

## The First Occurrence of *Enodiotrema megachondrus* in a Loggerhead Turtle Found on the Coast of Brazil

Max R Werneck<sup>1\*</sup>, Paula Baldassin<sup>2</sup>, Adriana Mastrangelli<sup>2</sup> and Hassan Jerdy<sup>3</sup>

<sup>1</sup>BW Veterinary Consulting, Rua Professora Sueli Brasil Flores, Praia Seca, Araruama-RJ, Brazil

<sup>2</sup>Serviços em Meio Ambiente, CTA, Rua Saturnino Rangel Mauro 283, Pontal de Camburi, Vitória, ES, CEP, Brazil

<sup>3</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro - UENF, Campos dos Goytacazes, Rio de Janeiro, Brazil

**\*Corresponding Author:** Max R Werneck, Director, BW Veterinary Consulting, Rua Professora Sueli Brasil Flores, Praia Seca, Araruama-RJ, Brazil. **E-mail:** max@bwvet.com.br

**Received:** March 21, 2019; **Published:** April 30, 2019

### Abstract

The present note describes the occurrence of *Enodiotrema megachondrus* (Looss, 1899) Looss, 1901 (Digenea: Plagiorchiidae) in a loggerhead sea turtle (*Caretta caretta* Linnaeus, 1758) found on the coast of Brazil. The parasites were found in small intestine, fixed in 70% alcohol, stained with hydrochloric carmine and cleared in a eugenol solution. The specimens were measured under a microscope. This parasite is exclusive to sea turtles and has been described in the green turtle (*Chelonia mydas* Linnaeus, 1758), hawksbill turtle (*Eretmochelys imbricata* Linnaeus, 1766), olive ridley turtle [*Lepidochelys olivacea* (Eschscholtz, 1829) and Kemp's ridley turtle [*Lepidochelys kempii* (Garman, 1880)]. In the loggerhead sea turtle (*Caretta caretta* Linnaeus, 1758), this parasite has been found in Egypt, France, Italy, the Mediterranean Sea, Madeira Island, the Adriatic Sea and the USA. This is the first report of *E. megachondrus* in this host on the coast of Brazil.

**Keywords:** Brazil; *Caretta caretta*; *Enodiotrema megachondrus*; Loggerhead Turtle; Parasites; Sea Turtles; Trematoda

### Introduction

The genus *Enodiotrema* was originally described by Looss [1] as *Enodia* (type species: *E. megachondrus* Looss, 1899) and also includes *E. reductum* Looss, 1901, *E. instar* Looss, 1901, *E. acariaeum* Looss, 1902, *E. microvitellatus* Chattopadhyaya, 1970, *E. schikhholvae* Gupta and Mehrotra, 1976 and *E. carettae* Blair and Limpus, 1982 [2].

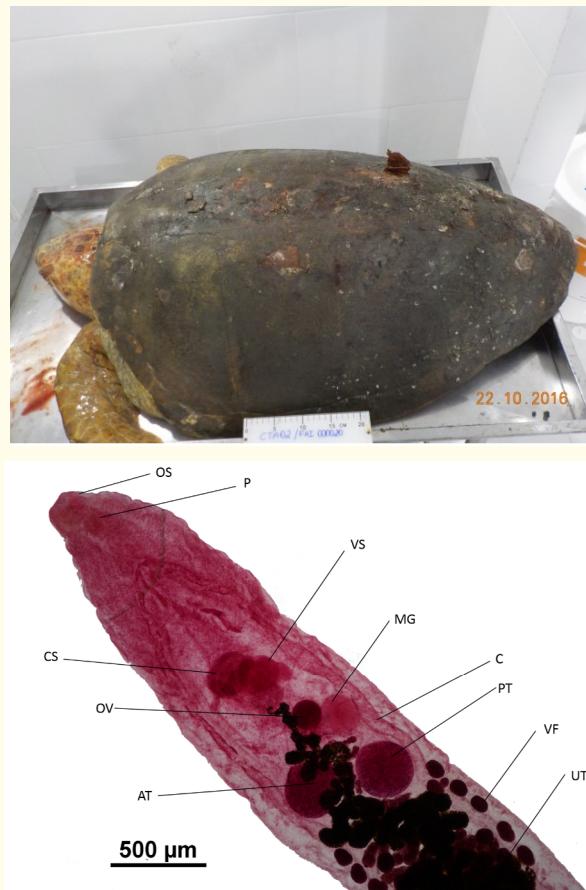
*Enodiotrema megachondrus* is a generalist parasite found in the green turtle (*Chelonia mydas* Linnaeus, 1758) in Egypt [1,3], the USA [4] and Brazil [5], the hawksbill turtle (*Eretmochelys imbricata* Linnaeus, 1766) in Cuba [6], the olive ridley turtle [*Lepidochelys olivacea* (Eschscholtz, 1829)] in Mexico [7] and Costa Rica [8], Kemp's ridley turtle [*Lepidochelys kempii* (Garman, 1880)] in the USA [4] and the loggerhead turtle (*Caretta caretta* Linnaeus, 1758) in Egypt [1,9], France [10], Italy [11], the Mediterranean Sea [12,13], Atlantic Ocean [14], Adriatic Sea [15] and the USA [4].

