

Recode of two species of internal parasites belonging to Nematoda on the fish species *Sparisoma cretense* in the marine water of Tartous city, Syria

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(Received 18 / 11 / 2025. Accepted 27 / 4 /2026)

□ ABSTRACT □

Fish are an important source of nutrients necessary for the functioning of the body's various organs, and they are also a good source of protein and vitamins, and an essential element because they provide omega-3 fatty acids.

In addition, the study of fish parasites is one of the most important global research areas concerned with fisheries.

This study aimed to investigate the occurrence of endoparasites of *Sparisoma Cretense* fish. Morphology, site of infection, prevalence of the parasites. Fish samples were collected from different locations on the coast of Tartous, during the period between June 2023 to May 2024. The total number of fish examined was 50 individuals. Total length were measured. In this study, two types of nematode parasites were isolated: *Anisakis* sp. and *Contracaecum* sp, which were isolated from the inner wall of the intestine.

During our current research, this species was from *Sparisoma cretense* fish, and the life cycle of this parasitic species was detailed.

Keywords: nematodes, *Sparisoma cretense*, Tartous city- Syria, *Anisakis* sp., *Contracaecum* sp.

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تسجيل نوعين من الطفيليات الداخلية التابعة لصف الديدان الخيطية Nematoda على النوع السمكي الزليق *Sparisoma cretense* من المياه البحرية لمدينة طرطوس

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(تاريخ الإيداع 18 / 11 / 2025. قبل للنشر في 27 / 4 / 2026)

□ ملخص □

تعد الأسماك مصدراً غذائياً مهماً لغناه بالعناصر الضرورية لعمل أجهزة الجسم المختلفة، كما أنها تعد مصدراً جيداً للبروتين والفيتامينات، وعنصراً أساسياً لأنها توفر أحماض أوميغا 3 الدهنية.

بالإضافة أن دراسة طفيليات الأسماك واحدة من أهم مجالات الأبحاث العالمية التي تعنى بالثروة السمكية.

هدفت هذه الدراسة إلى الكشف عن وجود الطفيليات الداخلية عند أسماك الزليق *Sparisoma Cretense* وتم دراسة شكلها، موقع الإصابة بالطفيليات، تم جمع عينات من الأسماك من مواقع مختلفة من ساحل طرطوس، خلال الفترة ما بين حزيران 2023 إلى أيار 2024، بلغ إجمالي عدد الأسماك التي تم فحصها 50 فرداً، حيث تم قياس الطول الكلي لهذه الأسماك.

تم في هذه الدراسة عزل نوعين من الديدان الخيطية Nematoda: النوع *Anisakis sp* والنوع *Contracaecum sp* والتي تم عزلها من الجدار الداخلي للأمعاء.

خلال بحثنا الحالي تم عزل هذين النوعين لأول مرة من أسماك الزليق *Sparisoma cretense* من المياه البحرية لمدينة طرطوس، وتم تفصيل دورة حياة هذا النوع الطفيلي.

الكلمات المفتاحية: الديدان الخيطية، *Sparisoma cretense*، مدينة طرطوس - سوريا، *Anisakis sp.*

Contracacum sp.

حقوق النشر : مجلة جامعة اللاذقية (تشرين سابقاً) - سورية، يحتفظ المؤلفون بحقوق النشر بموجب



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Introduction

The world has recently witnessed an increase in demand for fish meat in light of the population increase due to its nutritional, economic and even medical importance, as marine products, especially fish, are the most important.

Food sources rich in vitamins (A, D) and mineral elements (phosphate and iodine), in addition to being rich in proteins, amino acids, essential fatty acids, especially Omega 3[4]. Marine fish parasitology is a rapidly developing field of aquatic science. This is due to the growing importance of marine aquaculture, concerns about pollution effects on fish health and a generally increasing interest in marine environmental Biology [13].

The study of fish parasites is one of the fields of global research concerned with fisheries, where the Parasitic infection can also cause various functional disorders and delayed growth.

