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Digenea of the Green Turtle *(Chelonia mydas)* and the Leatherback Turtle *(Dermochelys coriacea)* from Puerto Rico

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ABSTRACT. – Six species of digeneans are reported from the green turtle, *Chelonia mydas*, and one species from the leatherback turtle, *Dermochelys coriacea*, in Puerto Rico. Species from *C. mydas* include one spirorchid, *Learedius orientalis*, one pronocephalid, *Pyelosomum cochelear*, two angiodictyids, *Deuterobaris proteus* and *Microscaphidium reticulare*, one styphlodorid, *Paralepoderma acariaeum* and one microscaphidiid, *Polyangium linguatula*. One paramphistomid, *Schizamphistomum* could not be identified to species. A single species of pronocephalid, *Astorchis renicapite* was the only digenean found in the leatherback turtle. The finding of *C. acariaeum*, *L. orientalis* and *A. renicapite* in *C. mydas* from Puerto Rico represent new geographic locality records.

INTRODUCTION

Few reports are available on the endoparasites of marine turtles of Puerto Rico. Fischthal and Acholonu (1976) reported 28 species of digeneans from 14 Atlantic hawksbill turtles, *Eretmochelys imbricata imbricata* (Linnaeus, 1766), from Cabo Rojo. Dyer et al. (1991) found seven species of digeneans in a green turtle, *Chelonia mydas* (Linnaeus, 1758), from Ponce. Later, Dyer et al. (1995a) detected seven species of digeneans in one *E. i. imbricata* from La Parguera and the same workers (1995b) reported six species of digeneans in a single *E. i. imbricata* from the same locality. Since *C. mydas* is a threatened species throughout its range and an endangered species in the breeding colony population of Florida and the Pacific Coast of Mexico (Anonymous, 1979), endoparasitic investigations are possible only on the death of moribund turtles or the death of stranded turtles salvaged by stranding networks. The Caribbean Stranding Network was established for the treatment and release of rehabilitated turtles as well as the collection of biological data vital to an understanding of wild populations. The present report adds to our knowledge of the endoparasitic fauna of *C. mydas* from Puerto Rico. The death of a single leatherback turtle, *Dermochelys coriacea* (Linnaeus, 1766), allowed an opportunity to study the digeneans of a species of turtle not previously examined from Puerto Rico.

MATERIALS AND METHODS

All helminths were recovered in sites at necropsy from the turtles shortly after death. The digestive tract, lungs, circulatory system, gall and urinary bladders were examined. Digeneans were fixed in hot AFA (Alcohol-Formalin-Acetic Acid) solution, stained in Harris' hematoxylin, dehydrated, cleared in beechwood creosote and mounted in Canada balsam. All specimens have been deposited in the United States National Museum Helminthological Collection (USNM Helm. Coll.) as noted.

This work was conducted under standard federal permits for handling endangered animals and operating a rehabilitation facility for endangered animals, which were obtained and maintained by the Caribbean Stranding Network.

RESULTS AND DISCUSSION

The four *Chelonia mydas* examined were infected with helminths (Table 1). Two turtles had single infections, one with

Paralepoderma acariaeum (Looss, 1902) Yamaguti, 1971, and the other with *Pyelosomum cochelear* Looss, 1899. One turtle had a dual infection of *Learedius orientalis* Mehra, 1939 and *P. cochelear* and one with a multiple infection of *Deuterobaris proteus* (Brandes, 1891) Looss, 1902, *Polyangium linguatula* (Looss, 1899) Looss, 1902, *Microscaphidium reticulare* (van Beneden, 1859) Looss, 1901, and *Schizamphistomum* sp. The single *Dermochelys coriacea* was infected with *Astorchis renicapita* (Leidy, 1856) Poche, 1926.

Paralepoderma acariaeum (Looss, 1902) Yamaguti, 1971

Six specimens of the styphlodorid *Paralepoderma acariaeum* were found in the intestine of a single *Chelonia mydas* collected 18 February 1994 from Culebra. Members of *Paralepoderma* are parasites in snakes and occasionally in turtles. Looss (1902) described this digenean from *Thalassochelys corticata* and *C. mydas* in Egypt. To our knowledge, it has not been reported since the original description. The present report constitutes the rediscovery of this species and establishes a new geographic locality record. All specimens have been deposited in the USNM Helm. Coll. No. 84310.

