

Wild and Cultured Fish Parasites in Türkiye: An Updated List of Species, Hosts, Microhabitat and Zoogeographical Distribution since 2020

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REVIEW

Abstract

A total of 624 nominal species-level and genus-level identified species of parasites were reported from 287 different nominal fish species from both wild and cultured marine and freshwater as well as aquarium habitats by 2020. This checklist provides the current state of the knowledge of fish parasites allocated in 10 phyla: Ciliophora, Platyhelminthes (Monogenea, Trematoda, and Cestoda), Cnidaria (Myxozoa), Nematoda, Arthropoda (Copepoda, Isopoda), Annelida, Euglenozoa, Myxozoa, Metamonada, Mollusca and one parasite group Acanthocephala in different water sources, and lists the reported 85 species-level, and 17 genus-level identified parasites in wild marine, 58 species-level and 19 genus-level identified parasites in wild freshwater, 7 species-level identified parasites in cultured marine, 4 species-level and 8 genus-level identified parasites in cultured freshwater, and 7 species-level and 14 genus-level identified parasites in aquarium environments since 2020. In addition, 46 parasite species have been added to the already-known fish parasite fauna, and previously not reported 59 fish species have also been reported to be the new hosts, mostly endemic freshwater species, investigated for parasites. The most specious taxons were Trematoda in marine, Monogenea in freshwater, and Ciliophora in aquarium hosts. This up-to-date checklist compiled from different sources for the last 5 years suggests more efforts to define the accurate diversity of fishes in Türkiye.

Keywords: Parasites; fish; biodiversity; Türkiye.

INTRODUCTION

Fish parasites are among the significant components of the aquatic environments and have a great variety of morphological and molecular diversities in both protozoan and metazoan taxa. Some are well-known parasites for their significant consequences in aquaculture conditions and their enormous range of ecological adaptations (Šimková, 2024). The physiology, morphology, reproduction, and behavior of their fish hosts are affected and even altered by parasites, and their presence reveals some patterns in the host distribution and population structure (Cantatore and Timi, 2015). Using fish parasites as parasitological tags also provided new insight into fish migration and stock assessment (Timi and Buchmann, 2023). Parasites reported from fishes are mainly allocated to the parasitic groups of Ciliophora, Platyhelminthes (Monogenea, Trematoda, and Cestoda), Cnidaria (Myxozoa), Nematoda, Arthropoda (Copepoda, Isopoda), Annelida, Mollusca, and a parasite group Acanthocephala members of some have significant impact on global finfish and shellfish aquaculture, and they have been well documented in parasitological surveys worldwide including Türkiye (Arthur and Te, 2006; Salgado-Maldonada, 2006; Kirjušina and Vismanis, 2007; Dijikanovic et al., 2012; Shinn et al., 2015;

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Luque et al., 2016; Özer, 2021; Trung et al., 2022).

Türkiye has an 8,333 km long coastal line higher than those among the EU, the Black Sea, the Mediterranean, and Adriatic Sea countries. Four different seas border it: The Mediterranean Sea, the Black Sea, the Aegean Sea, and the Sea of Marmara, which have different water quality parameters. Türkiye also has diverse freshwater sources, including 25 freshwater basins, most born within its borders, and some pour into the surrounding seas mentioned above. These large amounts of freshwater and marine ecosystems in Türkiye inhabit 415 and 491 fish species, respectively (Froese and Pauly, 2024). A total of 624 nominal and genus-levels identified species of parasites have been reported from a total of 287 different nominal and genus-level fish species from both wild and cultured marine and freshwater environments as well as aquariums in Türkiye by 2020 in a book by Özer (2021) indicating all the parasites previously reported. A total of 400, 242, 44, 41, and 38 parasite species were reported from 153 wild marines, 106 wild freshwaters, 18 cultured marines, 12 cultured freshwaters, and 32 aquarium host fish species, respectively (Özer, 2021; 2022). When the higher parasitic taxa are considered, trematodes (105), arthropods (89), monogeneans (59), and myxozoans (35) had the highest parasite species diversity in wild marine fishes. At the same time, the situation was different in wild freshwater fishes; monogeneans (89), trematodes (35), cestodes (29), and nematodes (21) were the most reported parasites (Özer, 2022). However, cultured marine, freshwater, and ornamental fish species were the hosts for less parasite diversity (Özer, 2022). Since then, many papers have been published in different scientific journals with details on the characteristics of the parasites, their hosts, microhabitats, and geographical localities in the wild and cultured environments. Providing a general overview of these parasites is needed to facilitate the understanding of their current occurrences and distributions in association with wild and cultured marine and freshwater fish and aquarium fish hosts. Species lists form a vital element of distribution studies because they aid in generating hypotheses to guide the application of experimental or comparative methods (Aguilar-Aguilar and Islas-Ortega, 2015). Thus, this checklist, organized as parasite-host and host-parasite lists, presents an update of the species belonging to 13 higher parasitic taxa since 2020 to facilitate future research on taxonomy, biogeography, ecology, and biodiversity.

MATERIALS AND METHODS

Data collection

The species in this paper encompass parasites described from 2020 to the present. A total of 134 reference papers were retrieved to gather knowledge on fish parasites and their occurrences in wild and cultured marine fishes and aquarium fishes in Türkiye. The animal science databases (<https://www.cabidigitallibrary.org>, PubMed, Scopus, Web of Science, Google Scholar, Zoological Record, Biological Abstracts, Fisheries Abstracts, the research repository of Aquadocs) were searched using the keywords: “parasite”, “fish”, and “Türkiye”. Results of unpublished theses were excluded from this search to allow the authors to have the first publication of their data through peer review evaluations as some may not meet the required criteria of the International Code of Zoological Nomenclature. Furthermore, scientific names for recorded hosts from the literature have been amended and corrected following the FishBase database (<https://www.fishbase.in/search.php>; 2024). The scientific names of existing parasites were carefully checked and corrected using various reliable sources, such as the WoRMS - World Register of Marine Species database (<http://www.marinespecies.org/index.php>; 2024). Both the numbers of fish infected by parasites and vice versa from wild marine and freshwater, cultured marine and freshwater, and aquarium fishes were also given in parentheses. The latitude and longitude of the geographical localities where samplings were conducted are given in Tables in accordance with the respective publications where possible, in the others that were not reported, we provided the possible most appropriate localities obtained from the database <https://www.google.com/maps/>.

Data analysis

Parasite species arranged by phylum, class, and family are presented in alphabetical order, followed by information on microhabitat, geographical locality, references, and notes indicating the occurrence of parasites, hosts, and localities to clarify their current records in comparison with the previous reports. Parasite species were classified into thirteen main taxa according to mainly the WoRMS - World Register of Marine Species database (<http://www.marinespecies.org/index.php>; 2024): Annelida, Arthropoda (Copepoda, Isopoda, Branchiura), Ciliophora, Cnidaria (Myxozoa), Euglenozoa, Metamonada, Mollusca, Myxozoa, Nematoda, and Platyhelminthes (Trematoda, Monogenea, Cestoda), parasite group Acanthocephala.

