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The Distribution of Some Metazoan Parasites from Canary Rockfishes, *Sebastes pinniger*

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Abstract - Four genera of metazoan parasites were recovered from 3 of 6 *Sebastes pinniger* examined during January 2003. Two hundred forty-five metazoan parasites were recovered. *Trochopus trituba* Sekerak and Arai, 1977 and *Anisakis* larvae were found to be infected *S. pinniger* Gill and to be abundant in this rockfish. One hundred eleven worms of monogenean trematodes and 134 larval anisakine nematodes were also found in this fishes. Precise positions with regard to gills, fins, and gastrointestinal tracts were recorded on *S. pinniger* to determine distribution of metazoan parasites of *Trochopus trituba, Anisakis simplex* larva, *Contracaecum* sp. larva, and *Pseudoterranova decipiens* larva. The monogenean trematodes, *T. trituba* were attached to the gill arches and fin, and the larval anisakine nematodes, *A. simplex, Contracaecum* sp., and *P. decipiens* were found on the visceral organs such as intestine, omentum and stomach wall. The second gill arches were the most heavily infested and posterodorsal region of the gill arches contained most monogenean trematodes. The main site of infestation of larval anisakine nematodes were the intestine.

Key words : distribution, metazoan parasite, *Sebastes pinniger*, gill arch

INTRODUCTION

The study of metazoan parasites of fish is of considerable importance not only to fish health authorities but to pisculturists. Under artificial conditions such as aquarium, metazoan parasites may be magnified many times and result in losses of fish harvest. In a few cases of the metazoan parasites they may cause serious harm, while in others some damage is done (Yamaguti 1963; Oshima 1972). In aquarium the parasites may readily harm hosts consecutively and the parasites moving about on the host's body surface are looking for the most suitable place of attachment.

Early workers reported that some parasites had a specificity for certain sites of the host (Akazaki 1965; Wiles 1968). This study reports on the distribution of some metazoan parasites in the tissues of *Sebastes pinniger* from aquarium.

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MATERIALS AND METHODS

The rockfishes were obtained from Oregon coast aquarium during January, 2003. The fish were iced in containers but not frozen. The fish were examined as quickly as possible for metazoan parasites or stored in a refrigerator until examined. After length measurements of each rockfish were taken, the fish were dissected. The gill, fin, body surface, and viscera of each fish were examined separately. Monogenean trematodes were preserved in a solution of 70% ethanol and nematodes collected were stored in 5% glycerine alcohol. Nematodes were cleared in lactophenol for identification.

Table 1. The distribution of *Trochopus trituba, Anisakis simplex* larvae, *Contracaecum* sp. larvae and *Pseudoterranova decipiens* larvae in *Sebastes pinniger*

Parasite	Gill (%)	Fin (%)	Intestine (%)	Stomach wall (%)	Omentum (%)	Total
T. trituba	110 (44.9)	1 (0.4)	0	0	0	111
A. simples larvae	0	0	69 (28.2)	5 (2.0)	13 (5.3)	87
Contracaecum sp. larvae	0	0	23 (9.4)	2 (0.8)	5 (2.0)	30
Pseudoterranova decipiens larvae	0	0	13 (5.3)	1 (0.4)	3 (1.2)	17
Total	110	1	105	8	21	245

The gills were examined for monogenean trematodes with a stereomicroscope and the exact location of the flukes recorded before removal for identification. Gill arches were numbered from 1-4 anteroposteriorly. The position of attachment of gill arch was recorded in respect of 3 regions; (1) anterior-ventral, (2) middle, (3) postero-dorsal. Terminology and identification of rockfishes were in accordance with Kramer and O'Connell (1995). The nomenclature used for the metazoan parasites in this paper was based on Berland (1961) and Beverley-Burton *et al.* (1986).

RESULTS

Examination of six canary rockfishes yielded 245 worms of metazoan parasites containing 111 monogenean trematodes of *Trochopus trituba* and 134 larval anisakine nematodes. Of 111 *T. trituba*, only one attached to the fin, and the remaining 110 monogenean trematodes were picked from gill arches. Forty nine of 110 *T. trituba* were found in the base of the second gill arches ; 25 attached to the first gill arch, 24 to the third and 12 to the fourth. *S. pinniger* infested with 87 *Anisakis simplex* larvae, 30 *Contracaecum* spp. larvae, and 17 *Pseudoterranova decipiens* larvae. *T. trituba* was recovered from the gills and dorsal fin of *S. pinniger*, while *A. simplex* larva, *Contracaecum* sp. larva and *P. decipiens* larva were found to be infected from gastrointestinal tracts. Gill and fin of hosts showed 44.9% and 0.4% infection respectively with monogenean trematodes. *T. trituba* were almost universal on the gills, but rare on fins of *S. pinniger* (Table 1, 2).