Deuterobaris proteus (Brandes, 1891) Looss, 1982

Twelve specimens of this angiodictyid were found in the small intestine of a single *C. mydas* collected on 24 September 1994 from Pijuán, Loiza. This species was described from specimens found in the intestine of *Chelone viridis* (= *Chelonia mydas)* from the Mediterranean. Later, Gupta (1961) described *Deuterobaris chelonei* from *C. mydas* in Trinidad. However, Gupta made no mention of ventral glands in the description. Neither was a type specimen deposited nor was a record of deposition of type material given. *Deuterobaris proteus* has previously been reported in green turtles from Florida (Nigrelli, 1941) and from Puerto Rico (Dyer et al., 1991). Our specimens are deposited in the USNM Helm. Coll. No. 84380.

TABLE 1. Helminths of *Chelonia mydas* and *Dermochelys coriacea.*

Host	Carapace length × width cm.	Geographic locality	Collection data	Helminth	Anatomical location	No. of parasites	USNM Helm. Coll. No.
Chelonia mydas	17.5 × 15.3	Culebra	940218	*Paralepoderma acariaeum*	intestine	6	84310
	78.0 × 69.0	Ponce	940420	*Learedius orientalis*	heart	94	86414
				Pyelosomum cochelear	urinary bladder	1	86411
	29.9 × 25.5	Canal Largo, La Parguera	940819	*Pyelosomum cochelear*	urinary bladder	1	86412
	54.9 × 48.6	Pijuan, Loiga	940924	*Schizamphistomum* sp.	intestine	6	84381
				Deuterobaris proteus	intestine	12	84380
				Polyangium linguatula	intestine	5	84379
				Microscaphidium reticulare	large intestine	4	84378
Dermochelys coriacea	149.6 × 100.6	Barceloneta	940608	*Astorchis renicapita*	large intestine and rectum	25	86413

Learedius orientalis Mehra, 1939

Ninety-four specimens of the spirorchid *Learedius orientalis* were detected in the heart and base of the aorta of a single *Chelonia mydas* collected 20 April 1944 from Ponce. While seven genera and ten species of spirorchids have been recorded in *C. mydas* from various parts of the world (Smith, 1972), *Learedius learedi* Price, 1934 is the only species reported from *C. mydas* in the West Indies (Dyer et al., 1991). It has also been reported from *E. i. imbricata* from Puerto Rico (Dyer et al., 1995b).

The genus *Learedius* was proposed by Price (1934) for one specimen of *L. learedi* found in the circulatory system of *Chelone mydas* (= *Chelonia mydas),* which died in the National Zoological Park, Washington, D.C. A more detailed description based on 45 specimens was given by Caballero et al. (1955). Mehra (1939) described *L. orientalis* based on 24 spirorchids from *C. mydas* taken in the Arabian Sea. After examination of the holotype of *L. learedi,* we agree with Fischthal and Acholonu (1976) that the only difference between the two species appears to be the shape and distance between the testes. The testes of *L. learedi* are rounded and somewhat separated from one another, while the testes of *L. orientalis* are crowded and abut with one another resulting in flattened margins. Our specimens are of the latter arrangement. Perhaps, as pointed out by Fischthal and Acholonu (1976) *L. orientalis* is a synonym of *L. learedi.* This constitutes the first report of *L. orientalis* in *C. mydas* from Puerto Rico and represents a new locality record. Five specimens have been deposited in the USNM Helm. Coll. No. 86414.

Pyelosomum cochelear Looss, 1899

One specimen of a pronocephalid from the urinary bladder of a green turtle taken in Ponce on 20 April 1994 and one from the urinary bladder of another green turtle taken in Canal Large, La Parguera on 19 August 1994 belong to *Pyelosomum cochelear.* This species has been reported from *C. mydas* in Puerto Rico (Dyer et al., 1991). The genus *Pyelosomum* was established by Looss (1899) with *P. cochelear* from the urinary bladder of *C. mydas* of Egypt as type species. *Pyelosomum cochelear* has also been reported from *C. mydas* of Florida (Nigrelli, 1941) and in *C. mydas* from Panama (Caballero, 1954). To our knowledge, *P. posterorchis* Oguro, 1936 is the only other species of *Pyelosomum* reported in *C. mydas.* This species was originally described from specimens found in the intestine of *Eretmochelys squamosa* (Linnaeus) from Palao Island and redescribed from specimens found in *C. mydas* of the Pacific coast of Panama. Although *P. posterorchis* was reported from the Atlantic hawksbill turtle of Cabo Rojo by Fischthal and Acholonu (1976), we did not detect it in our studies of this turtle (Dyer et al. 1995a, 1995b). Both specimens of *P. cochelear* have been deposited in the USNM Helm. Coll. Nos. 86411 and 86412.