RESULTS AND DISCUSSIONS

The present article compiles parasite species reported from wild and cultured marine, freshwater, and ornamental fishes until the present. In the present parasite-host checklist, a total of 158 species-level and 43 genus-level identified parasites belonging to phylum Annelida, Arthropoda (Copepoda, Isopoda, Branchiura), Ciliophora, Cnidaria (myxozoa), Euglenozoa, Metamonada, Mollusca, Myxozoa, Nematoda, Platyhelminthes

(Trematoda, Monogenea, Cestoda), and parasite group Acanthocephala are reported from 152 fish species (Tables 1-10). The distributions of parasites and their fish hosts are as follows: 85 species-level and 17 genus-level identified parasites belonging to 44 families of 8 phyla from 67 wild marine fish host species (Tables 1, 2); 58 species-level and 19 genus-level identified parasites belonging to 35 families of 9 phyla from 74 wild freshwater fish host species (Tables 3, 4); 7 parasite species belonging to 6 families of 4 phyla from 2 cultured marine fish species (Tables 5, 6); 4 species-level and 8 genus-level identified parasites belonging to 11 families of 4 phyla from 4 cultured freshwater fish species (Tables 7, 8), and finally, 7 species-level and 14 genus-level identified parasites belonging to 17 families of 7 phyla from 10 species-level and genus-level from ornamental fish hosts (Tables 9, 10). A total of 199 species-level and genus-level identified parasites were reported in this checklist (the species-level and genus-level identified parasites reported from wild or cultured marine, freshwater, and aquarium environments combined) and Platyhelminthes was the most specious phylum, followed by Arthropoda, Nematoda, Cnidaria, Ciliophora, Acanthocephala, Annelida, Mollusca, Myxozoa, Euglenozoa and Metamonada (see Figure 1, Tables 1-10). When the distribution of parasites at the class level is considered, Trematoda (36), Nematoda (32), Monogenea (29), Copepoda (18), and Cestoda (15) were the most common taxa, accounting for 18.1%, 16.1%, 14.6%, 9%, and 7.5%, respectively, of the total reported parasites.

When the most infectious parasite species reported from host fishes were considered, a nematode *Hysterothylacium aduncum* (21) and a cestode *Scolex pleuronectis* (17) from wild marine fishes; a monogenean *Paradiplozoon homoi* (21) and a cestode *Ligula intestinalis* (14) from wild freshwater fishes have been reported (Tables 1,2). Fewer cultured marine, freshwater, and aquarium fish host species were reported to be infected by the parasites, as seen in Table 3,4,5.

Of the investigated 150 fish species, the most infected fish hosts were East Atlantic peacock wrasse *Symphodus tinca* (11), leaping mullet *Chelon saliens* (11), bogue Boops boops (9), black goby *Gobius niger* (8), black scorpionfish *Scorpaena porcus* (8), shore rockling *Gaidropsarus mediterraneus* (7), chub mackerel *Scomber japonicus* (5), in wild marine environments; chub *Squalius cephalus* (16), Anatolian khramulya *Capoeta tinca* (14), Euphrates spiny eel *Mastacembelus mastacembelus* (11), common carp *Cyprinus carpio* (10), pumpkinseed *Lepomis gibbosus* (9), Georgian shemaya *Alburnus derjugini* (7) in wild freshwater environments; European seabass *Dicentrarchus labrax* (7) in the cultured marine environment; rainbow trout *Oncorhynchus mykiss* (8) in the cultured freshwater environment and goldfish *Carassius auratus* (7) in the aquarium environment. The rest of the fish hosts infected by fewer parasite species can be seen in Tables 6-11.

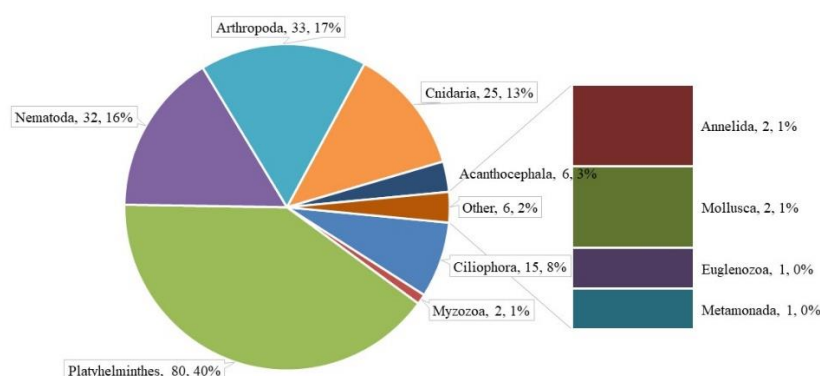


Figure 1. Total number and percentages (%) of parasites reported from fishes in Türkiye since 2020.

Table 1. Parasites, hosts, microhabitats, geographical localities, notes for the occurrence of parasites, and references in wild marine fishes in Türkiye since 2020

Parasite species	Fish species	Microhabitat	Geographical locality	Reference
CLASS				
ACANTHOCEPHALA				
Family				
Arhythmacanthidae				
Acanthocephaloides				
<i>irregularis</i> Amin, Oğuz, Heckman, Tepe & Kvach, 2011	<i>Gaidropsarus mediterraneus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gobius niger</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Scorpaena porcus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N	13

29°36'41.9"E*				
Family Echinorhynchidae				
<i>Solearhynchus rhytidotes</i> (Monticelli, 1905)				
Belofastova, 2006 (Syn: <i>Solearhynchus kostylewi</i> (Meyer, 1932) Kvach & Oguz, 2010)	<i>Solea solea</i> (Syn: <i>Solea vulgaris</i>)	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
Family Neoechinorhynchidae				
<i>Neoechinorhynchus</i> (<i>Neoechinorhynchus</i>) <i>agilis</i> (Rudolphi, 1819) Van Cleave, 1916				
	<i>Chelon aurata</i> (Syn: <i>Liza aurata</i>)	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
<i>Neoechinorhynchus</i> sp.	<i>Chelon saliens</i>	Intestine	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
PHYLUM ANNELIDA				
CLASS CLITELLATA				
Family Piscicolidae				
<i>Pontobdella muricata</i> (Linnaeus, 1758)	<i>Gymnura altavela</i> **	Dorsal fin	Iskenderun Bay (Mediterranean Sea) 36°13'14.1"N 35°50'31.5"E	58
PHYLUM ARTHROPODA				
CLASS MALACOSTRACA				
Order ISOPODA				
Family Cymothoidae				
<i>Anilocra frontalis</i> H. Milne Edwards, 1840	<i>Sciaena umbra</i> **	Skin	Dardanelles Strait (Northern Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
<i>Anilocra physodes</i> (Linnaeus, 1758)	<i>Nemipterus randalli</i> **	Dorsal fin	Mersin Bay (Mediterranean Sea)† 36°43'32.8"N 34°40'22.8"E*	16
<i>Ceratothoa italica</i> Schiödte & Meinert, 1883	<i>Boops boops</i> **	Buccal cavity	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
<i>Ceratothoa oestroides</i> (Risso, 1827)	<i>Boops boops</i>	Buccal cavity	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
	<i>Spicara maena</i>	Buccal cavity	Dardanelles Strait (Northern Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
	<i>Trachurus trachurus</i>	Buccal cavity	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
<i>Ceratothoa parallela</i> (Otto, 1828)	<i>Boops boops</i>	Buccal cavity	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
	<i>Spicara maena</i> **	Buccal cavity	Dardanelles Strait (Northern Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
<i>Emetha audouini</i> (H. Milne Edwards, 1840)	<i>Spicara maena</i>	Buccal cavity	Dardanelles Strait (Northern Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
<i>Mothocya epimerica</i> A. Costa in Hope, 1851	<i>Atherina boyeri</i>	Gill cavity	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	8
<i>Nerocila bivittata</i> (Risso, 1816)	<i>Mesogobius batrachocephalus</i> **	Ventral body surfaces, near by the pectoral fin, dorsal fin, caudal fin	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	123
	<i>Mycteroperca rubra</i> **	Caudal fin, skin	Antalya Bay (Mediterranean Sea)† 36°46'51.5"N, 031°12'660"E	41
	<i>Pterois miles</i> *	Pectoral fin	Bodrum (Aegean Sea)† 37°10'N, 27°25'E Kaş (Aegean Sea)† 36°11'31.3"N, 29°38'28.2"E	134
	<i>Pterois miles</i>	Pectoral fin	Iskenderun Bay (Mediterranean Sea)† 36°41'14.1"N 35°57'31.5"E*	184