Although *E. megachondrus* is reported in different parts of the world, it is widely reported in specimens of loggerhead turtles with prevalence reaching almost 96% in Spain [12]. However, in Brazil the few helminthofauna studies of this host do not reveal this trematode occurrence [16,17,20,21]. This note reports the first occurrence of *E. megachondrus* in a loggerhead turtle in Brazil.

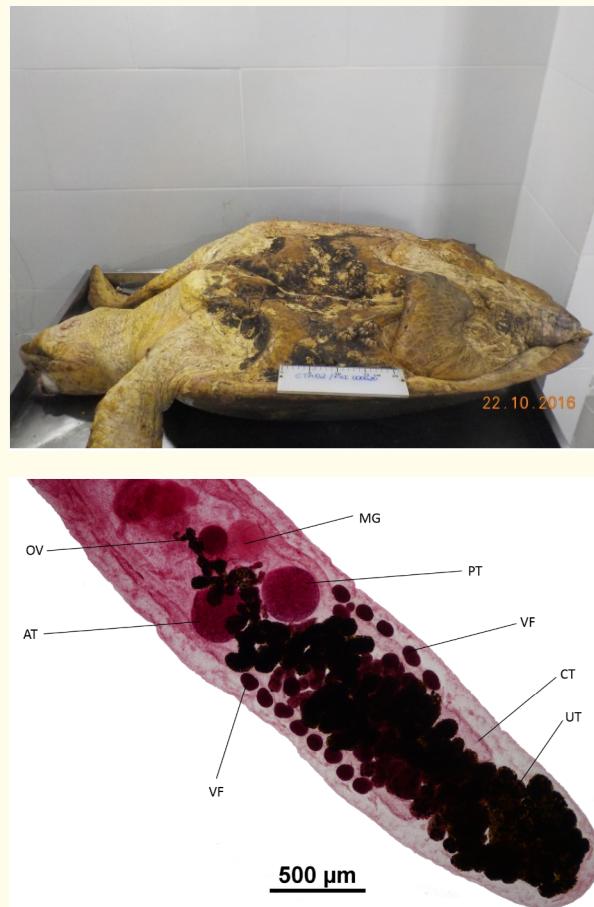
## Case Report

In October 2016, a female adult loggerhead turtle measuring 116 cm in curvilinear carapace length and weighing 100 Kg was found dead on a stretch of sand during beach monitoring activities [22] in the municipality of Guapimirim in the state of Rio de Janeiro, Brazil ( $43^{\circ}5'25.908''W$ ,  $2^{\circ}42'32.832''S$ ). The animal was transported and kept refrigerated until necropsy. The examination revealed edema in subcutaneous tissue, presence of foam and emphysema in the lungs, small intestine with a fecal impaction, containing shells and the organs already showed autolysis signs. These findings were inconclusive in the cause mortis determination. The inspection of the digestive tract revealed 20 specimens of *E. megachondrus* in the small intestine. Some of the parasites were damaged. The parasites were placed in a Petri dish, fixed in 70% alcohol, stained with carmine and cleared with eugenol. Morphometric data [expressed in micrometers as minimum and maximum values (mean  $\pm$  standard deviation)] were determined with the aid of a Nikon Eclipse 80i microscope (Kurobane Nikon Co., Ltd., Otawara, Tochigi, Japan) using the NIS Elements BR software program. Drawing was made using a drawing tube. Analyses of the parasites were authorized by federal licenses for activities with scientific purposes (SISBIO 30600-1 and 9329-1). The helminths were deposited in the Helminthological Collection of the *Instituto Oswaldo Cruz* (CHIOC 38392) in the state of Rio de Janeiro, Brazil.

