. manati</i>	Skin	
18 Mar 1998	M	277	Toa Baja	<i>C. fabaceus</i>	Colon	87820.01
				<i>C. cochleotrema</i>	Nares	87820.02

leotrema was found in 9 manatees (26%), in the nares of the host, although on 1 occasion this trematode was also found in the trachea and larynx. *Chelonibia manati* was only found in 3 manatees. In 1 manatee, the commensal *E. neucratooides* was reported. Remoras have been observed regularly on free-roaming manatees in the study area.

Only 1 of the manatees was parasitized simultaneously by 4 of the species of parasites and commensals identified, 6 (17%) were infected by 3 species of parasites, 1 was infected by only 2 species of parasites, and 12 (34%) were infected by only 1 species of parasite. In some manatees some parasites were not observed,

probably because of the state of decomposition of the animal and not the lack of antemortem presence of the parasite. All manatees that had parasites were either freshly dead or moderately decomposed when necropsied. Of the manatees examined in which parasites were not found, 6 were in an advanced state of decomposition and 4 were moderately decomposed.

Parasitized animals ranged in age from <1 to >28 years (ages determined following the technique of Marmontel et al., 1996) and were 148–335 cm in length. The youngest animals found as a host (<1 year of age, 148 and 151 cm in length) had only the commensal *C. manati*. The 2–3-yr-old animals with endoparasites were

feeding on seagrass. Neonates <130 cm were not parasitized by helminths. A captive-reared manatee (Mignucci-Giannoni, 1998) that died at approximately 1.9 yr of age (210 cm in length, 190 kg) was not parasitized by any helminth.

All 3 species of helminths noted here are known to parasitize manatees in Florida, Mexico, Brazil, and Guyana (see Beck and Forrester, 1988). A new species of paramphistomid trematode from the intestines of a manatee from Ciénaga de Zapata in Cuba was described by Coy-Otero (1989) as *Chiorchis groschafti* Coy-Otero, 1989, but this specimen appears not to differ from *C. fabaceus*. The trematodes *Nudacotyle undicola* Dailey, Vogelbein and Forrester, 1988 and *Moniligerum blairi* Dailey, Vogelbein and Forrester, 1988 and coccidian oocysts *Eimeria manatus* Upton, Odell, Bossart, and Walsh, 1989 and *Eimeria nodulosa* Upton, Odell, Bossart, and Walsh, 1989 have also been reported to parasitize Florida manatees (Beck and Forrester, 1988; Dailey et al., 1988; Upton et al., 1989) but were not collected in the gastrointestinal tracts of manatees examined from Puerto Rico.

The 3 species of helminths found in these manatees constitute the first records of these parasite-host relationships for the study area. The commensal *C. manati* is the first record in the Caribbean. It was initially described from western Florida on a manatee and loggerhead turtles (*Caretta caretta* (Linnaeus, 1758)), and 1 record exists from Texas from an unknown host (Gittings et al., 1986). The Texas finding convinced Gittings et al. (1986) that the species was endemic to the Gulf of Mexico, which our present findings contradict.

Although Puerto Rico is closer to the center of the West Indian manatee's geographic distribution than is Florida, the parasite diversity was not greater than that found in the northern part of the species' range. Puerto Rico is located in the middle of an island chain and thus has fewer shallow-water faunal species than do areas closer to the continental shelves. Thus, intermediate hosts of other described manatee helminths may be lacking. Continental specimens from the shores of Central America or South America may be a better test for Beck and Forrester's (1988) hypothesis.

Salvage and specimen collections were conducted under USFWS permits PRT 2-8430 and PRT-684532 and under a cooperative agreement with Puerto Rico's Department of Natural and Environmental Resources. Support for the study was provided in part by a grant to the CSN from the USFWS Caribbean Field Office. M. Marmontel (Projeto Mamirauá, Brazil) and D. J. Banowetz (Florida Department of Environmental Protection) determined the ages of the animals used in the study. We are grateful for the assistance of CSN participants in the study. The research and preparation of this contribution was conducted as part of a postdoctoral fellowship for A.A.M.G. with the U.S. Geological Survey Biological Resources Division Sirenia Project in Gainesville, Florida.

Literature Cited

- Beck, C. A., and D. J. Forrester.** 1988. Helminths of the Florida manatee, *Trichechus manatus latirostris*, with a discussion and summary of the parasites of sirenians. *Journal of Parasitology* 74:628-637.
- Coy-Otero, A.** 1989. Una nueva especie de trematodo del genero *Chiorchis* (Diplodiscidae), un parásito del manatí *Trichechus manatus* (Sirenia) de Cuba. *Poeyana* (Instituto de Zoología, Academia de Ciencias de Cuba) 378:1-4.
- Dailey, M. D., W. Vogelbein, and D. J. Forrester.** 1988. *Moniligerum blairi* n. g. sp. and *Nudacotyle undicola* n. sp. (Trematoda: Digenea) from the West Indian manatee, *Trichechus manatus* L. *Systematic Parasitology* 11:159-163.
- Gittings, S. R., G. D. Dennis, and H. W. Harry.** 1986. Annotated Guide to the Barnacles of the Northern Gulf of Mexico. TAMU-SG-86-402. Texas A&M Sea Grant College Program, Galveston. 36 pp.
- Marmontel, M., T. J. O'Shea, H. I. Kochman, and S. R. Humphrey.** 1996. Age determination in manatees using growth-layer-group counts in bone. *Marine Mammal Science* 12:54-88.
- Mignucci-Giannoni, A. A.** 1996. Marine mammals strandings in Puerto Rico and the United States and British Virgin Islands. Ph.D. Dissertation, University of Puerto Rico, Mayagüez.
- . 1998. Marine mammal captivity in the north-eastern Caribbean: with notes on the rehabilitation of stranded whales, dolphins and manatees. *Caribbean Journal of Science* 34(3-4). (In press.)
- Upton, S. J., D. K. Odell, G. D. Bossart, and M. T. Walsh.** 1989. Description of the oocysts of two new species of *Eimeria* (Apicomplexa: Eimeriidae) from the Florida manatee, *Trichechus manatus* (Sirenia: Trichechidae). *Journal of Protozoology* 36:87-90.