

Parasites of the Mutton Snapper *Lutjanus analis* (Perciformes: Lutjanidae) in Alagoas, Brazil

Parasitas de Cioba *Lutjanus analis* (Perciformes: Lutjanidae) em Alagoas, Brasil

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Abstract

A parasitological survey was carried out on a sample of sixty mutton snappers (*Lutjanus analis*) that were caught on the coast of Alagoas, northeastern Brazil. The parasite diversity and infection levels were low. The ectoparasite *Rocinela signata* Schioedte & Meinert, 1879 (Isopoda: Aegidae), and larvae of two endoparasites, *Trypanorhyncha* gen. sp. and *Hysterothylacium* sp. (Nematoda: Anisakidae), were detected. The significance of these parasites is discussed in the context of their transmission pathways and potential impact.

Keywords: Fish, *Rocinela*, *Trypanorhyncha*, *Hysterothylacium*.

Resumo

Um estudo parasitológico foi realizado em 60 exemplares de cioba, *Lutjanus analis*, capturados ao largo de Alagoas, no Nordeste do Brasil. A diversidade e níveis de infecção parasitária foram baixos. Foram detectados o ectoparasito *Rocinela signata* Schioedte & Meinert, 1879 (Isopoda: Aegidae) e dois endoparasitos, larvas de *Trypanorhyncha* gen. sp. e larvas de *Hysterothylacium* sp. (Nematoda: Anisakidae). O significado desses parasitos é discutido no âmbito das suas vias de transmissão e potencial impacto.

Palavras-chave: Peixe, *Rocinela*, *Trypanorhyncha*, *Hysterothylacium*.

Introduction

The mutton snapper, *Lutjanus analis* (Cuvier, 1828), is a commercially important perciform fish of the Lutjanidae family that occurs in the western Atlantic from 36° N to 28° S (FROESE; PAULY, 2011). It inhabits coastal areas associated with reefs or islands. Juveniles are usually found in estuaries or close to shore, among sea grasses and coral reefs, whereas adults tend to occur on the outer shelf, mostly in the 20-80 m depth stratum (CARVALHO-FILHO, 1999; FRÉDOU; FERREIRA, 2005). Mutton snappers are carnivorous, feeding primarily on crustaceans, fish and molluscs (MENEZES; FIGUEIREDO, 1980).

The fishing industry in northeastern Brazil is characterized by predominance of artisanal fisheries (CASTELLO, 2010). Reef-associated fish represent almost half of the total catch by weight, and the mutton snapper is one of the main targets of

this fishery (FRÉDOU; FERREIRA, 2005). Because of its high commercial value and the current overexploitation of its natural stocks, *L. analis* has been identified as one of the best prospects for aquaculture (WATANABE et al., 1998), and preliminary studies in floating net cages have suggested that production of this fish is viable (BENETTI et al., 2002).

Despite its commercial importance in northeastern Brazil, few parasitological studies have so far been conducted on *L. analis*. Palm (1997) detected a single specimen of *Grillotia* sp. (Cestoda: *Trypanorhyncha*) from the body cavity of a mutton snapper, but specific identification was not possible. Moreira (1977) detected the isopod *Rocinela signata* (Isopoda: Aegidae) on the gills of *L. analis* off the state of Santa Catarina, in southern Brazil. Elsewhere, the monogenean *Haliotrema* sp. has been detected in *L. analis* in Venezuela (FUENTES et al., 2009), and nematodes *Capillaria* sp. and *Contraecium* sp. in Colombia (CORTÉS et al., 2009).

The main purpose of the present study was to assess the parasite fauna of this important commercial species in Alagoas, northeastern Brazil, and to evaluate occurrences of parasites that might constitute potential threats to its production in floating-cage aquaculture.

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Materials and Methods

A total of 60 mutton snappers (*L. analis*) were caught by fishermen between December 2010 and March 2011 in various localities off the coast of Alagoas. Onshore, the fish were killed by means of thermal shock and were transported in ice boxes to the laboratory. They were weighed and measured, and their sex was determined through visual analysis of the gonads. Fulton's condition factor was determined using the equation $K = 100 W/L^3$ where W = whole body wet weight in grams and L = total length in cm (FROESE, 2006). Parasitological analyses were carried out using routine laboratory procedures. Macroscopic observation of the tegument, fins, nasal orifices and buccal cavity was followed by stereomicroscopic observation of the separate gill arches, heart, spleen, swimbladder, digestive tract, liver, gallbladder and kidney. Parasites that were detected were isolated and preserved in alcohol (70% v/v). All the parasites were cleared using increasing concentrations of glycerol and were observed under an optical microscope. Cestodes were also stained in carmine prior to optical microscope observation.

Prevalence, mean intensity and mean abundance were determined as described by Bush et al. (1997). Statistical analyses were carried out using IBM Statistics software. Correlations between fish length (total length) and parasite species abundance were analyzed using the Spearman rank correlation. For all tests, statistical significance was accepted when $p < 0.05$.

