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Scientific Note

Corynosoma spp. (Acanthocephala, Polymorphidae) in *Mirounga leonina* (Pinnipedia, Phocidae) of South Shetlands Islands: a new host for *Corynosoma cetaceum*

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Abstract. *Corynosoma bullosum* is a parasite of pinnipeds while *Corynosoma cetaceum* is considered a parasite of cetaceans. Until now, there were no records of parasitism by *C. cetaceum* in phocids. This study reports *C. bullosum* and the first record of *C. cetaceum* in *Mirounga leonina* from Antarctica.

Keywords: Antarctica, *Corynosoma*, infection, parasitism, phocid

Resumo. *Corynosoma* spp. (Acanthocephala, Polymorphidae) em *Mirounga leonina* (Pinnipedia, Phocidae) das Ilhas Shetlands do Sul: um novo hospedeiro para *Corynosoma cetaceum*. *Corynosoma bullosum* é um parasito de pinípedes enquanto *Corynosoma cetaceum* se destaca pelo parasitismo em cetáceos. Até o momento, não haviam registros de *C. cetaceum* em focídeos. Este estudo relata a ocorrência de *C. bullosum* e o primeiro registro de *C. cetaceum* em *Mirounga leonina* da Antártida.

Palavras chave: Antártida, *Corynosoma*, focídeo, infecção, parasitismo

Corynosoma Lühe, 1904 is a group of parasites with worldwide distribution that usually infects the gut of marine mammals and fish-eating birds, using them as final hosts (Bush *et al*. 2001). *Corynosoma bullosum* Linstow, 1892 is recognized as a parasite of jejunum, ileum and colon of pinnipeds. *Mirounga leonina*; *Mirounga angustirostris*; *Lobodon carcinophagus*; *Leptonychotes weddellii* and *Hydrurga leptonyx* stand out as final hosts of this parasite species (Edmonds 1954; Schmidt & Dailey 1971; Zdzitowiecki 1986). However, *Corynosoma cetaceum* Johnston & Best, 1942 stands out in the genus to be considered a typical parasite of stomach of cetaceans (Aznar *et al.* 2001). The odontocetes *Pontoporia blainvillei*; *Delphinus delphis*; *Tursiops truncatus*; *Phocaena spinipinnis* and *Cephalorhynchus eutropia* have been reported as hosts of *C. cetaceum* (Brownell 1975, Kagey 1976, Figueroa 1990, Torres *et al*. 1992, Aznar *et al*. 1994, Corcuera *et al*. 1995, Ridgway & Harrison 1999, Aznar *et al*. 2001, Marigo *et al*. 2002, Sardella *et al*. 2005, Silva & Cousin 2006, Berón-Vera 2008). Infections by this parasite species are very rare in pinnipeds. As far as we know, there are no records of parasitism by *C. cetaceum* in any Phocidae or Odobenidae species. Therefore, the aim of the present study was to report the occurrence of *C. cetaceum* and *C. bullosum* in the southern elephant seal *Mirounga leonina* (Pinnipedia, Phocidae) from the Elephant Island (South Shetlands Islands, Antarctica).

Six feces samples of *M. leonina* were analyzed. Five of them were collected by rectal

suction (~50 ml/animal) from five living elephant seals which were previously sedated with Zoletil 50® (1mg/kg) (Baker *et al*. 1990). One feces sample was collected directly from the sand at the Shipwreck Beach (61° 05'S, 055° 20'W; Elephant Island, South Shetlands Islands, Antarctica) in December 1998, during the austral summer. Acanthocephalans specimens were found in all samples. Even those found in the feces deposited in the sand of the beach were in perfect conditions. They were quickly washed in distilled water, fixed in AFA, and preserved in 70% alcohol. In the laboratory, parasites were stained with Semichon's acetocarmine and clarified in Faia's creosote. Taxonomic analysis and measurement of structures were carried out using light microscopy. Sexual maturity was classified following Aznar *et al.* (2001). Parasitological indices were calculated according to Bush (1997).