Microscaphidium reticulare (van Beneden, 1859) Looss, 1901

Four specimens of an angiodictyid from the large intestine of a green turtle collected on 24 September 1994 from La Parguera were identified as *Microscaphidium reticulare.* According to Yamaguti (1971), this species has been reported from *Chelone mydas* (= *Chelonia mydas)* from Egypt. Fischthal and Acholonu (1976) reported this species in *E. i. imbricata* from Cabo Rojo. The present report represents the first incidence of this species in *C. mydas* from Puerto Rico. Specimens have been deposited in the USNM Helm. Coll. No. 84378.

Polyangium linguatula (Looss, 1899) Looss, 1902

Five specimens of this microscaphidiid were found in the large intestine of a green turtle collected on 24 September 1994 from La Parguera. This species has been reported in *C. mydas* from the Mediterranean coast of Egypt (Looss, 1899, 1902; Sey, 1977), Australia (Johnston, 1913), Singapore (Kobayashi, 1915), Brazil (Teixeira de Freitas and Lent, 1938), Florida (Nigrelli, 1941; Manter, 1954), India (Blair, 1986), Cuba (Groschaft et al., 1977), and Puerto Rico (Dyer et al., 1991). Other species of *Polyangium* reported from marine turtles include *P. miyajimai* Kobayashi, 1921, in *C. mydas, P. longiseminale* Chattopadhyaya, 1972, in

Caretta caretta, and *P. colymbi* (Poche, 1926), Price, 1937, of uncertain host origin. We concur with Blair (1986) that *Polyangium* is represented by *P. linguatula* as the sole species and that specimens of *P. longiseminale, P. miyajimai,* and *P. colymbi* all lie within the range described for *P. linguatula.* Our specimens are deposited in the USNM Helm. Coll. No. 84379.

Schizamphistomum sp.

Six distorted specimens of paramphistomids found in the intestine of a single green turtle collected 24 September 1994 from La Parguera could not be identified to the species level. To our knowledge, *Schizamphistomum* is a monotypic genus with *L. scleroporum* (Creplin, 1844) Looss, 1912 as the only species. According to Yamaguti (1971), it has been reported in *Thalassochelys corticata* and *C. mydas* from the Atlantic, Pacific, and Mediterranean areas. Our specimens have been deposited in the USNM Helm. Coll. No. 84381.

Astorchis renicapite (Leidy, 1856) Poche, 1926

Twenty-five specimens of this pronocephalid were found in the intestine of a single leatherback turtle collected 8 June 1994 at Barceloneta. Yamaguti (1971) lists North America and Tunisia as geographic localities. Puerto Rico represents a new geographic locality. To our knowledge, this is the only digenean reported from the leatherback turtle and is probably host specific. Three specimens have been deposited in the USNM Helm. Coll. No. 86413.

Literature Cited

Anonymous. 1979. List of endangered and threatened wildlife and plants. Title 50, Part 17-1, Department of the Interior, Fish and Wildlife Service, Federal Register.

Blair, D. 1986. A revision of the subfamily Microscaphidiinae (Platyhelminthes: Digenea: Microscaphidiidae) parasitic in marine turtles (Reptilia: Chelonia). Austr. J. Zool. 34:241-277.

Caballero y C., E. 1954. Helmintos de la República de Panamá. X. Algunos Tremátodos de *Chelone mydas* (L.) tortuga marina comestible del Océano Pacifico del Norte. An. Est. Nac. Cienc. Biol. Mexico 8:31-58.

—, M. C. Zerecero y D., and R. G. Grocott. 1955. Helmintos de la República de Panamá. XV. Trematodos de *Chelone mydas* (L.) tortuga marina comestible del Océano Pacifico del Norte. 2a parte. An. Inst. Biol. Mexico 26:149-191.