The *Sparisoma* fish species is one of the economically important fish species, so this study was prepared. The *Sparisoma* fish belongs to the Scaridae family, and is spread in the Atlantic Ocean and Mediterranean Sea, and lives on rocky and sandy bottoms covered with algae [7].

The parrot fish often feeds on algae, which it gnaws from rocks and reefs with its strong teeth. Teeth are a typical tool for scratching and removing algae from coral rocks among living coral formations [16]. Also, Studies on marine fish parasites are relatively few [10]. The majority of studies included parasites of freshwater fish [17].

Research objectives and importance

The importance of the research comes from the fact that studies on internal fish parasites in Syria are relatively few.

This study comes at the forefront of research concerned with identifying internal and external parasites in *Sparisoma cretense*, also contributes to supplementing the taxonomic database of marine fish in Syria with new parasitic species.

The study aimed to detect endoparasitic infections in the brominated marine fish in the seawater of Tartous citymarine fish in Syria, with new parasitic species.

Methods and Materials:

The *Sparisoma* fish is considered a rare fish and is very beneficial to human health. This fish species prefers relatively warm water, and adults live on coral reefs or in areas with abundant algae. It feeds during the day on Algae, Seaweed, and small invertebrates.



Figure1:Sparisoma sample

50 individuals from the coast of Tartous, during the period between June 2023 to May 2024, transferred to the Fish Laboratory of the Higher Institute of Marine Research from two regions:

1- Al khrab

It is located about 19 km north of Tartous, features a rocky beach, but is relatively contaminated in the summer swimming months by the sewage water of nearby tourist resorts

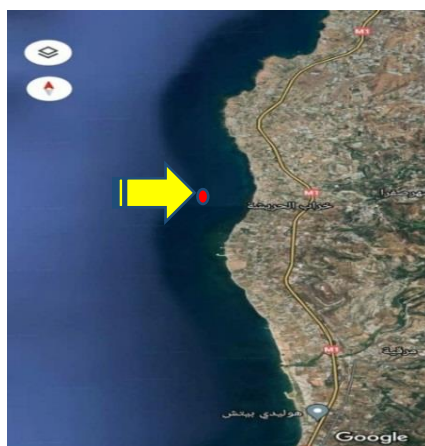


Figure 2:The Al khrab

2. Bsira:

It is located south of Tartous city and it is characterized by a sandy and clayey soil. composition, which makes it suitable for the reproduction of bottom-dwelling fish.



Figure 3:Bsira

The samples were then transferred to the fish laboratory at the Higher Institute of Marine Research, and measurements of the studied fish were made.
Examination stage:

Fish were dissected according to the method mentioned by the researchers[1] by making a longitudinal incision in the abdominal midline, which extends from the beginning of the fish's head to the end of the anus, then making another incision extending from the end of the first incision to the operculum. After that, the internal organs (Pyloric caeca, stomach, intestines, liver, gonads, swim bladder, muscles, eyes) were exposed for examination. They were examined with the naked eye, then using a magnifying glass to see the parasitic worms, and then the organs were examined. The interior and its contents were placed in a petri dish for Parasites isolated and established with alcohol 70%, after which parasitic samples were dyed using lactic acid according to [1,11,15]. The isolated parasite type was identified in this study after its depiction by relying on several global classification keys that relied on the external and internal formal qualities of the isolated parasite, the front, and rear ends of the body [2,5,13,14].

Results and Discussion:

In this study, two types of Nematoda parasites were studied: the first type was *Anisakes* ps, the second type was *Contracaecum* sp., which were isolated from the digestive tract of *Sparisoma cretense* fish and follow the following classification:

The first type *Anisakis* sp. follows the following classification:

Table 1 Classification of the first type of Nematoda parasites:

<i>Anisakis</i> sp.	
Kingdom	<i>Animalia</i>
Phylum	<i>Nematoda</i>
Class	<i>Chromadorea</i>
Order	<i>Rhabditida</i>
Family	<i>Anisakidae</i>
Genus	<i>Anisakis</i>
Species	<i>Anisakis</i> sp

The worm shares common features of all nematodes in that the worm-shaped body is round in cross-section and unsegmented (Figure 4). The body cavity is reduced to a narrow false abdominal cavity [12].