Twenty two *C. bullosum* worms were found, all of them females. Two of them were obtained by rectal suction in two southern elephant seals and the other twenty were obtained from the sample of feces collected from the sand. This difference may be due the fact that most parasites remain anchored to the intestinal mucosa at collection by rectal suction, while the specimens found in the feces could be detached from the intestinal mucosa as a way of escaping from unfavorable conditions (such as hydro-electrolytic imbalance or massive population densities). Specimens analyzed showed proboscis with 16 longitudinal rows containing 13 hooks in each. The 10 most anterior hooks were well developed while the 3 more posterior (basal) ones were less developed. The body morphology, as well as the proboscis, was consistent with that previously reported by Petrochenko (1958) and Zdizitowiecki (1978). *C. bullosum* parasitism showed a prevalence of 50%, mean intensity of infection of 7.33, and mean abundance of 3.66 parasites per host. Eight female worms were pregnant and presenting mature embriophores. One female worm was pregnant, but had immature embriophores. Four female worms did not present embriophores or ovarian balls, thus being considered as immature. The parasitic relationship between *M. leonina* and *Corynosoma* spp. acanthocephalans was already reported in seals of the South Shetland Islands. Zdzitowiecki (1984a) reported the southern elephant seal as the preferred final host for *C. bullosum* because it was the only species found showing female parasites carrying mature embriophores. In turn, Zdzitowiecki (1984b) reported the parasitism of southern elephant seals by *Corynosoma pseudohamanni*. Also, parasitism by *Corynosoma semerne* and *Corynosoma australe* was reported in the gut of southern elephant seals from Argentina (Johnston & Edmonds 1953, Sardella *et al*. 2005). Also in Argentina, Laws (1953) diagnosed an intestinal blockage in *M. leonina* by the presence of a tumor, which was believed to be induced by *Corynosoma strumosum* infection. The presence of adults and pregnant females found in the present study, confirms the coevolutionary adaptation and the importance of this host in the parasite eggs dispersal, as well as the continuity of the parasitic cycle in the Antarctic region.

Two *C. cetaceum* females were found in feces samples collected from two southern elephant seals in the present study. One specimen was collected by rectal suction, while the other was found in the feces sample collected at the sand of the beach. Both specimens showed armed proboscis with 20 longitudinal rows of hooks. Each row showed 15 hooks, being the 12 more anterior hooks well developed, while the 3 basal ones were less developed. This finding is in completely agreement with that reported by Sardella *et al.* (2005). Also, it is important to note the lack of genital spines. The parasitism prevalence for *C. cetaceum* was 33%, the mean intensity of infection was 1.00, and the mean abundance was 0.33 parasites per host. Both female worms were classified as non-pregnant adults, due to the presence of ovarian balls and the absence of mature or developing embriophores. The *C. cetaceum* morphology and biometry were similar to those found in specimens collected from *P. blainvillei* and *A. australis* by Sardella *et al*. (2005). In Pinnipedia, the only record of *C. cetaceum* parasitism is in species from the Otariidae. Smales (1986) firstly described *Arctocephalus pusillus doriferus* as a new host for *Polymorphus arctocephali*. Later, this worm species was considered as a synonymous of *C. cetaceum* (Aznar *et al*. 1999). Juvenile forms of this parasite were found in the stomach (Sardella *et al.* 2005) and intestine (Sardella *et al.* 2005, Silva *et al*. 2013) of *A. australis*. In turn, Hernández-Orts *et al*. (2012) reported *A. australis* and *Otaria flavescens* as hosts for immature *C. cetaceum* forms. Finally, Aznar *et al*. (2012) also cited the parasitism by *C. cetaceum* in *O. flavescens* from Argentina. Therefore, the parasitism of *C.cetaceum* in *M. leonina* reported in the present study is considered as a new record, including the presence of mature forms parasitizing this host. Furthermore, *M. leonina* is the first record of a phocid as host for *C. cetaceum*.

The infection of the definitive hosts by *Corynosoma* spp. occurs through ingestion of infected prey with cystacanths (Bush *et al*. 2001). The diet of southern elephant seals consists mainly

of squids and, less frequently, of fishes (Slip 1995). The parasitology of antarctic fishes is widely studied, mainly targeting nematodes Anisakidae (Rokicki *et al* . 2009) and acanthocephalans Polimorphidae (Zdzitowiecki 1978, Zdzitowiecki 1986, Zdzitowiecki & White 1992), and several of these species have been reported with cystacanths of *Corynosoma* spp. However, up to now, none of cephalopods in the diet of *M. leonina* was found with cystacanths of *Corynosoma* spp ., but perhaps this is due to lack of parasitological studies in squids from the south pole. Thus, the main sources of infection by *C. bullosum* and *C. cetaceum* for southern elephant seals must be infected fishes with the infectious forms of these acanthocephalans. However, more attention should be given to parasitological studies on squids from the southern end.

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