CARETTACOLA HAWAIENSIS N. SP. (TREMATODA: SPIRORCHIDAE)
FROM THE GREEN TURTLE, CHELONIA MYDAS, IN HAWAII

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ABSTRACT: Carettacola hawaiensis n. sp. (Trematoda: Spirorchidae) is described from the hepatic vessels of the green turtle, Chelonia mydas (L.), in Hawaii. The new species differs from any previously described species of Carettacola in size, placement of vitellaria, and shape and placement of Laurer's canal. The genus Haemoxenicon Martin and Bamberger, 1952, becomes a synonym of Carettacola Manter and Larson, 1950. Haemoxenicon stunkardi Martin and Bamberger, 1952, is transferred to the genus Carettacola Manter and Larson, 1950, and becomes Carettacola stunkardi n. comb. An emended generic diagnosis for Carettacola is given along with a key to the species.

From 1986 to 1988, 10 green sea turtles (Chelonia mydas (L.)) were found stranded on the island of Lanai, Maui, and Oahu in Hawaii. The turtles were covered with neoplasms identified as fibropapillomas. These growths on turtles examined for parasites. Two turtles, naming and feeding. Upon determination that the turtles were covered with neoplasms identified were infected with an undescribed species of the genus Haemoxenicon. The neoplasms were not parasitic, but caused reduced vision, disorientation, blindness, and physical obstruction to normal swimming and feeding. Upon determination that the turtles would not survive, they were killed and examined for parasites. Two turtles, 1 from Kahului Bay, Maui, and 1 from Kahului Bay, Maui, were infected with an undescribed species of the genus Carettacola Manter and Larson, 1950.

MATERIALS AND METHODS

A thorough examination for parasites was carried out on the lungs, liver, heart, major vessels, stomach, intestine, and bladder. Worms were placed in tap water and refrigerated overnight for egg expulsion, fixed in alcohol-formalin-acetic acid (AFA) for 2 days, and then transferred to 70% ethanol for storage. Whole mounts were stained in Semichon's acetocarmine, dehydrated in a graded ethanol series, and mounted in Canada balsam. Drawings were made with the aid of a drawing tube. Measurements are in micrometers unless otherwise indicated, with range followed by mean in parentheses. Representative specimens have been deposited in the United States National Museum (USNM) Helminthological Collection, Beltsville, Maryland, and the Harold W. Manter Laboratory (HWML), Division of Parasitology, University of Nebraska State Museum, Lincoln, Nebraska. The balance of the specimens are deposited in the Institute of Parasitology, California State University, Long Beach, California.

DESCRIPTION

Caretta carettacola hawaiensis n. sp.

(Figs. 1-4)

Diagnosis (based upon measurements of 8 whole specimens): Spirorchidae Stunkard, 1921; Carettacola L. Yamaguti, 1958. Body elongate, 5.0-7.7 mm (6.3) long, maximum width 0.210-0.380 mm (0.310) at midbody. Oral sucker terminal. 105-178 (160) long by 84-131 (112) wide with short spines around perimeter. Esophagus tubular, 0.92-1.16 mm (1.01) long, posterior third becoming flask-shaped at cecal bifurcation. Gland cells occur along esophagus particularly at narrow anterior portion of flask-shaped enlargement. Intestinal ceca slightly sinuous, terminating near anterior ends of forks of Y-shaped excretory vesicle. Acetabulum approximately 22% of body length from anterior end, 200-280 (230) in diameter, immediately posterior to intestinal bifurcation, weakly muscular, 64-134 (121) wide. Ovaries, anterior to cirrus sac, filling most of posterior interceliac field. Genital pores ventrobasal, approximately 32% of body length from anterior end. External seminal vesicle saccate, 101-161 (133) long by 88-131 (103) wide, anterior to cirrus sac, filling interceliac area between acetabulum and cirrus sac. Cirrus sac large, 287-337 (307) long by 104-125 (121) wide, partly an-

Received 21 March 1991; revised 1 July 1991; accepted 1 August 1991.

terior but mostly posterior to common genital pore, partly overlapping ovary, containing tubular seminal vesicle, numerous large prostatic cells, and long aspini- cious cecum.

