

***Anisakis simplex* (Nematode : Anisakidae) L₃ Larvae Infection in Chum salmon
(*Oncorhynchus keta*) from Namdae River, South Korea in 2009**

by

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ABSTRACT

This study was conducted for investigating prevalence and intensity of *Anisakis simplex* L₃ larvae isolated from 120 Chum salmon (*Oncorhynchus keta*) collected during October~November 2009 from the Namdae River, Korea. The same prevalence (100%) and slightly higher mean intensity was observed when compared with the previous year's data. All of chum salmon samples caught in Namdae River were infected with *A. simplex* L₃ larvae (100 %) and the mean intensity of infection was 79.65±84.85 (larvae/host). The nematodes were found mostly in muscle (98.00 %).

Key words : *Anisakis simplex*, *Oncorhynchus keta*, chum salmon

INTRODUCTION

The life cycles of *Anisakis simplex* (Nematode: Anisakidae) involve crustaceans, fishes, cephalopods and marine mammals acting as intermediate, paratenic or transport host and definitive host, respectively. An approximately 200 fish species and 25 cephalopod species have been reported infected by this parasite (Smith and Wooten, 1978; Abollo *et al.*, 2001). Human can be infected these worms by consuming raw or undercooked infected fish. However, they can be used as biological tags for many purposes of ecological studies. The infection of *Anisakis* sp. in chum salmon has been reported in several studies (Sugawara *et al.*, 2004; Urawa and Fujisaki, 2006; Kim *et al.*, 2007). A long term survey of these parasites is necessary for providing useful information on the potential use of these worms as biological tags, as well as the potential risk of human anisakiasis. The aims of this research are to investigate the prevalence, intensity and distribution of *A. simplex* larvae infecting Chum salmon (*O. keta*) from the Namdae River, Korea in 2009.

MATERIALS AND METHODS

One hundred and twenty fish samples in total were collected during October-November 2009. The fish were caught using a river-blocking set net at the mouth of the river. Whole fish were transported to the laboratory and immediately frozen until examination. Each individual fish sample were thawed, their fork length and body weight were measured, then they were sexed and examined for the parasites (Table 1). The examination of anisakid worm was conducted with body cavity, internal organ and muscles. Collected parasites were washed with 0.9 % NaCl solution, and then preserved in 5 % glycerin in 70 % ethanol for morphological analysis. Whole part of

the worm was cleared in glycerin-phenol-lactic acid-distilled water solution (2:1:1:1), and then used for the morphological characters observation.

RESULTS AND DISCUSSION

This study showed the similar results with those in 2008 (Setyobudi *et al.*, 2009). Totally 9,551 L₃ larvae were collected from 120 fish sample (male =60 fishes, female =60 fishes). All of chum salmon samples caught in Namdae River were infected with *Anisakis simplex* L₃ larvae (100%) and the mean intensity of infection was 79.59 ± 84.85 (larvae/host). The mean intensity in 2009 was slightly higher than in 2008 (69.65 ± 48.58 larvae/host). The highest record was 822 worms from one individual fish. The nematodes were found mostly in muscles surrounding the visceral organs (98.00%), with the mean intensity 78.00 ± 84.02 (larvae/host). Only a few of anisakid larvae were found in pyloric caeca, liver and others organ (Table 2). Several studies have shown a high prevalence of *Anisakis* spp. from salmonid species and mostly found in musculature (Novotny and Uzmann, 1960; Deardorff and Kent, 1989; Urawa & Fujisaki, 2006).

The highest mean intensity of *A. simplex* infection occurred in chum salmon with 60.1-65.0 cm of body length, while the lowest mean intensity occurred in chum salmon with body length of less than 50 cm (Figure 1). Most of the hosts were infected with 21-100 parasites (68.33%) and only 2.50% of the hosts were infected with more than 200 parasites. Similar results of prevalence and mean intensity of *A. simplex* infections were reported by Sugawara *et al.* (2004) and Urawa & Fujisaki (2006) in adult chum salmon returning to the Chitose River, Japan and it was increased year by year.

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Tabel 1. Sampling date, the number and fork length of fish samples

Sampling Date	Number of samples	Fork length (cm)
October 22, 2009	40	64.5 ± 3.98
October 28, 2009	40	63.1 ± 5.67
November 04, 2009	40	61.6 ± 4.80
Total	120	63.1 ± 4.97

Tabel 2. The distribution and intensity of *A. simplex* in chum salmon from Namdae River, Korea in 2009

Organ	%	Intensity (mean ±SD, (range))
Liver	0.41	1.22 ± 0.55 (1-3)

Muscle	98.0	78.00 ± 84.02 (6-818)
Body cavity	0.43	1.41 ± 0.82 (1-4)
Pyloric caeca	1.14	2.02 ± 1.79 (1-11)
Others	0.02	1.0
Total	100	79.59 ± 84.85 (6-822)

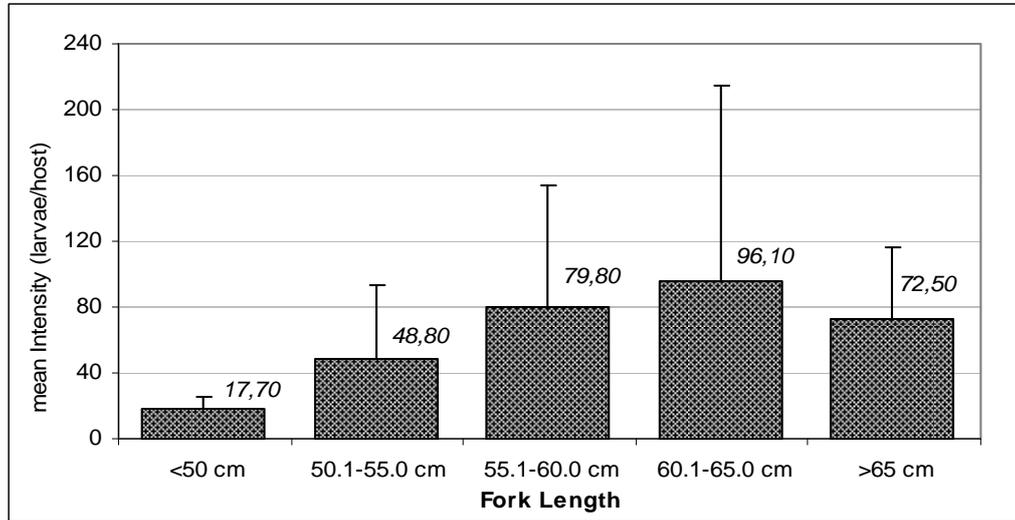


Figure 1. Mean intensity of *A. simplex* infection in chum salmon based in the host body length and sexes