The morphological analysis and morphometric comparisons were performed with the identification key for the genus proposed by Tkach [18] as well as descriptions by Looss [1,3], Gupta and Mehrotra [19], Groschaft, *et al.* [6], Santoro and Morales [8] and Werneck, *et al* [5].



**Figure 1:** *Enodiotrema megachondrus* found in a loggerhead turtle from Brazil, anterior end. Legend: (OS): Oral sucker; (P): Pharynx; (CS): Cirrus sac; (VS): Ventral Sucker; (OV): Ovary; (MG): Mehlis Gland; (AT): Anterior testis; (PT): Posterior Testis; (VF): Vitelline Follicles; (UT): Uterus.



**Figure 1:** *Enodiotrema megachondrus* found in a loggerhead turtle from Brazil, anterior end. Legend: (OS): Oral sucker; (P): Pharynx; (CS): Cirrus sac; (VS): Ventral Sucker; (OV): Ovary; (MG): Mehlis Gland; (AT): Anterior testis; (PT): Posterior Testis; (VF): Vitelline Follicles; (UT): Uterus.

## Results and Discussion

The morphological findings were compatible with those published in previous reports [1,3,5,18]. The following were the morphometrics of the specimens measured ( $n = 3$ ): total length of 4.046 - 4.541 ( $4.356 \pm 270$ ) and total width of 859 - 997 ( $930 \pm 69$ ); oral sucker 168 - 184 ( $176 \pm 11$ ) in length by 200 - 228 ( $214 \pm 19$ ) in width; pharynx 93 - 102 ( $98 \pm 4$ ) in length by 88 - 98 ( $93 \pm 5$ ) in width; acetabulum 202 - 239 ( $220 \pm 18$ ) in length by 175 - 217 ( $195 \pm 21$ ) in width; cirrus sac 185 - 269 ( $223 \pm 42$ ) in length by 121 - 231 ( $174 \pm 55$ ) in width; anterior testicle 308 - 374 ( $332 \pm 36$ ) in length by 315 - 345 ( $326 \pm 16$ ) in width; posterior testicle 326 - 369 ( $348 \pm 21$ ) in length by 311 - 357 ( $334 \pm 23$ ) in width; ovary 163 - 220 ( $187 \pm 29$ ) in length by 160 - 205 ( $182 \pm 22$ ) in width; vitelline follicles 73 - 126 ( $102 \pm 12$ ) in length by 63 - 100 ( $78 \pm 9$ ) in width; right vitellaria with 7 - 8 follicles; left vitellaria with 7 - 11 follicles; eggs measuring 22 - 28 ( $24 \pm 2$ ) in length by 10 - 15 ( $12 \pm 1$ ) in width.

No discrepancies in the morphometric data are found in the present study when compared with previous descriptions [1,5,6,8]. The morphological analysis of the specimens was compatible with the family Plagiorchiidae. All individuals exhibited two broad vitelline follicles located after the testicles (see Tkach [18]) and the specimens were compatible with descriptions given by Looss [1,3].

In Brazil, little is known regarding helminth fauna in the loggerhead sea turtle. To date, descriptions are found on aspidogastrids (Family Aspidogastridae: *Lophotaspis vallei*), digeneans (family Calycodidae: *Calyodes anthos*; family Rhytidodidae: *Rhytidodes gelatinosus*;

family Pronocephalidae: *Pronocephalus trigonocephalus*, *Pyelosomum renicapite*; family Telorchiidae: *Orchidasma amphiorchis*) and nematodes (family Anisakidae: *Sulcascaris sulcata*; family Kathlaniidae: *Kathlania leptura*) [17]. More recently, *Monticellius indicus* (Digenea: Spirorchidae) [20] and *Plesiochorus cymbiformis* (Digenea: Gorgoderidae) [21] have been described.

## Conclusion

The helminth fauna of the loggerhead turtle in Brazil correspond to approximately 10 species distributed among 9 families, the present note adds *E. megachondrus* to this list.

## Acknowledgment

The Biological samples were obtained through the "Phase 2" beach monitoring project in the state of Rio de Janeiro, Brazil, which is a requirement established by the federal environmental licensing division of the Brazilian environmental agency (IBAMA), for the exploration of oil and gas by Petrobras at the Santos Basin pre-salt province. BW is a company involved with the activities of veterinary medicine and develops specific consulting work. One of the aims of the company is to disseminate the results of scientific studies to contribute to the conservation of marine organisms.

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**Volume 4 Issue 3 May 2019**

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