

***Scomberomorus commerson*, a New Paratenic Host of *Contracaecum* sp. and *Anisakis* sp. (Nematoda: Anisakidae) from Persian Gulf**

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Abstract: The Persian Gulf is located in the south and south east of Iran. This Gulf is the most important fisheries resources, have very important ecological effects on fish parasites. *Scomberomorus commerson* (Teleostei, Perciformes, Scombridae) is one of the most important and commercial species in the Persian Gulf and Oman Sea. In order to identify the contamination rates and investigate the average of pollution, 100 *S. commerson* from five stations were caught and transported to the central laboratory. In 16 (16%) fish, 3 cases of *Contracaecum* sp. (3%) and 13 *Anisakis* sp. (13%) were identified belong to helminth family of anisakidae. In the present study, 3 larvae of *Anisakis* were found in the flesh of fish. Since this is the first study indicating that *S. commerson* acts as paratenic hosts for these nematodes from Iran, further studies are envisaged to investigate the involvement of these fish in relation to human transmission and the public health implications of these nematodes in this area as this fish is regularly consumed by local people.

Key words: *Scomberomorus commerson* • Anisakidae nematodes • New paratenic host • Persian Gulf

INTRODUCTION

The Persian Gulf is located in the south and south east of Iran with average area and depth of 240,000 km² and 35 m, respectively. The Persian Gulf is characterized by warm and saline water and is a shallow sea such as the Baltic and North Sea (Fig. 1). The depth of the Persian Gulf decreases from east to west with maximum depth of 90 m in the strait of Hormuz. This Gulf is the most important fisheries resources, have very important ecological effects on fish parasites.

The Scombridae fish family contains 15 genera and about 50 species of epipelagic and generally migratory marine fish. It includes species of high commercial interest such as mackerels, bonitos and tunas. Tuna and seer fish species were distributed widely in the Persian Gulf and Oman Sea. *Scomberomorus commerson* (Teleostei, Perciformes, Scombridae) is a mackerel of the Scombridae family. *S. commerson* is a large and fast pelagic predator which is found in vast numbers in the tropical and sub-tropical waters [1]. *S. commerson* is one of the most important and commercial species in the Persian Gulf and

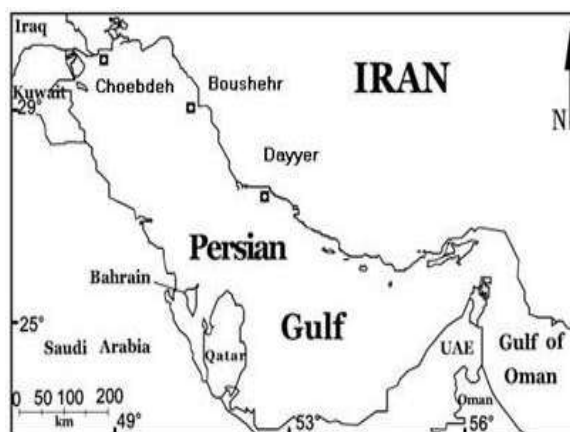


Fig. 1: Location map of the Persian Gulf, south of Iran

Oman Sea. This fish has many important roles in the foods of human in the South of Iran.

Parasitic diseases in fish seriously limit aquaculture production and its economic viability. Knowledge of fish parasites, therefore, is an essential requirement for successful aquaculture [2]. Parasites play a pivotal role in the biology of fishes and can affect their behavior,

health and distribution [3]. Anisakis and Contracaecum larvae were reported from several species of marine fish throughout the world. The adult worms live in the intestine of marine mammals and fish. The small 3rd stage larvae are found encapsulated or free in abdominal cavity and other organs. The larvae will migrate to abdominal muscle if the fish are not quickly eviscerated. Humans can accidentally be infected with larval stages of these nematodes, leading to a severe disease generally known as anisakidosis [4]. Anisakiasis is caused by the ingestion of larval nematodes belonging to the genera Anisakis, Pseudoterranova, Contracaecum and Hysterothylacium in raw or undercooked seafood [5]. With the increased popularity of eating undercooked or raw fish dishes, the number of anisakiasis cases expected to be increased. The disease now is considered as an emergence zoonotic disease and therefore, these parasites attracted attention of scientists in different parts of the world and various aspects of their biology and lifecycle is being investigated. This study was thus undertaken to investigate the possibility of *S. commerson* acting as a paratenic host for these species of nematodes from Persian Gulf and Oman Sea.

MATERIALS AND METHODS

One hundred tuna fish (*Scomberomorus commerson*) caught from five stations of Persian Gulf in Bandar-Abbas in Hormozgan Province, south of Iran (Fig. 2) and examined for identify the contamination rates and investigate the average of pollution. Majority of caught fish were with length of 40-69 cm and weight of less than 5kg during the dissection. The fish were examined within 12 hours of being caught. Each fish was eviscerated and abdominal cavity and different viscera were washed under running water into a 100 mesh sieve to remove adhering larvae. Then skin, abdominal cavity, stomach sub serous tissues, the contents of stomach and intestine and sliced livers, spleens and gonads were searched for parasites through naked eyes and under dissecting microscope. Meanwhile, 30 grams of muscles were taken from around the body cavity of each fish were digested in artificial gastric juice and examined under dissecting microscope. All collected larvae were preserved in 70% alcohol containing 5% glycerin and cleared in lactophenol for identification and transferred to department of health and food quality control, Faculty of veterinary medicine, university Shahrekord. The parasite specimens were identified by using Koyama *et al.* keys [6].



