

## Studies on Some Parasites from Aquarium Rockfishes, *Sebastes* spp.

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**Abstract :** The results of study of the parasites of rockfishes, *Sebastes* spp. collected at Oregon coast aquarium during April 6 to June 30, 2002 are presented. Six species of parasites were recovered from examination of 19 rockfishes with an incidence of infection of 42.1%. This study investigated parasitic infestation of 7 black rockfish, *Sebastes melanops* ; 3 quillback rockfish, *S. maliger* ; 2 yellowtail rockfish, *S. flavidus* ; 3 canary rockfish, *S. pinniger* 2 yelloweye rockfish, *S. ruberrimus* ; 2 tiger rockfish, *S. nigrocinctus*. *Sebastes* spp. from aquarium were found to be infested with parasites : *Mycrocotyle sebastis*, *Megalocotyle trituba*, *Clavella uncinata*, *Anisakis simplex* larvae, *Contracaecum* sp. larvae, *Pseudoterranova decipiens* larvae. Prevalence and mean intensity of rockfishes were infected respectively as follows : 21.1%, 4.0 of *M. sebastis*, 10.5%, 55.5 of *M. trituba*, 21.1%, 34.3 of *A. simplex* larvae, 10.5%, 15.0 of *Contracaecum* sp. larvae, 10.5%, 8.5 of *Pseudoterranova decipiens* larvae and 10.5%, 5.0 of *Clavella uncinata*. This study revealed that gills and gastrointestinal tracts of *S. pinniger* were heavily infested with *M. trituba* and *A. simplex* larvae.

**Keywords :** parasites, rockfishes, aquarium, infection

### Introduction

Disease caused by parasites requires exogenous and endogenous factors. Monogenetic trematodes and parasitic copepods are common ectoparasites of fish but members of a few genera have been reported to be pathogenic. Disease and mortality in aquaculture, often occurring under crowded conditions are known to have been caused by parasites, and they can be the cause of epizootics, since they affect the health of fish<sup>1-4)</sup>.

Parasitic diseases flourishes in an artificial environment such as aquarium owing to increased effectiveness of transmission in a restricted body of water, and generally, the parasite becomes distributed widely over the gills, fins, gastrointestinal tracts of fish. The present study was undertaken to investigate the infection degree of parasites on rockfishes, *Sebastes* spp.

### Materials and Methods

A total of 19 individuals of Rockfishes, *Sebastes* spp. used in this study were collected from Oregon coast aquarium between April 6 and June 30, 2002. Rockfishes used were *S. melanops*, *S. maliger*, *S. flavidus*, *S. pinniger*, *S. ruberrimus* and *S. nigrocinctus*, varying in body length from 34.8 to 59.0 cm. Fish were kept alive in an aerated container. All fish were returned to the laboratory for examination. Body surface, gills, fins and viscera were excised and placed on transparent plastic sheets. These fish were measured, and examined under 50x magnification using standard parasitological techniques for the presence of parasites. Parasites were gently separated with forceps. The parasites identified and counted. AFA (alcohol-formal-acetic acid) and 8% formalin solution were used to fix and they were preserved in 70% ethanol. Nematodes were cleared in glycerin or lactophenol. Identification of the parasites was in accordance with Kabata<sup>5)</sup>, Hoffman<sup>6)</sup>. The details on hosts were given by Kramer and O'Connell<sup>7)</sup>. Prevalence and intensity of infection were determined for each species of parasite. Prevalence refers to the

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percentage of infected fish in a sample. Intensity refers to the number of parasites per infected fish.