Ovary reniform, 220–280 (250) long by 150–220 (190) wide, intercecal, about 1/3 body length from anterior end; oviduct extends posteriorly then turns sin- istral and is joined by small, spherical seminal receptacle. Oviduct extends to edge of cecum, bends anterior, and enters uterus near common vitelline duct. The uterus extends anteriorly where it is joined by Laurer's canal. Laurer's canal opens dorsolaterally through mar- ginal pore, opposite posterior end of ovary. Vitelline follicles large, primarily extracecal, roughly S-shaped. Testes numerous, arranged in linear series, filling most of posterior intercecal field; external seminal vesicle, filling intercecal area between acetabulum and cirrus pouch. Cirrus pouch large, postacetabular, containing tubular seminal vesicle, numerous prostatic cells. Cirrus armed or unarmed. Genital pore ventro- sinistral to cirrus pouch, posterior to acetabulum, pre- ovarian. Ovary oval to reniform, intercecal, immedi- ately behind cirrus pouch. Recopicalium seminis small. Laurer's canal present behind or overlapping ovary, may or may not be expanded behind pore with mus- cular walls. Vitelline follicles extending around ceca from level of anterior testes to cecal ends. Uterus short, containing a single egg with polar filament. Excretory vesicle Y-shaped, with terminal pore. Parasites of ma- rine turtles.

Type species: Carettacola bipora Manter and Larson, 1950.

KEY TO SPECIES OF CARETTACOLA

1a. Vitellaria formed around ventral surface of ce- cal branches ........................................ C. hawaiensis

1b. Vitellaria formed around dorsal surface of ce- cal branches ........................................ 2

2a. Laurer's canal expanded behind lateral por- forming muscular sac ............................ C. bipora

2b. Laurer's canal with only minute pore opening on dorsal surface without muscular sac

......................................................... C. stunkardi

DISCUSSION

Glazebrook et al. (1989) listed the most com- mon sites for cardiovascular flukes in marine turtles as the heart, followed by visceral vessels. Carettacola bipora was found in intestinal washings of the loggerhead turtle, but the worms were believed to have originated from a nearby blood vessel (Manter and Larson, 1950). Glazebrook et al. (1989) listed C. bipora from "abdominal blood vessel." Haemoxenicon stunkardi and Haemoxenicon chelonenecon Martin and Bamberger, 1952, were found in mesenteric veins of C. mydas. Haemoxenicon chelonenecon subsequently has been synonymized with H. stunkardi by Caballero et al. (1955). Carettacola hawaiiensis is the first trematode found in the hepatic vessels of a marine turtle. The occurrence of these 3 worms in the vascular system of organs other than the heart and associated major vessels sets them apart from other sea turtle spirorchids.
When the 3 species are compared the configuration of the arrangement of internal structures is nearly identical (Figs. 1, 5, 6). The occurrence of a well developed Laurer’s canal in all 3 worms (Figs. 7–9) also differentiates these parasites from other known spirorchids infecting marine turtles. The true uterus is very short in all 3 species, with the Laurer’s canal being an offshoot of the uterine region in *C. hawaiensis* rather than the ootype region (near the seminal receptacle) as in *C. bipora* and *C. stunkardi*. Another unique feature shared by only these 3 spirorchid worms is the C-shaped vitelline follicles that encircle the cecal branches, *C. hawaiensis* ventrally (Fig. 3) and *C. bipora* and *C. stunkardi* dorsally (Figs. 5, 6).

**ACKNOWLEDGMENTS**

We thank J. Ralph Lichtenfels of the U.S. National Parasite Collection and J. S. Garth of the Allan Hancock Foundation, University of Southern California, for the loan of specimens. We also thank Hans Bertsch for the translation of publications and Carol Lyon for her illustrations. This work was partially funded by National Fisheries Service Contract #40JINF-9-0091.

**LITERATURE CITED**