Fig. 2: Photograph showing *Scomberomorus commerson* caught from five stations of Persian Gulf, south of Iran

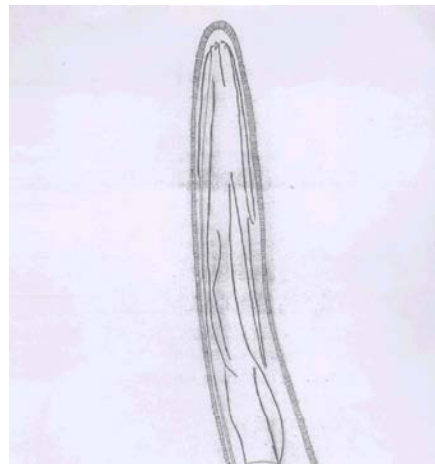


Fig. 3: *Anisakis* sp.; drawing picture (Anterior end of larva)

RESULTS

Out of a total 100 *S. commerson* examined in this study, In 16 (16%) fish, 3 cases of *Contracaecum* sp. (3%) and 13 *Anisakis* sp. (13%) were identified belong to helminth family of anisakidae (Figs. 3-9). Length of the body *Contracaecum* larvae was 1.1 to 3.1 mm with a maximum width of 0.11 to 0.35 mm. Length of the body *Anisakis* larvae was 2.2 to 3 mm with a maximum width of 0.07 to 0.15 mm.

No larvae were found in the livers, spleens and gonads of fish in the present study. No significant differences in parasitisation between both sexes were observed. Prevalence in young hosts was lower than in adults.

The most infested organ of these fish was the abdominal cavity. In the fish abdominal cavity, they were mostly coiled but, occasionally, slightly extended. In the present study, 3 larvae of *Anisakis* were found in the flesh of fish.



Fig. 4: *Anisakis* sp. (Posterior end of larva)



Fig. 7: *Contracaecum* sp. (Drawing picture)



Fig. 5: *Anisakis* sp. (Anterior part of the body)

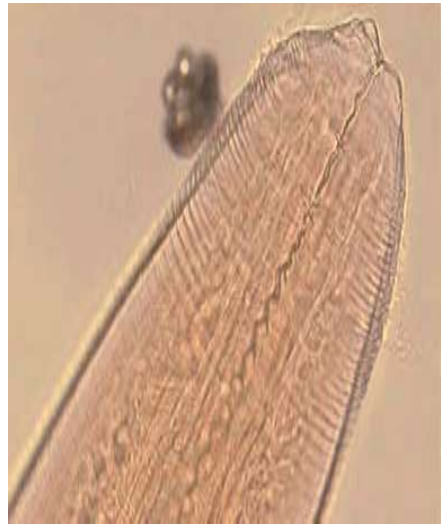


Fig. 8: *Contracaecum* sp. (Anterior part of the body)



Fig. 6: *Anisakis* sp. (Posterior part of the body)



Fig. 9: *Contracaecum* sp. (Posterior part of the body)

DISCUSSION

Between agents that cause infection in fish of freshwater, brackish-water and marine environments throughout the world, nematodes are of particular importance because they cause mechanical and nutritional deficiencies in the host. Present knowledge of these parasites still remains incomplete, especially those pertaining to biology and ecology, but also taxonomy, phylogeny and zoogeography.

Nematodes are frequently regarded as one of the most important and harmful worm parasites that affect fish. They can kill the host fish by serious mechanical harm from excessive movement that puts a strain on the host, killing the fish and having a detrimental effect on the fishing industry [7]. There are relatively few studies on nematode parasites that infect fish in Iran [8, 9].

To improve aquaculture in South Iran for the prevention of the losses of fish stock, there are needs for more information available on the parasite fauna that affects wild fish which may be transferred to farms.

In the present study, 3 larvae of *Anisakis* were found in the flesh of fish. Also, *Anisakis* larvae were previously found in the muscles around the body cavity of 20% of other species of Tuna fish (*Euthynnus* sp.) from north Persian Gulf and 15% of pikeperch (*Lucioperca lucioperca*) from Caspian Sea [10].

The occurrence of larvae of *Contracaecum* sp. from Acipenseridae and *Rutilus frisii* fish from other areas of Iran was reported [11, 12]. Also, 3rd stage larvae of *Anisakis* have been reported from several species of fish from south Caspian Sea [11, 12], north Persian Gulf [13,14].

The presence of third stage larvae of *Contracaecum* sp. and *Anisakis* sp. in *S. commerson* fish from south of Iran, confirmed that these fish might act as paratenic hosts for these worms. Despite the low infection rate of these worms, their occurrence in these fish might cause a serious public health problem in this area. These worms in the final hosts and also in humans might cause haemorrhages and ulcers in the gastrointestinal tract leading to serious illness and even death in heavy infections. *Anisakis* larvae especially *Anisakis* are very prevalent in some fish including tunas of Persian Gulf and consumption of infected fish if it is not properly cooked may lead to human anisakiasis. No human anisakiasis is yet reported from Iran. This issue could be attributed to cooking habit of fish in studied areas as well as other parts of the country.

The presence of these worms in *S. commerson* in this area is thus of great concern for the health of these fish and also from a public health point of view. These results showed that People can be infected by ingestion of the immature stages of the worm.

However, this study is the first time the presence of *Contracaecum* sp. and *Anisakis* sp. larvae has been observed in *S. commerson* in this area. Since, *S. commerson* has many important roles in the foods of human in the South of Iran and might act as paratenic host for *Contracaecum* sp. and *Anisakis* sp. Further studies are warranted to observe the involvement of these fish in the transmission of nematodes and are of considerable public health importance.

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