	<i>Pterois miles</i>	Pectoral fin	Bodrum coasts (Aegean Sea) 37°00'54.7"N 27°24'48.8"E*	184
	<i>Scorpaena scrofa</i>	Skin	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	8
	<i>Solea solea</i> **	Ventral body surfaces, near by the pectoral fin, dorsal and caudal fins	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	123
	<i>Symphodus cinereus</i> **	Ventral body surfaces, near by the pectoral fin, dorsal and caudal fins	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	123
	<i>Ephinephelus marginatus</i> **	Caudal fin	Antalya Bay (Mediterranean Sea)† 36°46'515"N, 031°12'660"E	41
Nerocila milesensis Öktener, Tuncer & Trilles, 2020*,‡	<i>Pterois miles</i> **	Anal fin	Kaş (Aegean Sea)† 36°11'31.3"N 29°38'28.2"E	134
Nerocila orbignyi (Guérin, 1832)	<i>Parablennius sanguinolentus</i> **	dorsal fins	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	123
	<i>Mugil cephalus</i> **	Ventral and pectoral fins	Bandırma Bay (Sea of Marmara) 40°23'05.4"N 27°57'57.1"E*	131
Family Gnathiidae				
Gnathia larvae	<i>Parupeneus forsskali</i> **	Gills	Datça Bay (Aegean Sea)† 16°17' N, 120° 12' E	132
	<i>Sargocentron rubrum</i> **	Gills, mouth cavity	Fethiye Bay (Aegean Sea)† 16°17' N, 120° 12' E	132
	<i>Upeneus moluccensis</i> **	Gills	Fethiye Bay (Aegean Sea)† 16°17' N, 120°12' E	132
	<i>Chromogobius zebratus</i> **	Caudal peduncle	Antalya Bay (Mediterranean Sea)† 36°51'600"N 30°43'725"E	51
	<i>Labrus viridis</i> **	gills and mouth cavity	İzmir Bay (Aegean Sea) 38° 32' 9" N, 26° 45' 17" E	102
Paragnathia sp.*	<i>Sphyraena chrysotaenia</i> **	Fins	Erdemli-Anamur (Mersin, Mediterranean Sea) 36°12'10.9"N 33°55'39.4"E*	96
CLASS COPEPODA				
Family Caligidae				
Caligus apodus (Brian, 1924)	<i>Chelon auratus</i> **	Body surface, pectoral, ventral and caudal fins	Bandırma Bay (Sea of Marmara)† 40°21'12.8" N 27°58'04.7" E	135
Caligus minimus Otto, 1821	<i>Echeneis naucrates</i> **	Gills	Köyceğiz Dalyan Lagoon† 36°82'4967"N 28°63'2510"E	130
Caligus quadratus Shiino, 1954	<i>Thunnus thynnus</i> **	Gills	Antalya Bay (North-eastern Mediterranean Sea) 36°52'28.6"N 30°41'43.2"E*	83
Caligus pageti Russell, 1925	<i>Mugil cephalus</i>	Body surface, pectoral, ventral and caudal fins	Bandırma Bay (Sea of Marmara)† 40°21'12.8" N 27°58'04.7" E	135
Caligus turkiyensis Öktener, Montes, Romero, Türker & Trilles, 2024*,‡	<i>Mugil cephalus</i> **	Skin, fins	Bandırma Bay (Sea of Marmara)† 40°21'12.8" N 27°58'04.7" E	135
Euryphorus brachypterus (Gerstaecker, 1853)	<i>Thunnus thynnus</i>	Under the gill cover	Mediterranean Sea 36°55'17.4"N 28°39'59.9"E*	10
Family Ergasilidae				
Ergasilus lizae Krøyer, 1863	<i>Chelon saliens</i>	Gills	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
	<i>Chelon labrosus</i>	Gills	Beymelek Lagoon (Mediterranean Sea)†	183

36°16'N, 30°04'E				
Family Lernaepodidae				
<i>Clavellisa scombri</i> (Kurz, 1877)	<i>Scomber scombrus</i> **	Inner wall of gill cover, the gill lamellae, tongue pad	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	10
<i>Parabrachiella mugilis</i> (Kabata, Raibaut & Ben Hassine, 1971)*	<i>Chelon auratus</i> **	Pectoral fins	Bandırma Bay (Sea of Marmara)† 40°23'05.4"N 27°57'57.1"E*	116
Family Lernanthropidae				
<i>Lernanthropus</i> sp.*	<i>Nemipterus randalli</i> **	Gills	Erdemli-Anamur (Mersin, Mediterranean Sea) 36°12'10.9"N 33°55'39.4"E*	96
Family Pandaridae				
<i>Pandarus bicolor</i> Leach, 1816	<i>Squalus acanthias</i> **	Anal fins, body surface	Sea of Marmara† 40°31'43.8"N-27°12'11.2"E*	128
<i>Pandarus boscii</i> Leach, 1816*	<i>Squalus acanthias</i> **	Anal fins, body surface	Sea of Marmara† 40°31'43.8"N-27°12'11.2"E*	128
PHYLUM CILIOPHORA				
CLASS OLIGOHYMENOPHOREA				
Family Trichodinidae				
<i>Trichodina domerguei</i> (Wallengren, 1897)	<i>Solea solea</i> **	Gills	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	148
<i>Trichodina jadranica</i> Raabe, 1958	<i>Scophthalmus maeoticus</i> **	Gills	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	148
	<i>Solea solea</i> **	Gills	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	148
<i>Trichodina ovonucleata</i> Raabe, 1958	<i>Gaidropsarus mediterraneus</i> **	Gills	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	148
	<i>Parablennius sanguinolentus</i> *	Gills	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	148
<i>Trichodina rectuncinata</i> Raabe, 1958*	<i>Scophthalmus maeoticus</i> *	Gills	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	148
	<i>Gaidropsarus mediterraneus</i> **	Gills	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	148
	<i>Parablennius sanguinolentus</i> **	Gills	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	148
PHYLUM CNIDARIA				
CLASS MYXOZOA				
Family Ceratomyxidae				
<i>Ceratomyxa scophthalmi</i> Özer, Gürkanlı, Okay, Çiftçi & Yurakhno, 2022*,‡	<i>Scophthalmus maeoticus</i> **	Gall bladder	Sinop coasts (Black Sea)† 42° 05' 68" N, 35° 10' 55" E	141
<i>Ceratomyxa scorpaeni</i> Garbouj, Rangel, Castro, Hmissi, Santos & Bahri, 2016*	<i>Scorpaena porcus</i> **	Gall bladder	Sinop coasts (Black Sea)† 42° 05' 68" N, 35° 10' 55" E	126
<i>Myxidium finnmarchicum</i> Mackenzie, Collins, Kalavati & Hemmingsen, 2010*	<i>Scophthalmus maeoticus</i> **	Gall bladder	Sinop coasts (Black Sea)† 42° 05' 68" N, 35° 10' 55" E	141
<i>Myxidium parvum</i> Yurakhno, 1991	<i>Salaria pavo</i> **	Gall bladder	Sinop coasts (Black Sea) 42° 05' 68" N, 35° 10' 55" E	68
<i>Myxobolus ichkeulensis</i> Bahri & Marques, 1996	<i>Mugil cephalus</i>	Gills	Kızılırmak Delta (Samsun, Black Sea)† 41°44'04.2"N 35°57'23.0"E	37
<i>Myxobolus parvus</i> Shulman, 1962	<i>Chelon saliens</i>	Gills, kidney, gall bladder, lower jaw	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
<i>Myxobolus spinacurvatura</i> Maeno,	<i>Mugil cephalus</i> **	Liver, intestine wall	Kızılırmak Delta (Samsun, Black Sea)† 41°44'04.2"N, 35°57'23.0"E	186