Dyer, W. G., E. H. Williams, Jr., and L. Bunkley-Williams. 1991. Some Digeneans (Trematoda) of the green turtle, *Chelonia mydas* (Testudines: Cheloniidae) from Puerto Rico. J. Helminthol. Soc. Washington 58:176-180.

———, ———, and ———. 1995a. Some digeneans (Trematoda) of the Atlantic hawksbill turtle, *Eretmochelys imbricata imbricata* (Testudines: Cheloniidae) from Puerto Rico. J. Helminthol. Soc. Washington 62:13-17.

———, ———, and ———. 1995b. *Angiodictyum mooreae* n. sp. (Digenea: Microscaphidiidae) and other digeneans from the Atlantic hawksbill turtle, *Eretmochelys imbricata imbricata* (L.) from Puerto Rico. J. Aquat. Anim. Health 7:38-41.

Fischthal, J. H., and A. D. Acholonu. 1976. Some digenetic trematodes from the Atlantic hawksbill turtle. *Eretmochelys imbricata imbricata* (L.), from Puerto Rico. Proc. Helminthol. Soc. of Washington 43:174-185.

Groschaft, J., A. C. Otero, and F. Tenora. 1977. Trematodes (Trematoda) from Cuban turtles. *Chelonia mydas mydas* (L.) and *Eretmochelys imbricata imbricata* (L.) (Testudinata—Cheloniidae). Acta Univ. Agriculturae, Facultas Agronomic 25:155-167.

Gupta, S. P. 1961. On some trematodes from the intestine of the marine turtle, *Chelone mydas* from the Caribbean Sea. Can. J. Zool. 39:293-298.

Johnston, S. J. 1913. On some Queensland trematodes, with anatomical observations and description of new species and genera. Quart. J. Micros. Sci. 59:361-400.

Kobayashi, H. 1915. On some digenetic trematodes in Japan. Dobutsugaku Zasshi 27:180-182. (In Japanese.)

Looss, A. 1899. Weitere Beiträge zur Kenntnis der Trematoden—Fauna Aegyptens, zugleich Versuch einer naturlichen Gliederung des Genus *Distomum* Retzius. Zool. Jahrb., Abteil. Syst. Oekol. Geogr. Tiere 12:521-784.

—. 1902. Ueber neue und bekannte Trematoden aus Seeschildkröten. Nebst Erorterungen zur Systematik und Nomenclatur. Zool. Jahrb., Abteil. Syst. Oekol. und Geogr. Tiere 16:411-894.

Manter, H. W. 1954. Trematodes of the Gulf of Mexico. United States Fish and Wildlife Service, Fish. Bull. 55:335-350.

Mehra, H. R. 1939. New blood flukes of the family Spirorchiidae Stunkarel (Trematoda) from the marine turtle *Chelone mydas* of the Arabian Sea with observations on the synonymity of certain genera and classification of the family. Proc. Nat. Acad. Sci. India 9:155-167.

Nigrelli, R. F. 1941. Parasites of the green turtle, *Chelonia mydas* (L.), with special reference to the rediscovery of trematodes described by Looss from this host species. Journal of Parasitol. 27(Suppl.): 15-16.

Price, E. W. 1934. New genera and species of blood flukes from a marine turtle, with a key to the genera of the family Spirorchidae. J. Wash. Acad. Sci. 24:132-141.

Sey, O. 1977. Examination of helminth parasites of marine turtles caught along the Egyptian coast. Acta Zool. Acad. Scient. Hungar. 23:387-394.

Smith, J. W. 1972. The blook flukes (Digenea: Sanguinicolidae) and Spirorchidae of cold-blooded vertebrates and some comparison with schistosomes. Helminthol. Abstr., Series A 41:161-204.

Teixeira de Freitas, J. F., and H. Lent. 1938. Sobre alguns trematodeos parasitos de *Chelone mydas* (L.) principalemente Paramphistomoidea. Mem. Inst. Oswaldo Cruz 33:79-88.

Yamaguti, S. 1971. Synopsis of digenetic trematodes of vertebrates. Keigaku Publishing Co., Tokyo, Japan. 1074 pp.