## Results

Rockfishes were made available for parasitological examination. Parasites were found in 8 *Sebastes* spp. of 19 rockfishes examined. The parasites found included the monogenea helminths 16 *Mycrocotyle*

*sebastis* Goto, 1884, 111 *Megalocotyle trituba* Pratt and Aldrich, 1953, 103 the nematoda *Anisakis simplex* larva Dujardin, 1845, 30 *Contracaecum* sp. larva Templeman, 1948, 17 *Pseudoterranova decipiens* larva Myers, 1959 and the copepoda 10 *Clavella uncinata* Oken, 1816 (Table 3, 4). Examination of gills from *S. melanops* and *S. maliger* revealed a preference of 21.1% and a mean intensity of 4.0 *M. sebastis*. *M. sebastis* and *M.*

**Table 1.** A summary of parasitism of the rockfishes, *Sebastes* spp. from Oregon coast aquarium

Family	Genus and species	Common name	No. examined	No. parasitized
Scorpaenidae	<i>Sebastes melanops</i>	Black rockfish	7	5
	<i>Sebastes maliger</i>	Quillback rockfish	3	1
	<i>Sebastes flavidus</i>	Yellowtail rockfish	2	1
	<i>Sebastes pinniger</i>	Canary rockfish	3	1
	<i>Sebastes ruberrimus</i>	Yelloweye rockfish	2	0
	<i>Sebastes ruberrimus</i>	Tiger rockfish	2	0
Total			19	8

**Table 2.** Parasites of *Sebastes* spp. from aquarium

Parasite species	No. worms recovered	Location
Trematoda		
Monogenea		
<i>Mycrocotyle sebastis</i> Goto, 1884	16	Gills
<i>Megalocotyle trituba</i> Pratt and Aldrich, 1953	111	Gills, Fin
Nematoda		
<i>Anisakis simplex</i> larva Dujardin, 1845	103	Stomach, Intestine, Omentum
<i>Contracaecum</i> sp. larva Templeman, 1948	30	Stomach, Intestine
<i>Pseudoterranova decipiens</i> larva Myers, 1959	19	Intestine
Copepoda		
<i>Clavella uncinata</i> Oken, 1816	10	Fins

**Table 3.** Occurrence of parasites in rockfish hosts collected from aquarium

Parasite	Host					
	<i>S. melanops</i>	<i>S. maliger</i>	<i>S. flavidus</i>	<i>S. pinniger</i>	<i>S. ruberrimus</i>	<i>S. nigrocinctus</i>
<i>Mycrocotyle sebastis</i>	++	+	-	-	-	-
<i>Megalocotyle trituba</i>	-	-	-	+++	-	-
<i>Clavella uncinata</i>	++	-	-	-	-	-
<i>Anisakis simplex</i> larva	-	-	++	+++	-	-
<i>Contracaecum</i> sp.	-	-	-	++	-	-
<i>Pseudoterranova decipiens</i> larva	-	-	-	++	-	-

- negative, + mild infection, ++ moderate infection, +++ heavy infection

**Table 4.** List of parasites found in aquarium and degree of infection

Parasite species	Intensity		
	Prevalence	Range	Average
<i>Mycrocotyle sebastis</i>	21.1	2.0-4.7	4.0
<i>Megalocotyle trituba</i>	10.5	1.0-110.0	55.5
<i>Anisakis simplex</i> larva	21.1	16.0-4305	34.3
<i>contracaecum</i> sp. larva	10.5	7.0-23.0	15.0
<i>Pseudoterranova decipiens</i> larva	10.5	1.0-16.0	8.5
<i>Clavella uncinata</i>	10.5	1.0-9.0	5.0

*trituba* were recovered from the gills. *S. melanops* and *S. maliger* was the base of gill filaments. *Clavella uncinata* were found on the fins of individuals of *S. melanops*. Nematodes of *Anisakis simplex* larva, *Contracaecum* sp. larva and *Pseudoterranova decipiens* larva were found in intestine, stomach wall and omentum of *S. flavidus* and *S. pinniger* examined (Table 2).

Rockfishes belonging to *S. melanops* and *S. maliger* have been found infected with *M. sebastis*. *M. sebastis* infections in *S. maliger* were light. The nematoda infections were moderate to heavy. Of the 150 *Anisakis* larvae from rockfishes, 134 were recovered from *S. pinniger*; while the other 16 were located in *S. flavidus*. *A. simplex* larva was recovered from 2 of 6 host species. *Contracaecum* sp. larva and *P. decipiens* larva were recovered from only *S. pinniger*. One hundred eighteen individual larvae and 24 larvae recovered were embedded from the intestine and omentum, respectively. Only 8 of the larvae were observed upon the stomach wall. Four hosts were infested, while *S. ruberrimus* and *S. nigrocinctus* were free of the parasite.