The mouth is located in the front part, surrounded by appendages used for feeding and sensation, with an anus opening at the back. The squamous epithelium secretes multiple layers to protect the body from digestive acids.



Figure 4: Picture of *Anisakis* sp

Details of the form vary according to host stage and life cycle. At the stage when fish are infected, *Anisakis* is in the form of characteristic “coils”, about 2 cm long when unfolded, and in the final host, they are longer, thicker and more robust, to deal with the dangerous environment in the mammalian intestines (Figure 5).



Figure (5) *Anisakis* sp: A: the front of the body, B: the End of the body, C: the middle of the body

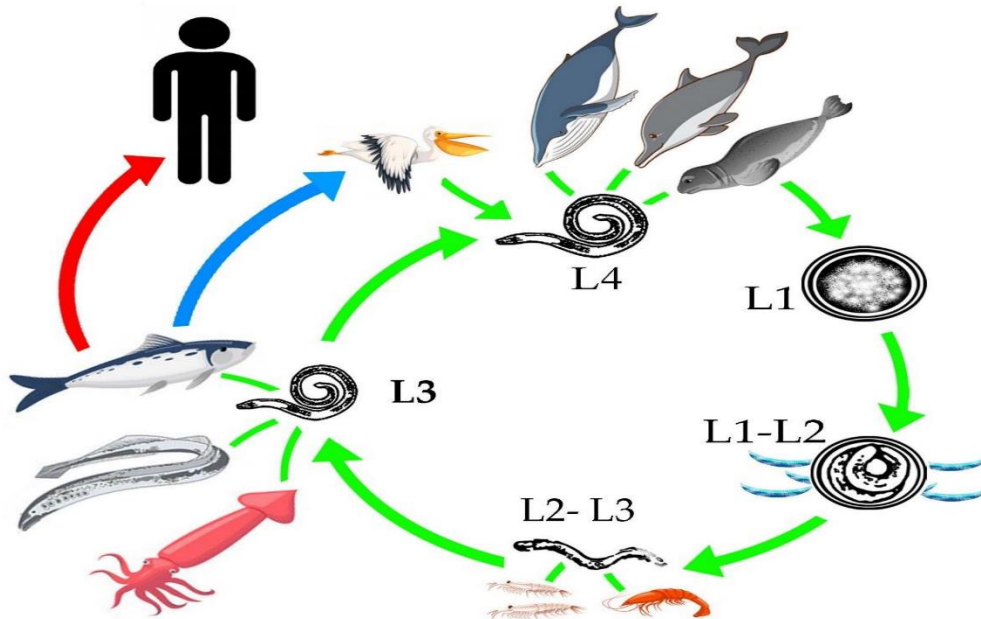
Life cycle of *Anisakis* sp:

Anisakis worms have complex life cycles that pass through a number of hosts during their lives[12]. The eggs hatch in seawater, where the larvae are eaten by crustaceans, and the crustaceans are later eaten by fish or squid. The nematodes burrow into the intestinal wall and form a sac around them as a protective layer, usually on the outer surface of the visceral organs, and sometimes in the muscles or under the skin (Figure 6).

The life cycle is completed when infected fish are eaten by marine mammals, such as whales, sea lions, dolphins, and other animals.

The nematodes emerge from the cyst into the intestine, feed, grow, and lay eggs in seawater in the host's waste.

Because the intestines of marine mammals are very similar in function to those of humans, the *Anisakis* species is able to infect humans who eat raw or undercooked fish [6].



