

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

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### 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. schikholovae* Gupta and Mehrotra, 1976 and *E. carettae* Blair and Limpus, 1982 [2].

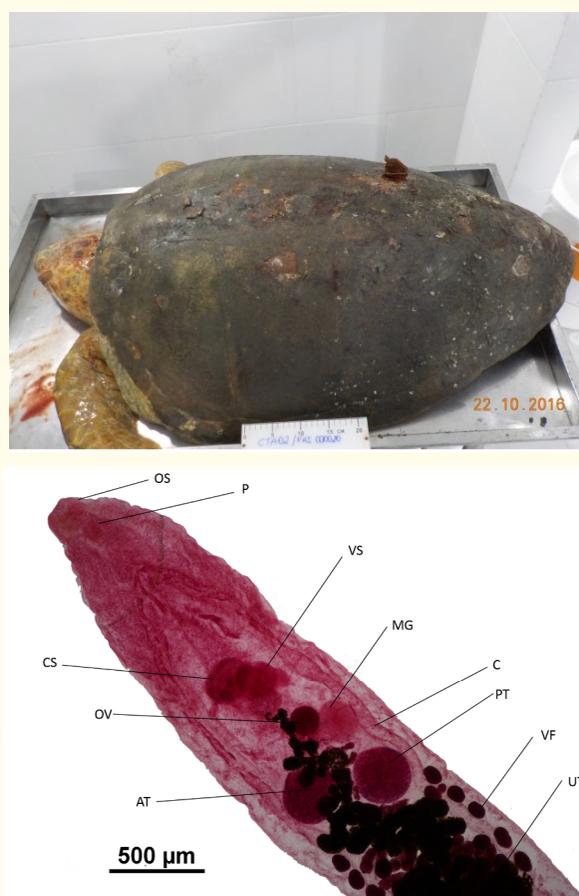
*Enodiotrema megachondrus* is a generalist parasite found in the green turtle (*Chelonia mydas* Linnaeus, 1758) in Egypt [1,3], the USA [4] and Brazil [5], the hawksbill turtle (*Eretmochelys imbricata* Linnaeus, 1766) in Cuba [6], the olive ridley turtle [*Lepidochelys olivacea* (Eschscholtz, 1829)] 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.

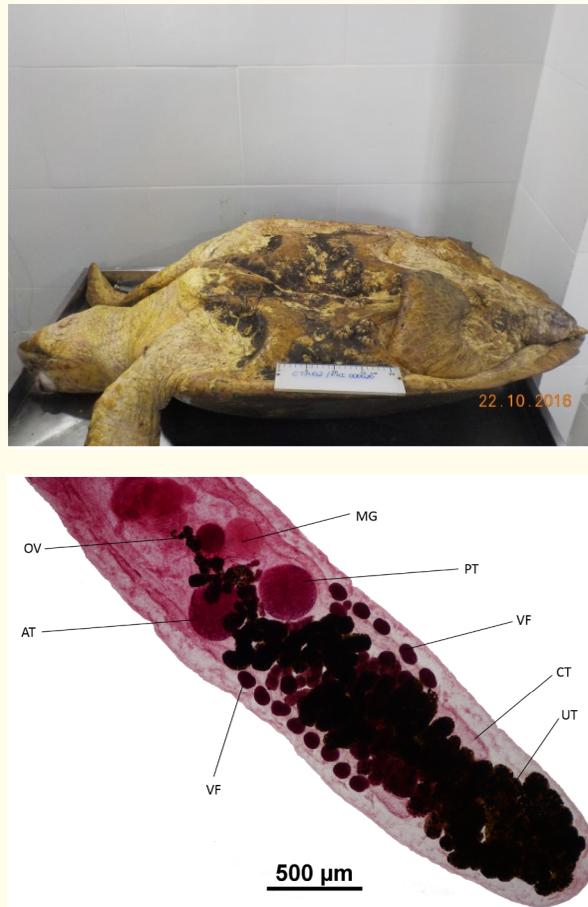
**Case Report**

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°5'25.908'' W, 2°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 ± 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: *Calycodes anthos*; family Rhytidodidae: *Rhytidodes gelatinosus*;

family Pronocephalidae: *Pronocephalus trigonocephalus*, *Pyelosomum renicapite*; family Telorchidae: *Orchidasma amphiorchis*) and nematodes (family Anisakidae: *Sulcascaaris 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 the Brazil correspond to approximately 10 species distributed among 9 families, the present note adds *E. megachondrus* to this list.

### Acknowledgment

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