Results

In the sample of 60 mutton snappers (*L. analis*) caught off Alagoas, the mean weight of the fish was 1496.7 ± 828.3 g (range: 650-4800 g) and the total length was 45.6 ± 6.1 cm (range: 38-66 cm). Females constituted 51.7% of the sample, whereas the remaining 48.3% were males. The mean condition factor was 1.480 ± 0.307 (range: 0.900-2.400).

The parasites detected in the sampled mutton snappers were *Trypanorhyncha* gen. sp. larvae (Cestoda), which were encapsulated in the visceral cavity; *Hysterothylacium* sp. larvae (Nematoda: Anisakidae) in the stomach lumen; and the ectoparasite *Rocimela signata* Schioedte & Meinert, 1879 (Isopoda: Aegidae), located in the gill chamber. The infection levels are presented in Table 1.

The condition of the trypanorhynch plerocercoids found did not allow their specific identification; however, two well-

developed bothrids and four tentacles were observed in all these specimens. Likewise, it was not possible to identify the species of *Hysterothylacium* sp. larvae. The nematodes detected were L3 larvae, showing their characteristic perforator tooth. The two isopods detected measured 3 and 4 mm and they clearly exhibited the morphological features of *R. signata*, in particular the typical inverted W-shaped pigmented figure on the pleotelson (Brusca; Iverson 1985).

A significant positive correlation was found between the total length of the fish and *Trypanorhyncha* gen. sp. larval abundance ($r = 0.358$; $p = 0.005$).

Discussion

Both the parasite diversity and the infection levels detected were unexpectedly low. Fish size and feeding habits tend to be good predictors of the species richness of parasite assemblages (LUQUE et al., 2004). In particular, carnivorous fishes tend to be associated with greater diversity of endoparasites, which they acquire from their prey (LUQUE et al., 2004). The low diversity detected in this study could be related to the limited sampling period analyzed.

The aegid isopod *R. signata* occurs in the eastern Pacific and western Atlantic from Florida to Brazil at depths of up to 68 m (BRUCE, 2009). It is an ectoparasite commonly found in fishes in northeastern Brazil (CARVALHO-SOUSA et al., 2009), and has previously been detected in *L. analis* (MOREIRA, 1977). Aegids are temporary parasites that attach to their hosts and suck blood, and they usually have very low host specificity; in fact, *R. signata* is known to attack humans (GARZÓN-FERREIRA, 1990). These isopods often have a negative impact on fish, through stunting growth and causing wounds that are liable to lead to secondary infection (BUNKLEY-WILLIAMS; WILLIAMS, 1998), and they can be particularly detrimental to fish in floating net cages, where they cannot be avoided. It is conceivable that they might also cause respiratory problems when they are located on the gills, as was the case in this study, especially due to their large size.

A trypanorhynch larval specimen had previously been detected by Palm (1997) in a mutton snapper from Brazil. The occurrences of trypanorhynch plerocercoids seem to indicate that the mutton snapper serves as an intermediate host for these cestodes, for which elasmobranchs are their definitive hosts. These parasites may have been acquired through consumption of crustaceans such as

Table 1. Infection levels of parasites in *Lutjanus analis* with mean intensity and abundance \pm standard deviation are followed by range in parenthesis, in Alagoas, Brazil.

	Prevalence (%)	Mean Intensity \pm SD (min-max)	Mean Abundance \pm SD (min-max)
<i>Trypanorhyncha</i> gen. sp.	10.0	1.33 \pm 0.52 (1-2)	0.13 \pm 0.43 (0-2)
<i>Hysterothylacium</i> sp.	3.3	3.00 \pm 2.83 (1-5)	0.10 \pm 0.66 (0-5)
<i>Rocimela signata</i>	3.3	1.00 \pm 0.00 (1)	0.03 \pm 0.18 (0-1)
Total Parasites	13.3	2.00 \pm 1.60 (1-5)	0.27 \pm 0.88 (0-5)

harpacticoid copepods (MARCOGLIESE, 2002). The abundance of *Trypanorhyncha* gen. sp. larvae was positively correlated with fish size (total length), which suggests that they tend to accumulate in the fish with increasing host size. This is a common pattern for tropically transmitted endoparasites' development stages, which persist in the intermediate host for long periods of time (e.g. HERMIDA et al., 2012). However, it could also be related to changes in the depth range and feeding habits among older mutton snappers.

The anisakid nematode *Hysterothylacium* sp. had not been previously detected in *L. analis*; however, it is a widespread marine fish parasite that has often been detected in fish in Brazil (KNOFF et al., 2012), including from the northeastern region (SAAD; LUQUE, 2009).

In conclusion, low parasite diversity and infection levels were detected in mutton snappers (*L. analis*) of Alagoas, and the isopod *Rocinela signata* presents the greatest potential threat to development of marine cage cultivation of *L. analis*.

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