Sorimachi, Ogawa & Egusa, 1990*				
<i>Myxobolus</i> sp.	<i>Chelon saliens</i>	Urinary bladder	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
Family Ortholineidae				
<i>Ortholinea divergens</i> (Thélohan, 1895)	<i>Symphodus cinereus</i>	Kidney	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	127
<i>Ortholinea gobiusi</i> Naidenova, 1968	<i>Neogobius melanostomus</i>	Kidney	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	127
	<i>Gobius niger</i>	Kidney	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	127
<i>Ortholinea hamsiensis</i> Okkay, Gürkanlı, Çiftçi & Özer, 2024*,‡	<i>Engraulis encrasicolus**</i>	Urinary bladder	Sinop coasts (Black Sea)† 42°05'68"N 35°10'55"E	127
<i>Ortholinea</i> sp.	<i>Mullus surmuletus**</i>	Kidney	Kocaeli coasts (Black Sea)† 41°12'37"N 29°59'56"E	124
Family Sphaerosporidae				
<i>Sphaerospora mugilis</i> (Sitja-Bobadilla & Alvarez-Pellitero, 1995)	<i>Chelon saliens</i>	Kidney	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
PHYLUM MYZOOA				
Coccidian parasite of unknown taxonomy*	<i>Pagellus erythrinus**</i>	Intestine, abdominal muscle	Aegean Sea† 37°19'52.5"N 27°00'01.6"E‡	2
PHYLUM NEMATODA				
CLASS CHROMADOREA				
Family Anguillicolidae				
<i>Anguillicola crassus</i> Kuwahara, Niimi & Itagaki, 1974	<i>Anguilla anguilla</i>	Swimbladder	Çamalti Tuzla (İzmir Bay, Aegean Sea)† 38°25'57.8"N 27°00'13.2"E‡	67
	<i>Anguilla anguilla</i>	Swimbladder	Gediz Delta (Aegean Sea)† 30°38' N, 55°26' E	161
Family Anisakidae				
<i>Anisakis pegreffii</i> Campana-Rouget & Biocca, 1955	<i>Boops boops**</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E‡	9
	<i>Engraulis encrasicolus**</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E‡	9
	<i>Micromesistius poutassou**</i>	Not reported	Aegean Sea† 37°19'52.5"N 27°00'01.6"E	151
	<i>Scomber japonicus</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E‡	9
	<i>Scomber japonicus</i>	Not reported	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E	10
	<i>Scomber japonicus**</i>	Not reported	Dardanelles Strait (Çanakkale) 40°03'04.6"N 26°17'25.8"E‡	42
	<i>Scomber scombrus**</i>	Not reported	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E‡	10
	<i>Scorpaena scrofa</i>	Not reported	Gulf of İzmir (Aegean Sea) 38° 29'32" N 26° 48'57" E	17
<i>Anisakis simplex</i> (Rudolphi, 1809) Dujardin, 1845	<i>Boops boops</i>	Intestine	Ayvalık, Edremit Bay (Aegean Sea) 39°17'-39°34'N 26°57'-26°34'E	103
	<i>Sardina pilchardus</i>	Intestine	Ayvalık, Edremit Bay (Aegean Sea) 39°17'-39°34'N 26°57'-26°34'E	103
	<i>Engraulis encrasicolus</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E‡	7
<i>Anisakis typica</i> (Diesing, 1860) Baylis, 1920*	<i>Merluccius merluccius**</i>	Not reported	Mediterranean Sea† 36°55'17.4"N 28°39'59.9"E‡	152
	<i>Scomber japonicus</i>	On the	Dardanelles Strait (Aegean Sea)	9

		internal organs	40°03'04.6"N 26°17'25.8"E*	
	<i>Scomber japonicus</i>	Not reported	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	10
	<i>Scorpaena scrofa</i> **	Not reported	Gulf of İzmir (Aegean Sea) 38° 29'32" N 26° 48'57" E	17
	<i>Scomber japonicus</i> **	On the internal organs	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	7
Anisakis ziphidarum Paggi, Nascetti, Webb, Mattiucci, Cianchi & Bullini, 1988*	<i>Scorpaena scrofa</i> **	Not reported	Gulf of İzmir (Aegean Sea)† 38° 29'32" N 26° 48'57" E	17
Anisakis sp.	<i>Scyllorhinus canicula</i> **	Liver	Sea of Marmara 40°45'03.3"N 28°14'43.7"E*	179
	<i>Boops boops</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	7
Contracaecum pelagicum Johnston & Mawson, 1942*	<i>Scomber japonicus</i> **	On the internal organs	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	7
Contracaecum sp.	<i>Boops boops</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	7
Phocanema decipiens (Krabbe, 1878) Myers, 1959 (Syn: Pseudoterranova decipiens (Krabbe, 1878) Gibson, 1983)*	<i>Boops boops</i> **	Intestine	Ayvalık, Edremit Bay (Aegean Sea)† 39°17'-39°34'N 26°57'-26°34'E	103
Skrjabinisakis physeteris (Baylis, 1923) Safonova, Voronova & Vainutis, 2021 (Syn: Anisakis physeteris Baylis, 1923)*	<i>Trachurus trachurus</i> **	On the internal organs	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	7
Family Ascarididae				
Ascaridoid nematode	<i>Engraulis encrasicolus</i>	Internal organs and body cavity	Southern Black Sea 42°07'00.7"N 34°28'02.8"E*	3
Family Cucullanidae				
Dichelyne (Cucullanellus) minutus (Rudolphi, 1819) (Syn : Cucullanellus minutus (Rudolphi, 1819) Törnquist, 1931)	<i>Solea solea</i> (Syn: <i>Solea vulgaris</i>)	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Symphodus tinca</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
Family Philometridae				
Philometra saltatrix Ramachandran, 1973	<i>Pomatomus saltatrix</i>	Gonads	Sea of Marmara 40°42'45.6"N 28°33'12.9"E*	122
Philometra sp.	<i>Trachinus draco</i>		Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Trachurus mediterraneus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
Family Raphidascarididae				
Hysterothylacium aduncum (Rudolphi, 1802) Deardorff & Overstreet, 1981	<i>Boops boops</i>	Intestine	Ayvalık, Edremit Bay (Aegean Sea) 39°17'-39°34'N 26°57'-26°34'E	103
	<i>Alosa immaculata</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Chelidonichthys lucerna</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13