Life cycle

Adult stages of anisakid nematodes reside in the stomach of marine mammals, where they are embedded in the mucosa in clusters. Unembryonated eggs produced by adult females are passed in the feces of marine mammals. The eggs become embryonated in water, undergoing two developmental molts, and hatch from the eggs as free-swimming ensheathed third-stage (L3) larvae. Newly hatched larvae are still ensheathed in the cuticle of the previous second larval stage (L2) and attach to the substrate caudally [2,8]. These free-swimming larvae are then ingested by crustaceans. The ingested larvae grow inside the crustacean hemocoel and become infective to fish and cephalopod hosts. After predation on infected crustaceans, L3 larvae are digested, and L3 larvae are transmitted at the tissue stage between parahaemostatic hosts. Fish and squid maintain L3 larvae that are infectious to humans and marine mammals, which are the definitive host. The heterotrophic life cycle includes a variety of invertebrates and vertebrates that are transferred through the marine food chain [9]. When the definitive host a marine mammal ingests fish or squid containing third-stage larvae, the larvae molt twice and develop into adult worms, causing symptoms of anisakiasis.

There is an extensive study on the prevalence of nematodes of the genus *anisakis* in fish consumed in Marrakech, Morocco(19). However, there is insufficient information and reporting on the prevalence of this parasite in the eastern Mediterranean basin, nor on the extent of nematode impact on humans in that region (20).

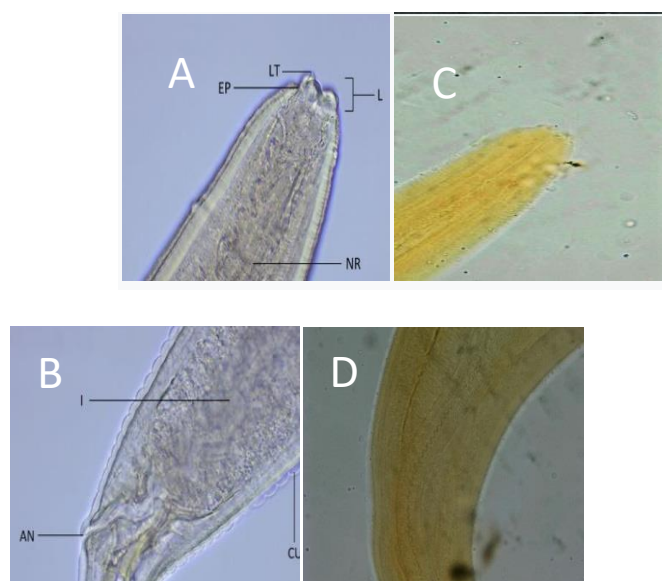


Figure (7): *Contracaecum* sp. A: Lateral view of the third stage *Contracaecum* sp. L: underdeveloped lips, LT: larval (cephalic) tooth, EP: excretory pore, NR: nerve ring, B: I: intestine, AN: anus, CU: striated cuticle[18], c : the front of the body, D: the End of the body

Conclusions And Recommendations

1. Two type of Nematoda parasites were isolated: the first type was *Anisakes* sp., and the second type was *Contracaecum* sp., which were isolated from the digestive tract of *Sparisoma cretense* fish.
2. Continue the Study of the Marine Fish Parasites to establish a taxonomic database for the Marine Fish Parasites.

3. Studying the effect of parasites on the productivity of these economically important fish so that they form a scientific base that can be used later when cultivating these fish.
4. Follow-up research related to this type of fish over the years to find out the latest developments

References:

