

Studies on the Infestation of Monogenean Helminth, *Microcotyle sebastis*, and Copepod, *Clavella adunca* from *Sebastes melanops* and *S. maliger*

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볼락류(*Sebastes melanops*, *S. maliger*)로부터 검출된 단생흡충류 *Microcotyle sebastis*와 요각류 *Clavella adunca* 감염에 관한 연구

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ABSTRACT

Seven specimens of *Sebastes melanops*, black rockfish and three of *S. maliger*, quillback rockfish, were collected from Oregon Coast Aquarium during the period of September 19 to November 5, 2001 and examined for parasites. One monogenean helminth species and parasitic copepod species were recorded from black and quillback rockfishes, respectively. A total of 26 parasites were collected: 16 *Microcotyle sebastis* from the gill filaments of black and quillback rockfishes and 10 *Clavella adunca* were found in the fins of black rockfish. The prevalence of *Microcotyle sebastis* was 40.0%, and intensity of infection was 2.0(1-11). With regard to *Clavella adunca*, the prevalence and intensity were 20.0% and 1.4(2-8), respectively.

Keywords: Infestation, *Sebastes melanops*, *S. maliger*, *Microcotyle sebastis*, *Clavella adunca*

요 약

오리건 해안에 위치한 수조에서 채집한 10마리의 볼락류 *Sebastes melanops*와 *S. maliger*에 관해서 2001년 9월 19일부터 동년 11월 5일까지 조사한 결과, 총 26개체의 단생류와 요각류가 검출되었다. 그 중 16개체의 *Microcotyle sebastis*가 볼락류의 아가미와 지느러미에서, 10개체의 *Clavella adunca*가 지느러미에서 발견되었었다. *M. sebastis*의 감염률과 감염강도는 40.0%, 2.0(1-11)이었으며 *C. adunca*는 각각 20.0%, 1.4(2-8)이었다.

I. Introduction

Moxenous parasites, such as monogeneans and copepods, often proliferate in captive fishes, and thus as major groups are of a great concern to in aquaculture and public aquaria. Unsightly infestations by external copepods were noted on many rockfishes

held at the Oregon Coast Aquarium, Newport, Oregon, and thus prompted an investigation of external parasites of these fish at this facility.

A study of the parasites of rockfish was conducted during the period of September 19 to November 5, 2001. A total of ten fishes representing two species were examined in the present study. Host specimens were collected together with samples of black rockfish, *Sebastes melanops*, and quillback rockfish, *S. maliger*. Incidences and intensities of infestation for two species of parasites(a copepod and a

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monogenean helminth) recovered from rockfish are presented herein.

II. Materials and Methods

Live specimens were transported to the Oregon State University laboratory and examined immediately as fresh material. Systematic assignment of host species followed the arrangement described in publication No. 25 of Marine Advisory Bulletin.¹⁾ The parts of the fishes examined for parasites were gills, fins, the external surface of the body and the entire digestive tract. The parts from each fish were excised and opened in a petri dish containing 70% alcohol. The length of fish was recorded. Examinations of fishes were made with the aid of a stereomicroscope with 50x magnification. The parasites were washed in glycerol and identified in whole mounts. Live worms were fixed and stored in 5% formaldehyde for later examination. Measurements of worms were made with the aid of an ocular micrometer. The parasites recovered were preserved in the lactophenol. Number of fishes in which parasites were found as well as the range of intensity of infection were noted. The parasites were identified according to the description made by Bykhovsky *et al.*²⁾ and Van Clave & Mueller.³⁾

III. Results

The length of host specimens ranged from 20.5 to 52.4cm. Three black rockfish and one quillback rockfish were found to be infected with sixteen monogenea and ten copepods. One species of monogenea, *M. sebastis* and one species of parasitic copepod, *C. adunca*, were found on the gill filaments and fins, respectively (Table 1). The length of monogenean worms of black and quillback rockfishes ranged from 3.0 to 3.9 mm. Copepods (in length) ranged 2.7 to 2.8 mm of cephalothorax, 2.4 to 2.7 mm trunk, and 2.6 to 3.4 mm of ovisac.