The prevalence varied from 10.5% to 21.5% depending on the species of parasites. A prevalence of 21.1% was recovered for *M. sebastis* and *A. simplex* larva, and 10.5% for *M. trituba*, *Contracaecum* sp. larva, *P. decipiens* larva, *C. uncinata*. Intensity of parasites ranged from 4.0 to 55.5. Intensity of infection for *M. sebastis*, *M. trituba*, *A. simplex* larva, *Contracaecum* sp. larva, *P. decipiens* larva and *C. uncinata* was 4.0, 55.5, 34.3, 15.0, 8.5 and 5.0, respectively. In the monogenean helminths, the intensity of infection with *M. trituba* was 1.0 to 110 worms per infected

fish, while in the case of *M. sebastis* the figures were 2.0 to 4.7. The mean number of *C. uncinata* per fish was 5.0.

## Discussion

Rockfishes were examined for external and internal parasites. *S. pinniger* were the most heavily infested, having 134 individuals; *M. trituba* 111, *A. simplex* larva 87, *Contracaecum* sp. larva 30, and *P. decipiens* larva 17. *S. melanops* revealed that *M. sebastis* were 14 and 10 *C. uncinata*. One hundred twenty six individuals were removed from gills, 11 from fins, and 150 from gastrointestinal tracts. *M. sebastis* from quillback rockfishes harboured only two larvae, while those from black rockfishes revealed the moderate infection. *M. sebastis* were attached in the gill filaments of *S. melanops* and *S. maliger*, but *C. uncinata* were found on the fins of *S. melanops*. Canary rockfishes in which gills heavily infested had *M. trituba* attached to the gill filaments. This worm accounted for one individual monogenea on the dorsal fin. Preferred sites were attached on distal ends of the gill filaments or on gill bars. There was no preference for attachment on either the left or right side of the gills. Anchoring in and feeding on gill filaments and skins cause histological damage, which results in low oxygen concentrations<sup>8)</sup>.

*Clavella uncinata* were not found on the gills themselves. However, *C. uncinata* were found attached to the pectoral, pelvic, and caudal fins. *C. uncinata* occurred most frequently on the pectoral fin followed by the caudal fin in *S. melanops*. Kabata and Cousens<sup>9)</sup> found that copepods of *S. californiensis* attached in the pectoral and pelvic fins of sockeye fry. In the yellowtail and canary rockfishes, the *Anisakis* larvae were encapsulated on the gastrointestinal tracts- particularly coiled in flat spirals clusters in the intestine. Sites encapsulated by *Anisakis* larvae upon *Sebastes* spp. were the stomach wall and omentum, as well as the intestine.

Detailed examination of gills revealed the prevalence of infestation to be 10.5% and mean intensity to be 55.5 *M. trituba* per infested host. Monogenea exhibited the mean intensity being lowest *M. sebastis* and highest *M. trituba*. *A. simplex* larvae from yellowtail rockfishes were

less infected than those from canary rockfish. *C. uncinata*, *Contraecum* sp. larvae, and *P. decipiens* larvae were found in a single host species, while *M. sebastis* and *A. simplex* larvae were recovered from two host species.

Monogeneans such as *M. sebastis* and *M. trituba* impair gill functions, e. g., excretion and irritate the branchial epithelium. *Anisakis* larvae are transmitted to man through eating either raw or uncooked sea fish. Parasitic copepods may induce loss of weight and impair gill functions<sup>5,6</sup>. According to Overstreet and Howse<sup>10</sup>, poor environmental conditions may favor parasitic infestation by lowering resistance, causing disease, and stressing host. Rockfishes that likely had relatively few flukes when introduced from the wild developed moderate to heavy infestations in captivity. Williams<sup>11</sup> suggested that heavy infestations of flukes may result under conditions of overcrowding and shallow stagnant water. It may be that parasite infection percentages of Oregon coast aquarium should be a little high.

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