

METAZOAN PARASITES OF BRAZILIAN MENHADEN
Brevoortia aurea (SPIX & AGASSIZ, 1829)
(OSTEICHTHYES: CLUPEIDAE) FROM THE COASTAL
ZONE OF THE STATE OF RIO DE JANEIRO, BRAZIL

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Brazilian menhaden *Brevoortia aurea* (Spix & Agassiz, 1829) is a nerito-pelagic fish occurring in coastal zones and in marine, brackish, and estuarine habitats, with known geographic distributions in the southwestern Atlantic Ocean, from Rio de Janeiro to the Argentine (Figueiredo & Menezes, 1978). A planktivorous species, it usually presents schooling habits with high populational density of specimens. *Brevoortia aurea* is very important as bait for commercial fishery and is used on a large scale for oil and flour production (Carvalho-Filho, 1999).

The monogenean *Mazocraeoides georgei* Price, 1936, was reported as parasitic on *B. aurea* from Guanabara Bay, Rio de Janeiro, Brazil (Kohn & Santos, 1988; Kohn & Cohen, 1998). However, no further studies have been reported on the parasites of this fish up to the present date.

Between January and February 2001, forty-two specimens of Brazilian menhaden measuring 29.56 ± 2.39 (27–38 cm) in total length, were examined from Jacarepaguá Lagoon, Rio de Janeiro, RJ, Brazil (22°59'S, 43°23'W).

After identification (Figueiredo & Menezes, 1978), the fishes were necropsied to study their metazoan parasite infracommunities, and all organs, body cavities, and body surface were examined. The monogeneans collected were fixed in 10% formalin, stored in ethanol 70°GL, and stained in Gomori's trichromic. The nematodes were fixed in AFA, stored in ethanol 70°GL, and cleared with lactophenol. The terms mean abundance, mean intensity, and prevalence of infection/infestation are according to Bush *et al.* (1997). The following analysis included only parasite species with prevalence higher than 10%

(Bush *et al.*, 1990). Dominance frequency and relative dominance (number of specimens of one species/total number of specimens of all species in the infracommunity) of each parasite species were calculated (Rohde *et al.*, 1995). Spearman's rank correlation coefficient r_s was calculated to determine possible correlations between the total length of hosts and parasite abundance. Pearson's correlation coefficient r was used as an indication of the relationship between the host's total length and parasite prevalence, with previous arcsine transformation of prevalence data (Zar, 1999). The effect of host sex on abundance and parasite prevalence was tested using the Z_c normal approximation to the Mann-Whitney test and the Fisher exact test, respectively. Voucher specimens of studied helminths were deposited in the Coleção Helminológica do Instituto Oswaldo Cruz (CHIOC), Rio de Janeiro, Brazil.

Eighty-eight percent of *B. aurea* was parasitized by at least one metazoan species and a total of 683 metazoan parasite specimens was collected, with mean 16.3 ± 43.6 parasite/fish. Five metazoan parasite species were determined (Table 1). *Mazocraeoides georgei* Price, 1936, was the most abundant, prevalent, and dominant species, representing 93.4% of metazoan parasites collected with mean relative dominance 0.699 ± 0.417 and frequency of dominance 71.4%. Host length was not correlated with parasite abundance and prevalence ($r_s = 0.115$, $p = 0.467$ and $r = 0.89$, $p = 0.215$). Host sex did not influence parasite abundance ($Z_c = -1.076$, $p = 0.278$) but showed significant influence on parasite prevalence ($p = 0.026$), parasitizing 94% of the males and 64% of the females.

TABLE 1

Prevalence, mean intensity, mean abundance, and site of infection/infestation of the metazoan parasites of *Brevoortia aurea* from the coastal zone of the State of Rio de Janeiro, Brazil.

Parasite	Prevalence %	Mean intensity	Mean abundance	Site of infection/infestation
Monogenea				
<i>Mazocraeoides georgei</i> Price, 1936 (CHIOC 34943a,b)	76.2	19.9 ± 49.1	15.2 ± 43.6	Gills
Nematoda				
<i>Anisakis</i> sp. (larval) (CHIOC 34688)	9.5	1.8 ± 1.0	0.2 ± 0.6	Mesenteries
<i>Contracaecum</i> sp. (larval) (CHIOC 34689)	9.5	4.5 ± 3.0	0.4 ± 1.6	Mesenteries
<i>Pseudoterranova</i> sp. (larval) (CHIOC 34694)	9.5	2.0 ± 2.0	0.2 ± 0.8	Mesenteries
<i>Procamallanus</i> sp. (CHIOC 34693)	9.5	1.0 ± 1.0	0.1 ± 0.3	Intestine

Menhadens are commonly parasitized by ectoparasites (Carvalho-Filho, 1999; Kohn & Santos, 1988; Felley *et al.*, 1987) and were considered debilitated if injured by ectoparasites, thus rendering them more susceptible to daytime surface trawling (Guthrie & Kroger, 1974). The schooling habits exhibited by this host might explain the dominance of monoxenous parasites like *M. georgei*. However, studies on quantitative aspects of parasitism in clupeid fishes from the coastal zone of the State of Rio de Janeiro reported digenean dominance (Luque *et al.*, 2000). Nevertheless, the occurrence of larvae and adult nematodes parasitic in Brazilian menhaden is reported for the first time. In agreement with Luque *et al.* (2000), our results confirmed that additional studies are needed to evaluate the structure of clupeid parasite communities in the neotropical region.

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