T. trituba and *A. simplex* larvae were more heavily infested with 45.3% and 35.5% respectively, but *Contracaecum* sp. larvae and *P. decipiens* larvae were infested with 12.2%, 6.9% respectively of all the fish examined. Small numbers of worms were found in the dorsal fin, stomach wall and fourth gill arch. With sites delinated per fish, 49 of 110 *T. trituba* favoured posterodorsal region of the second gill arch. Fifty nine of 110 monogenean helminths chose attachment to the posterodorsal region of gill arches. The first gill arches received the next greatest volume and the fourth the least. 84.5% of the attached worms occurred on the posterodorsal and anteriorventral regions of the gill arches. The middle region of the gill arches was the least frequented position. Seventeen monogenea in all were found attached

Table 2. The distribution of *Trochopus trituba* on the gill arches of canary rockfishes

Gill arch	Position			Total
	A	M	P	
I	14	4	7	25
II	10	5	34	49
III	6	0	18	24
IV	4	8	0	12
Total	34	17	59	110

A : anterior-ventral region
M : middle region
P : postero-dorsal region

Table 3. The distribution of the metazoan parasites from infested canary rockfishes, *Sebastes pinniger*

Locality	No. of parasites	Percentage
Gill arch		
I	25	10.2
II	49	20.2
III	24	9.8
IV	12	4.9
Dorsal fin	1	0.4
Intestine	105	42.9
Omentum	21	8.6
Stomach wall	8	3.2
Total	245	100.0

at the middle region of gill arches, and none at all on the middle region of the third gill arches (Table 2).

A total of 134 worms of the anisakine nematodes were obtained and 105 of these were found in the intestine, the rest were omentum and stomach wall. With regard to the position of the anisakine nematodes, 42.9% of worms were parasitized in intestine; of these, 8.6% were infected in omentum and only 3.2% in stomach wall. Of the anisakine nematodes, *A. simplex* larvae were in a greater number of the fish examined than *Contracaecum* sp. larvae and *P. decipiens* larvae (Table 3).

DISCUSSION

Four genera of parasites were noted: *Trochopus trituba* (Pratt and Aldrich 1953) Bravo-Hollis 1958; *Anisakis simplex* larva (Rudolphi 1809) Dujardin 1845; *Contracaecum* sp. larva Templeman 1948; *Pseudoterranova decipiens* larva (Krabbe 1878) Myers 1959. The monogenean trematodes which settle on the gill of fishes are more important than those which live on the skin or fin. The former are capable of inflicting serious damage. The effects are retardation of growth, loss of weight and anemia (Wiles 1968). *T. trituba* was found attached to the dorsal fin with 0.4% of the parasites examined. Contrasting with the very low frequency on the fin, monogenean trematodes were noted the extremely high frequency on the gills. The purpose of this study was to further investigate the distribution of metazoan parasites on the tissues of their host.

Intestine was the most frequented position, and second gill arches were the next most heavily infested sites. *T. trituba* was found mainly on the anteriorventral and posterodorsal region of gill arches, occurring in large numbers. Site specificity was indicated for the posterodorsal and anteriorventral regions of the gill arches. *T. trituba* was more prevalent on the inner surfaces of the hemibranchs of gill arch II. Wiles (1968) reported that *Diplozoon paradoxum* occurred most often on gill arches I and II in the bream and on the inner hemibranch in the bream and minnow. The direction of the ventilating current and the region of the hemibranchs during respiration may influence the position of monogenea on the gill arches. *T. trituba* occurred most often on gill arches I, II, and III. Paling (1968) found that the greatest volume of water in the gill ventilating cur-rent of glochiedia passed over the second and third gill arches in brown trout. The greater volume of water flowing over I, II, and III gill arches gives more parasites the opportunity to attach to these gill arches.

Anisakiasis is the zoonotic disease of larval marine ascaridoid nematodes to the visceral organs of hosts. In case of eating of raw or uncooked seafood by men, the sudden and severe onset of epigastric pain associated with nausea and vomiting may occur (Myers 1975). *A. simplex* larvae were the commonest infesting 35.5% of the parasites examined. Considering the three larval types of Anisakine nematodes collected, *A. simplex* was most prevalent, followed by *Contracaecum* sp. and *P. decipiens*. Most of the anisakine nematodes occur in or on the intestine; the next highest incidence is encountered in the omentum. A great degree of infections with *A. simplex* larvae were recovered in the intestine. A moderate infections with *A. simplex* larvae were noted in omentum. Light infections with *P. decipiens* larvae were noted in stomach wall and omentum. *A. simplex* larvae occurred more commonly in the intestine, whereas *P. decipiens* larvae were found mainly in the stomach wall. The 3rd stage larvae of *Contracaecum* sp. and *P. decipiens* appeared to be more common in omentum than in stomach wall. Encapsulated worms were most commonly found in the intestine, but small were attached to the stomach wall and omentum.

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