	<i>Engraulis encrasicolus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gaidropsarus mediterraneus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gobius niger</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Merlangius merlangus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Mullus surmuletus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Sarda sarda</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Sardina pilchardus**</i>	Intestine	Ayvalık, Edremit Bay (Aegean Sea)† 39°17'-39°34'N 26°57'-26°34'E	103
	<i>Sciaena umbra</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Scorpaena porcus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Solea solea</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Spicara smaris</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Symphodus tinca</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Trachinus draco</i>		Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Trachurus mediterraneus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Trachurus trachurus</i>	Not reported	Central Black Sea 41°29'56.3"N 36°24'17.2"E*	193
	<i>Uranoscopus scaber</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Chelon saliens</i>	Intestine	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
	<i>Pomatomus saltatrix</i>	Intestine, stomach	Sea of Marmara 40°42'45.6"N 28°33'12.9"E*	122
<i>Hysterothylacium fabri</i> (Rudolphi, 1819) Deardorff & Overstreet, 1980	<i>Mullus barbatus</i>	Not reported	Mediterranean Sea† 36°55'17.4"N 28°39'59.9"E*	176
<i>Hysterothylacium</i> sp.	<i>Mullus surmuletus</i>	Intestine	Kocaeli coasts (Black Sea) 41°12'37"N 29°59'56"E	124
	<i>Trachurus trachurus</i>	On the internal organs	Dardanelles Strait (Aegean Sea) 40°03'04.6"N 26°17'25.8"E*	7
<i>Hysterothylacium</i> larval type III	<i>Mullus ponticus</i>	Intestine	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
<i>Hysterothylacium</i> larval type IV	<i>Mullus ponticus</i>	Intestine	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
<i>Hysterothylacium</i> larval type VIII	<i>Mullus ponticus</i>	Surface of internal organs and visceral cavity	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
<i>Hysterothylacium</i> larval type VIII	<i>Engraulis encrasicolus</i>	Surface of internal organs and visceral cavity	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
<i>Hysterothylacium</i> larval type VIII	<i>Trachurus trachurus</i>	Surface of internal organs and visceral cavity	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
<i>Hysterothylacium</i> larval	<i>Merlangius</i>	Surface of	Samsun (Black Sea)	62

type VIII	<i>merlangus</i>	internal organs and visceral cavity	41°29'56.3"N 36°24'17.2"E	
Hysterothylacium larval type IX	<i>Trachurus trachurus</i>	Surface of internal organs and visceral cavity	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
Hysterothylacium larval type IX	<i>Merlangius merlangus</i>	Surface of internal organs and visceral cavity	Samsun (Black Sea) 41°29'56.3"N 36°24'17.2"E	62
CLASS ENOPLA				
Family Capillariidae				
<i>Capillaria (Procapillaria) gracilis</i> (Bellingham, 1840) Travassos, 1915 (Syn: <i>Capillaria gracilis</i> (Bellingham, 1840))	<i>Gobius niger</i> **	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Mullus surmuletus</i> **	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
PHYLUM PLATYHELMINTHES				
CLASS CESTODA				
Family Bothriocephalidae				
<i>Bothriocephalus scorpii</i> (Müller, 1776) Cooper, 1917	<i>Scorpaena porcus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
<i>Bothriocephalus</i> sp.	<i>Raja clavata</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
Family Echeneibothriidae				
<i>Echeneibothrium variable</i> Van Beneden, 1850	<i>Raja clavata</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
Family Eutetrarhynchidae				
<i>Tetrarhynchobothrium tenuicolle</i> Diesing, 1850	<i>Raja clavata</i> **	Intestine	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	149
	<i>Squalus acanthias</i> **	Intestine	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	149
Family Lacistorhynchidae				
<i>Grillotia (Grillotia) erinaceus</i> (van Beneden, 1858) Guiart, 1927	<i>Merlangius merlangus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Platichthys flesus</i>	Intestine	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	149
	<i>Raja clavata</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
Family Onchobothriidae				
<i>Acanthobothrium coronatum</i> (Rudolphi, 1819) Blanchard, 1848	<i>Raja clavata</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Squalus acanthias</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
Family Phyllobothriidae				
<i>Yamaguticestus squali</i> (Yamaguti, 1952) Caira, Bueno & Jensen, 2021*	<i>Squalus acanthias</i> **	Intestine	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	149
Family Progrillotiidae				

<i>Progrillotia dasyatidis</i> Beveridge, Neifar & Euzet, 2004	<i>Arnoglossus laterna**</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Chelidonichthys lucerne**</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gaidropsarus mediterraneus</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gaidropsarus mediterraneus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Gobius niger</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gobius niger</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Mesogobius batrachocephalus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Mullus barbatus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Mullus surmuletus</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Mullus surmuletus**</i>	Intestine	Kocaeli coasts (Black Sea)† 41°12'37"N 29°59'56"E	124
	<i>Neogobius melanostomus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Ophidion rochei</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Scorpaena porcus</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Scorpaena porcus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Solea solea**</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Zosteriosessor ophicephalus**</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
Family Tetraphyllidea incertae sedis				
<i>Scolex pleuronectis</i> Müller, 1788	<i>Arnoglossus laterna</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Chelidonichthys lucerne**</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Gaidropsarus mediterraneus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Gobius cruentatus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Gobius niger</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Merlangius merlangus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Mesogobius batrachocephalus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Mullus barbatus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Neogobius melanostomus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Ophidion rochei</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Platichthys flesus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Scorpaena porcus**</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Solea solea</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Spicara flexuosum</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Trachinus draco**</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149