- [1] E. Amlacher, Taschenbuch der Fischkrankheiten für Veterinärmediziner und Biologen. 1976.
- [2] R. C. Anderson, Nematode Parasites of Vertebrates: Their Development and Transmission. Cabi, 2000.
- [3] J. C. Ángeles-Hernández, F. R. Gómez-de Anda, N. E. Reyes-Rodríguez, V. Vega-Sánchez, P. B. García-Reyna, R. G. Campos-Montiel, ... & A. P. Zepeda-Velázquez, "Genera and species of the Anisakidae family and their geographical distribution," *Animals*, vol. 10, no. 12, p. 2374, 2020.
- [4] C. Béné, M. Barange, R. Subasinghe, P. Pinstrip-Andersen, G. I. Merino, G. Hemre, & M. Williams, "Feeding 9 billion by 2050—Putting fish back on the menu," *Food Security*, vol. 7, no. 2, pp. 261-274, 2015.
- [5] I. E. E. Bykhovskaya-Pavlovskaya, A. V. Gusev, M. N. Dubinina, N. A. Izyumova, T. S. Smirnova, I. L. Sokolovskaya, ... & V. M. Epstein, Key to parasites of freshwater fish of the USSR. 1964.
- [6] F. Dujardin, Histoire naturelle des helminthes ouversintestinaux, vol. 1. Roret, 1845.
- [7] D. Golani, B. Ozturk, & N. Basusta, Fishes of the eastern Mediterranean. 2007.
- [8] M. Køie, B. Berland, & M. D. Burt, "Development to third-stage larvae occurs in the eggs of *Anisakis simplex* and *Pseudotetravandecipiens* (Nematoda, Ascaridoidea, Anisakidae)," *Canadian Journal of Fisheries and Aquatic Sciences*, vol. 52, S1, pp. 134-139, 1995.
- [9] T. Kuhn, Molecular studies on marine ascaridoid nematodes, Doctoral dissertation, Heinrich Heine University, Düsseldorf, 2010.
- [10] T. Layka, "Record of the nematode species *Hysterothylacium aduncum* (Nematoda: Anisakidae) parasitizing *Sparus aurata* fish in the marine waters off the coast of Latakia," *Tishreen University Journal for Biological Sciences*, vol. 40, no. 3, 2018.
- [11] Z. Lucky, Methods for the diagnosis of fish diseases, Amerind. publishing Co. PV T. Ltd., New Delhi, Bombay, India, 1977.
- [12] S. Mattiucci & G. Nascetti, "Molecular systematics, phylogeny and ecology of anisakid nematodes of the genus *Anisakis* Dujardin, 1845: an update," *Parasite*, vol. 13, no. 2, pp. 99-113, 2006.
- [13] H. Möller & K. Anders, Diseases and parasites of marine fishes, 1986.
- [14] F. Moravec, Parasitic nematodes of freshwater fishes of Europe, vol. 470. Kluwer Academic Publishers, 1994.
- [15] M. H. Pritchard & G. O. Kruse, The collection and preservation of animal parasites, Eds., 1982.
- [16] J. E. Randall & R. F. Myers, "*Scarus fuscicaudalis*, a new species of parrotfish (Perciformes: Labroidae: Scaridae) from the western Pacific," *MICRONESICA-AGANA*, vol. 32, no. 2, pp. 221-228, 2000.
- [17] Hasan Salmman & Amal Dayoub, "A Study on Carp Infection Dynamics by the Worm (*Dactylgryus*) in Al-Sinn Fish Farm," *Latakia University Journal for Research and Scientific Studies – Basic Sciences Series*, vol. 24, pp. 159–172, 2003.

- [18] N. Vuić, ČakalićTurković I., B. Vlaičević, M. StojkovićPiperac, & D. Čerba, “The influence of Contracaecum larvae (Nematoda, Anisakidae) parasitism on the population of Prussian carp (*Carassiusgibelio*) in Lake Sakadaš, Croatia,” *Pathogens*, vol. 11, no. 5, p. 600, 2022.
- [19] A. Biary, S. Berrouch, O. Dehhani, A. Maarouf, B. Sasal, B. Mimouni, and J. Hafid, “Prevalence and identification of Anisakis nematodes in fish consumed in Marrakesh, Morocco,” *Mol. Biol. Rep.*, vol. 48, no. 4, pp. 3417–3422, 2021, doi: 10.1007/s11033-021-06323-y.
- [20] A. R. Rahmati, B. Kiani, A. Afshari, E. Moghaddas, M. Williams, and S. Shamsi, “World-wide prevalence of Anisakis larvae in fish and its relationship to human allergic anisakiasis: A systematic review,” *Parasitol. Res.*, vol. 119, no. 11, pp. 3585–3594, 2020, doi: 10.1007/s00436-020-06892-0.