Table 2. Prevalence and intensity range of parasites of the gills and fins of black and quillback rockfish

Species	No. of parasites	Prevalence (%)	Intensity rate (mean)
<i>Microcotyle sebastis</i>	16	40.0	1-11(2.0)
<i>Clavella adunca</i>	10	20.0	2-8(1.4)

The monogeneans, *M. sebastis*, were recovered from *Sebastes melanops* and *S. maliger*, of which four of ten(40.0%) individuals harboured the parasites and mean intensity of infection was 2.0 (1-11). The parasitic copepods, *Clavella adunca* was found to have infected 20.0% of the fishes examined. Average intensity of infection for *C. adunca* was 1.4(2-8). Prevalence(20.0%) and intensity (1.4) were low and copepods were not recovered from *S. maliger*. No helminth parasites were found in the intestinal organs.

IV. Discussion

The present study was initiated, because aquaries at the Oregon Coast Aquarium, Newport, Oregon, frequently observed infections of specimens in display by external parasites. *Microcotyle sebastis* Goto, 1894 is a monogenean helminth belonging to the family Microcotylidae, and *Clavella adunca* Strom, 1762 is a parasitic copepod belonging to the family Lernaepodidae. *Microcotyle* spp. and *Clavella* spp. parasitize teleost fishes and are widespread throughout Atlantic and Pacific Oceans.^{4,7)} Especially, northern fishes are often infected with only one species of Monogenea,⁸⁾ and *C. adunca* parasitize fishes of the suborder Gadoidei. To date, the survey of rockfish monogenea was completed by Beverly-Burton *et al.*¹⁾, in which *M. sebastis* of *Sebastes maliger* (Jordan and Gilbert) and *S. caurinus* (Richardson) were reported. The parasitic copepods from *Sebastes* have been reported by Kabata.⁴⁾

Ten worms were collected from black rockfishes and found in the fins as a habitat for species of

Table 1. The taxonomy and parasitic location found in black and quillback rockfishes

Family	Species	Host	Location	Authority
Microcotylidae	<i>Microcotyle sebastis</i>	<i>S. melanops</i> <i>S. maliger</i>	Gills	Goto, 1894
Lernaepodidae	<i>Clavella adunca</i>	<i>S. melanops</i>	Fins	Strom, 1762

copepod. Parasite abundance is often greater in other wild fishes. For example, Hanek and Threlfall¹⁰⁾ reported nineteen species and two genera copepods collected from sticklebacks, and Schlman¹¹⁾ reported fifteen species of helminths and one species of parasitic copepod from sticklebacks. Samples from the Aquarium appeared to have fewer parasite species, and this is probably due to small samples. In addition, the staffs at the aquarium treat the fish open arrival in quarantine to remove parasites. *M. sebastis* appeared to be specific for gills and attached to black and quillback rockfishes, and *C. adunca* was attached to fins rather than body. Forty percent of the worms collected from seven black rockfishes and three quillback rockfishes were *M. sebastis* and *C. adunca*, whereas a lower prevalence(20.0%) of *C. adunca* occurred in black rockfishes. Of ten rockfishes belonging to two species, 40% were infected at least one species of parasite. Parasitization of 40.0 percent was rather high degree of infection. Poljansky¹²⁾ found 44.4% of thirty six digenea of marine fishes of Barents Sea in a variety of fish families. In contrast, only 4.5% were found in a variety of unrelated hosts of 66 species of digenea collected from New Zealand marine fishes.¹³⁾ Infection levels at the Oregon Coast Aquarium were similar to those observed in the samples at Barents Sea. None of the ten specimens of *S. malanops* and *S. maliger* examined was found to harbour any of the nematodes.