	<i>Trachurus trachurus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
	<i>Zosterisessor ophicephalus</i>	Intestine	Sinop coasts (Black Sea) 41°58'49.9"N 35°11'45.7"E*	149
CLASS MONOGENEA				
Family Ancyrocephalidae				
<i>Ligophorus szidati</i> Euzet & Suriano, 1977	<i>Chelon saliens</i> **	Gills	Sinop coasts (Black Sea)† 42°05'68"N 35°10'55"E	139
Family Diplectanidae				
<i>Diplectanum aequans</i> (Wagener, 1857) Diesing, 1858	<i>Dicentrarchus labrax</i>	Gills	Black Sea 41°29'56.3"N 36°24'17.2"E* Aegean Sea 37°19'52.5"N 27°00'01.6"E	18
Family Mazocraeidae				
<i>Grubea cochlear</i> Diesing, 1858	<i>Scomber japonicus</i> **	Gills	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	6
Family Microcotylidae				
<i>Microcotyle pomatomi</i> Goto, 1899	<i>Pomatomus saltatrix</i>	Gills	Sea of Marmara 40°42'45.6"N 28°33'12.9"E*	122
<i>Solostamenides mugilis</i> (Vogt, 1879) Unnithan, 1971	<i>Chelon saliens</i>	Gills	Sinop coasts (Black Sea) 42°05'68"N 35°10'55"E	139
CLASS TREMATODA				
Family Acanthocephalidae				
<i>Stephanostomum</i> sp.	<i>Pomatomus saltatrix</i> **	Intestine, stomach, pyloric caeca	Sea of Marmara† 40°42'45.6"N 28°33'12.9"E*	122
Family Cryptogonimidae				
<i>Anisocladium fallax</i> (Rudolphi, 1819) Looss, 1902	<i>Uranoscopus scaber</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
<i>Anisocladium gracile</i> (Looss, 1901) Vlasenko, 1931	<i>Uranoscopus scaber</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
<i>Anisocoelium capitellatum</i> (Rudolphi, 1819) Lühe, 1900	<i>Uranoscopus scaber</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
<i>Aphanurus stossichii</i> (Monticelli, 1891) Looss, 1907	<i>Engraulis encrasicolus</i> **	Pharynx and stomach	Sinop coasts (Black Sea)† 41°58'49.9"N 35°11'45.7"E*	150
<i>Metadena pauli</i> Vlasenko, 1931) Yamaguti, 1958	<i>Symphodus ocellatus</i> **	Gills, eyes	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus rossali</i> **	Gills, eyes	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus tinca</i> **	Gills, eyes	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
Family Didymozoidae				
<i>Didymozoon</i> sp.*	<i>Scomber japonicus</i> **	Gills	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	10
	<i>Scomber scombrus</i> **	Gills	Dardanelles Strait (Aegean Sea)† 40°03'04.6"N 26°17'25.8"E*	10
Family Fellodistomidae				
<i>Monascus filiformis</i> (Rudolphi, 1819) Looss, 1907	<i>Mullus surmuletus</i> **	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
<i>Proctoeces maculatus</i> (Looss, 1901) Odhner, 1911*	<i>Symphodus cinereus</i> **	Intestine	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus rossali</i>	Intestine	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus tinca</i> **	Intestine	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	147

<i>Proctotrema bacilliovatum</i> Odhner, 1911	<i>Mullus surmuletus</i>	Intestine	Kocaeli coasts (Black Sea) 41°12'37"N 29°59'56"E	124
Family Gorgoderidae				
<i>Phyllodistomum acceptum</i> Looss, 1901	<i>Parablennius sanguinolentus</i>	urinary bladder	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	69
<i>Phyllodistomum crenilabri</i> Dolgikh & Naidenova, 1968*	<i>Symphodus ocellatus**</i>	Urinary bladder	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	69,147
	<i>Symphodus tinca**</i>	Urinary bladder	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	69,147
<i>Phyllodistomum</i> sp.*	<i>Gobius cruentatus**</i>	Urinary bladder	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	69
Family Haploporidae				
<i>Saccocoelium obesum</i> Looss, 1902	<i>Chelon saliens</i>	Intestine	Sinop coasts (Black Sea)† 42°05'68"N 35°10'55"E	139
<i>Saccocoelium tensus</i> Looss, 1902	<i>Chelon saliens</i>	Intestine	Sinop coasts (Black Sea)† 42°05'68"N 35°10'55"E	139
Family Haplospilichnidae				
<i>Schikhobalotrema sparismae</i> (Manter, 1938) Skrjabin & Guschanskaja, 1955	<i>Chelon saliens</i>	Intestine	Sinop coasts (Black Sea)† 42°05'68"N 35°10'55"E	139
Family Heterophyidae				
<i>Condylcotyla pilodora</i> Pearson & Prévot, 1985*	<i>Symphodus cinereus**</i>	Brain	Sinop coasts (Black Sea)† 42°01' 55' N, 35°16' 36' E	147
<i>Galactosomum lacteum</i> (Jägerskiöld, 1896) Looss, 1899	<i>Symphodus tinca**</i>	Gills	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
Family Lepocreadiidae				
<i>Prodistomum polonii</i> (Molin, 1859) Bray & Gibson, 1990	<i>Trachurus mediterraneus**</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
Family Opecoelidae				
<i>Gaevskajatrema perezii</i> (Mathias, 1926) Gibson & Bray, 1982	<i>Symphodus cinereus**</i>	Intestine	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus rossali**</i>	Intestine	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus tinca</i>	Intestine	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
<i>Helicometra fasciata</i> (Rudolphi, 1819) Odhner, 1902	<i>Alosa immaculata**</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Gobius niger</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Platichthys flesus**</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Scorpaena porcus</i>	Not reported	Şile coasts (Black Sea) 41°10'52.0"N 29°36'41.9"E*	13
	<i>Solea solea</i> (Syn: <i>Solea vulgaris</i>)**	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Symphodus rossali**</i>	Intestine	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus tinca</i>	Intestine	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
<i>Helicometra insolita</i> Polyanski, 1955	<i>Solea solea</i> (Syn: <i>Solea vulgaris</i>)**	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
	<i>Symphodus tinca</i>	Not reported	Şile coasts (Black Sea)† 41°10'52.0"N 29°36'41.9"E*	13
Opecoelidae gen. sp.	<i>Symphodus rossali**</i>	Gills	Sinop coasts (Black Sea) 42°01' 55' N, 35°16' 36' E	147
	<i>Symphodus tinca**</i>	Gills	Sinop coasts (Black Sea)	147

Note: †indicates discovery for science; *indicates previously not reported parasite record; **indicates previously not reported host record; ‡indicates new locality record; ‡indicates coordinates not mentioned in published paper and provided by author from Google maps).

Table 2. Parasites, hosts, microhabitats, geographical localities, notes for the occurrence of parasites, and references in wild freshwater fishes in Türkiye since 2020