Mean intensity of *M. sebastis* and *C. adunca* was 2.0(1-11) and 1.4(2-8), respectively. Sekerak and Arai¹⁴⁾ reported that intensity of *M. sebastis* recovered from gills of *S. alutus* was 1-10, therefore, the intensity reported in the present study was higher than those of Sekerak and Arai.¹⁴⁾ Apply and Burt¹⁵⁾ recovered *Clavella adunca* from cods caught in three localities of Canadian Atlantic waters and reported the intensity of 3.2(1-52). Thus, intensity of *C. adunca* was much less in our samples than in three samples from Canadian Atlantic waters. However, display animals at this facility appeared to harbor a greater intensity of infection.

References

1. Donald, E. K. and Victoria, M. O. : Guide to north-east Pacific rockfishes. Marine advisory bulletin No. 25. University of Alaska Fairbanks 1995 Edition, 1995.
2. Bykhovskiy, B. E., et al. : Key to parasites of freshwater fishes of the U.S.S.R. Publ. House Acad. Sci. U.S.S.R., Moscow-Leningrad, 1962.
3. Van Clave, H. J. and Mueller, J. F. : Parasites of Oneida Lake fishes. pt. 3. A biological and ecological survey of the worm parasites. Roosevelt Wild Life ANN, **3**, 161-334, 1934.
4. Kabata, Z. : Copepoda and Branchiura, p. 3-127. In L Margolis and Z. Kabata[ed.]. Guide to the parasites of fishes of Canada. Part II-Crustacea. *Can. Spec. Publ. Fish. Aquat. Sci.*, **101**, 184p, 1988.
5. Lee, D. L., Whiakar, D. J. and Stanley, R. D. : A preliminary examination of the parasite fauna of yellowtail rockfish, *Sebastes flavidus*. *Can. Tech. Rep. Fish. Aquat. Sci.*, **1777**, 21p, 1990.
6. Morrison, C. M., McClelland, G., Cornick, J. and Marcogliese, D. : Parasites and diseases of some marine finfish off Nova Scotia. *Can. Tech. Rep. Fish. Aquat. Sci.*, **1424**, 36p, 1986.
7. Stanley, R. D., Lee, D. L. and Whitaker, D. J. : Parasites of yellowtail rockfish, *Sebastes flavidus* (Ayres, 1862)(Pisces: Teleostei), from the Pacific coast of North America as potential biological tags for stock identification. *Can. J. Zool.*, **70**, 1086-1096, 1992.
8. Rohde, K. A. : critical evaluation of intrinsic and extrinsic factors responsible for niche restriction in parasites. *Am. Nat.*, **114**, 648-671, 1979.
9. Beverley-Burton, M. : The taxonomic status of *Actinocleidus* Muller, 1937; *Anchoradiscus* Mizelle, 1941; *Clavunculus* Mizelle et al., 1956; *Anchoradiscoides* Rogers, 1967; *Synclathrium* Price, 1967 and *Crinicleidus* n. gen. : North American ancyrocephalids(Monogenea) with articulating haptor bars. *J. Parasitol.*, **72**, 22-44, 1986.
10. Hanek, G. and Threlfall, W. : Parasites of the threespine stickleback(*Gasterosteus aculeatus*) in Newfoundland and Labrador. *J. Fish. Res. Bd. Canada*, **27**, 901-907, 1970.
11. Shulman, S. S. and Shulman-Albova, R. E. : Fish parasites from the White Sea. Publ. House. Acad. Sci., USSR, 1953.
12. Poljansky, Yu. I. : Parasites of the fish of the Barents Sea. *Tr. Zool. Inst. Akad. Nauk SSR*, **19**, 5-170, 1955.
13. Manter, H. W. : The zoogeography of trematodes of marine fishes. *Exp. Parasitol.*, **4**, 62-86, 1955.
14. Sekerak, A. D. and Arai, H. P. : Helminths of *Sebastes alutus*(Pisces: Teleostei) from the north-eastern Pacific. *Can. J. Zool.*, **51**, 475-477, 1973.
15. Appy, R. G. and Burt, M. D. B. : Metazoan parasites of cod, *Gadus morhua* L., in Canadian Atlantic waters. *Can. J. Zool.*, **60**, 1573-1579, 1982.

1. Donald, E. K. and Victoria, M. O. : Guide to north-