Parasite species	Fish species	Microhabitat	Geographical locality	References
CLASS ACANTHOCEPHALA				
Family Neoechinorhynchidae				
<i>Neoechinorhynchus (Neoechinorhynchus) rutili</i> (Müller, 1780) Hamann in Stiles & Hassall, 1905	<i>Capoeta trutta</i>	Not reported	Kumlutarla, Taranbükü and Gemici regions (Karakaya Dam) Lake 38°42'57.2"N 38°29'38.0"E*	66
	<i>Capoeta trutta</i>	Not reported	Fırat River (Karakaya Dam Lake) 38°43'05.1"N 38°28'39.0"E*	27
	<i>Capoeta trutta</i>	Intestine	Koçkale (Keban Dam Lake) 38°36'27.6"N 39°27'44.3"E*	76
CLASS PALAEACANTHOCEPHALA				
Family Pomphorhynchidae				
<i>Pomphorhynchus spindletuncatus</i> Amin, Abdullah & Mhaisen, 2003	<i>Capoeta pestai</i>	Not reported	Sarıöz Stream (Beyşehir-Konya) 37°44'08.1"N 31°45'22.8"E*	54
PHYLUM ANNELIDA				
CLASS CLITELLATA				
Family Piscicolidae				
<i>Piscicola geometra</i> (Linnaeus, 1761)	<i>Mastacembelus mastacembelus</i> **	Skin	Tigris River – Bismil† 37°50'02.94"N,40°41'52.10"E Tigris River – Lice† 38°22'5052"N,40°41'02.56"E	91
PHYLUM ARTHROPODA				
CLASS ICHTHOSTRACA				
Family Argulidae				
<i>Argulus foliaceus</i> (Linnaeus, 1758)	<i>Mastacembelus mastacembelus</i>	Gills, opercula, skin	Euphrates River (Keban Dam) 38°51' 35.57" N,38° 56'01.87"E	91
	<i>Alburnus escherichii</i> **	Gills, fins, skin	Kunduzlar Dam Lake (Eskişehir)† 39°20'30"N 30°32'25"E	145
	<i>Barbus plebejus</i> **	Gills, fins, skin	Kunduzlar Dam Lake (Eskişehir)† 39°20'30"N 30°32'25"E	145
	<i>Capoeta tinca</i> **	Gills, fins, skin	Kunduzlar Dam Lake (Eskişehir)† 39°20'30"N 30°32'25"E	145
	<i>Carassius gibelio</i>	Gills, fins, skin	Kunduzlar Dam Lake (Eskişehir)† 39°20'30"N 30°32'25"E	145
	<i>Cyprinus carpio</i>	Gills, fins, skin	Kunduzlar Dam Lake (Eskişehir)† 39°20'30"N 30°32'25"E	145
	<i>Squalius cephalus</i>	Gills, fins, skin	Kunduzlar Dam Lake (Eskişehir)† 39°20'30"N 30°32'25"E	145
CLASS COPEPODA				
Family Ergasilidae				
<i>Ergasilus sieboldi</i> Nordmann, 1832	<i>Cyprinion macrostomum</i> **	Not reported	Murat River 39°21'21.5"N 30°33'33.9"E*	90
	<i>Mastacembelus mastacembelus</i> **	Gills	Euphrates River (Keban Dam)† 38°51' 35.57" N,38° 56'01.87"E	91
	<i>Squalius</i>	Not reported	Murat River	90

	<i>cephalus**</i>		39°21'21.5"N 30°33'33.9"E*	
Family Lernaeidae				
<i>Lamproglena pulchella</i> Nordmann, 1832	<i>Barbus lacerta</i>	Gills	Uzuncayır Dam Lake (Tunceli)† 39°21'21.5"N 30°33'33.9"E*	78
	<i>Capoeta umbla**</i>	Not reported	Murat River 39°21'21.5"N 30°33'33.9"E*	90
	<i>Chondrostoma regium</i>	Not reported	Murat River 39°21'21.5"N 30°33'33.9"E*	90
	<i>Squalius cephalus**</i>	Not reported	Murat River 39°21'21.5"N 30°33'33.9"E*	90
Family Lernaeopodidae				
<i>Lernaea cyprinacea cyprinacea</i> Linnaeus, 1758 (Syn: <i>Lernaea cyprinacea</i> Linnaeus, 1758)	<i>Alburnus baliki</i>	Skin, fins	Karpuzçay Creek (Antalya)† 36°46'56.84"N 31°30'00.95"E	73
	<i>Pomatoschistus anatoliae**</i>	Skin, fins	Karpuzçay Creek (Antalya)† 36°46'56.84"N 31°30'00.95"E	73
	<i>Chelon ramada</i>	Skin, fins	Karpuzçay Creek (Antalya)† 36°46'56.84"N 31°30'00.95"E	73
	<i>Lepomis gibbosus</i>	Fins, mesentery	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E Dipsiz-Çine Stream† 37°45'49.99"N 27°50'0.99"E	105
PHYLUM CILIOPHORA				
CLASS OLIGOHYMENOPHOREA				
Family Epistylididae				
<i>Apiosoma</i> sp.	<i>Alburnus derjugini**</i>	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
<i>Vorticella</i> sp.	<i>Alburnus derjugini**</i>	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
Family Ichthyophthiriidae				
<i>Ichthyophthirius multifiliis</i> Fouquet, 1876	<i>Capoeta umbla**</i>	Not reported	Murat River† 39°21'21.5"N 30°33'33.9"E*	90
	<i>Chondrostoma regium**</i>	Not reported	Murat River† 39°21'21.5"N 30°33'33.9"E*	90
	<i>Cyprinion macrostomum**</i>	Not reported	Murat River† 39°21'21.5"N 30°33'33.9"E*	90
	<i>Mastacembelus mastacembelus**</i>	Gills	Tigris River – Bismil† 37°50'02.94"N,40°41'52.10"E Tigris River – Lice† 38°22'50.52"N,40°41'02.56"E Euphrates River (Keban Dam)† 38°51' 35.57" N,38° 56'01.87"E	91
	<i>Silurus glanis**</i>	Skin, gills	Bursa† 40°12'02.2"N 29°04'08.5"E*	142
	<i>Squalius cephalus**</i>	Not reported	Murat River† 39°21'21.5"N 30°33'33.9"E*	90
Family Trichodinidae				
<i>Trichodina</i> sp.	<i>Alburnus derjugini**</i>	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
	<i>Carassius gibelio**</i>	Gills	Onaç Reservoir (Burdur)† 37°30'22.17"N 30°34'31.71"E	194
	<i>Chondrostoma regium**</i>	Not reported	Murat River† 39°21'21.5"N 30°33'33.9"E*	90
	<i>Squalius cephalus</i>	Not reported	Murat River† 39°21'21.5"N 30°33'33.9"E*	90
	<i>Cyprinus carpio</i>	Gills	Hirfanlı Dam Lake 39°10'59.3"N 33°36'43.8"E*	43
CLASS PHYLLOPHARYNGEA				
Family Chilodonellidae				

<i>Chilodonella piscicola</i> (Zacharias, 1894) Jankovskij, 1980 (Syn: <i>Chilodonella cyprini</i> (Moroff, 1902) Strand, 1928)	<i>Alburnus derjugini</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
PHYLUM CNIDARIA				
CLASS MYXOZOA				
Family Myxobolidae				
<i>Myxobolus anatolicus</i> Pekmezci, Yardimci, Yilmaz & Polat, 2014	<i>Capoeta tinca</i> **	Gills	9 localities in Samsun (Kızılırmak River, Mert River, Akçay Stream, Kürtün Stream, Kavak Stream, Tersakan Stream, Hasan Uğurlu Dam Lake, Suat Uğurlu Dam Lake, Lâdik Lake)† 40°50'- 41°51'N, 37°08'- 34°25'E	155
<i>Myxobolus arrabonensis</i> Cech, Borzák, Molnár & Székely, 2015*	<i>Chondrostoma angorense</i> **	Gills	Lake Ladik (Samsun)† 40°54'30.38"N 36°0'20.89"E	154
<i>Myxobolus cakmaki</i> Pekmezci, Yardimci, Bolukbas, Yilmaz & Polat, 2021*,‡	<i>Capoeta tinca</i> **	Gills	Kavak stream (Samsun)† 41°03'02.5" N, 35°57'03.9" E Akçay stream (Samsun) 41°06'47.3" N, 37°08'59.3" E	155
<i>Myxobolus cyprini</i> Doflein, 1898*	<i>Capoeta trutta</i> **	Pectoral fins, Skeletal muscle	Uzuncayır Dam Lake (Tunceli)† 39°21'21.5"N 30°33'33.9"E*	78
<i>Myxobolus dechtiari</i> Cone & Anderson, 1977*	<i>Lepomis gibbosus</i> **	Gills	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E	105
<i>Myxobolus ekingeni</i> Pekmezci, Yardimci, Bolukbas, Yilmaz & Polat, 2021*,‡	<i>Capoeta tinca</i> **	Gills	Lâdik Lake (Samsun)† 40°54'29.9" N, 36°00'34.9" E Engiz stream (Samsun)† 41°26'53.9" N, 36°01'32.0" E	155
<i>Myxobolus karaeri</i> Pekmezci, Yardimci, Bolukbas, Yilmaz & Polat, 2021*,‡	<i>Capoeta tinca</i> **	Fins, gills, skin, operculum	Engiz stream (Samsun)† 41°26'53.9" N, 36°01'32.0" E Istavloz Stream, Eser Stream, Derbent Dam Lake, Suat Uğurlu Dam Lake in Samsun† 40°50'- 41°51'N, 37°08'- 34°25'E	155
<i>Myxobolus polati</i> Pekmezci, Atkinson, Yardimci, Bolukbas, Ozpicak & Yilmaz, 2021*,‡	<i>Chondrostoma angorense</i> **	Gills	Lake Ladik (Samsun)† 40°54'30.38"N 36°0'20.89"E	154
<i>Myxobolus samsunensis</i> Pekmezci, Yardimci, Bolukbas, Yilmaz & Polat, 2021*,‡	<i>Capoeta tinca</i> **	Gills	Akçay stream (Samsun)† 41°06'47.3" N, 37°08'59.3" E Kızılırmak River, Mert River, Kürtün Stream, Kavak Stream, Tersakan Stream, İlyaslı Stream, Yakakent Stream, Küplüağzı Stream, Taşgelik Stream, Derbent Dam Lake, Lâdik Lake in Samsun† 40°50'- 41°51'N, 37°08'- 34°25'E	155
<i>Myxobolus</i> sp.	<i>Cyprinus carpio</i>	Kidney	Hirfanlı Dam Lake 39°10'59.3"N 33°36'43.8"E*	43
	<i>Squalius cephalus</i> **	Gills	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
	<i>Squalius cephalus</i> **	Kidney	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
PHYLUM MOLLUSCA				
CLASS BIVALVIA				
Family Unionidae				
<i>Unio pictorum</i> (Linnaeus, 1758)*	<i>Mastacembelus mastacembelus</i> **	Gills	Tigris River – Bismil† 37°50'02.94"N, 40°41'52.10"E	91

			Tigris River – Lice† 38°22'50.52"N, 40°41'02.56"E Euphrates River (Keban Dam)† 38°51' 35.57" N, 38° 56'01.87"E Murat River – Genç† 38°44'30.81"N, 40°31'06.62"E	
<i>Unio crassus</i> Philipsson, 1788 (Syn: <i>Unio stevenianus</i> Stepanov, 1870)*	<i>Capoeta kosswigi**</i>	Gills and fins	Karasu River (Van)† 38°36'25" N, 43°14'38" E	14
PHYLUM MYZOOZOA				
CLASS CONOIDASIDA				
Family Eimeriidae				
<i>Eimeria</i> sp.	<i>Cyprinus carpio</i>	Intestine	Hirfanlı Dam Lake 39°10'59.3"N 33°36'43.8"E*	43
PHYLUM NEMATODA				
CLASS CHROMADOREA				
Family Acuariidae				
Acuariidae gen. sp.*	<i>Lepomis gibbosus**</i>	Intestine wall, mesentery	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E	105
Family Anisakidae				
<i>Contracaecum rudolphii</i> Hartwich, 1964	<i>Carassius gibelio**</i>	Pancreas, fibrous connective tissue and its mesentery	Karataş Lake (Burdur)† 37°23'13.4"N 29°58'19.5"E*	71
	<i>Chondrostoma angoranse**</i>	Body cavity	Susurluk stream (Bursa)† 39°48'973"N, 280 10' 714"E	24
	<i>Oxynoemacheilus angorae**</i>	Body cavity	Nilüfer Stream (Bursa)† 40°10'44.8"N, 28°58'13.0"E	24
	<i>Oxynoemacheilus simavicus**</i>	Body cavity	Nilüfer Stream (Bursa)† 40°10'44.8"N, 28°58'13.0"E	24
<i>Contracaecum</i> sp.	<i>Pseudophoxinus antalyae**</i>	Not reported	Kırkgöz Resources (Antalya)† 37°06'37.3"N 30°34'50.2"E*	86
	<i>Lepomis gibbosus**</i>	Mesentery	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E Dipsiz-Çine Stream† 37°45'49.99"N 27°50'0.99"E	105
Family Camallanidae				
<i>Procamallanus viviparus</i> Ali, 1956*	<i>Mastacembelus mastacembelus**</i>	Intestine	Tigris River – Bismil† 37°50'02.94"N, 40°41'52.10"E Tigris River – Lice† 38°22'50.52"N, 40°41'02.56"E	91
Family Quimperiidae				
<i>Paraquimperia tenerrima</i> (von Linstow, 1878) Baylis, 1934*	<i>Lepomis gibbosus**</i>	Mesentery	Sarıçay River† 37°18'57.99"N 27°42'24.00"E	105
Family Rhabdochonidae				
<i>Rhabdochona denudata</i> (Dujardin, 1845) Railliet, 1916	<i>Capoetta tinca**</i>	Not reported	Devres stream (Çankırı)† 40°48'01"N 33°19'06"E	44
	<i>Squalius cephalus</i>	Not reported	Terme stream (Çankırı) 40°24'1"N 33°40'22"E	44
	<i>Mastacembelus mastacembelus**</i>	Intestine	Tigris River – Bismil† 37°50'02.94"N, 40°41'52.10"E Tigris River – Lice† 38°22'50.52"N, 40°41'02.56"E Euphrates River (Keban Dam)† 38°51' 35.57" N, 38° 56'01.87"E Murat River – Genç† 38°44'30.81"N, 40°31'06.62"E	91
	<i>Pseudophoxinus antalyae**</i>	Not reported	Kırkgöz Resources (Antalya)† 37°06'37.3"N 30°34'50.2"E*	86

	<i>Squalius cephalus</i>	Stomach-intestine	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
<i>Rhabdochona fortunatowi</i> Dinnik, 1933*	<i>Capoeta damascina**</i>	Intestine	Fırnız Stream (K. Maraş)† 37°45'29.0"N 36°39'32.0"E* Göksu River (Antalya)† 36°52'46.8"N 30°36'58.1"E*	22
	<i>Capoeta caelestis**</i>	Intestine	Fırnız Stream (K. Maraş)† 37°45'29.0"N 36°39'32.0"E* Göksu River (Antalya)† 36°52'46.8"N 30°36'58.1"E*	22
	<i>Capoeta tinca**</i>	Intestine	Nilüfer stream (Bursa)† 40°10'44.8"N 28°58'13.0" E	19
<i>Rhabdochona gnedini</i> Skrjabin, 1948*	<i>Alburnus sp.**</i>	Not reported	Seydiköy Dam Lake (Çankırı)† 40°34'23"N 33°27'33"E	44
	<i>Capoetta tinca**</i>	Not reported	Devres stream (Çankırı)† 40°48'01"N 33°19'06"E	44
	<i>Squalius cephalus**</i>	Not reported	Terme stream (Çankırı)† 40°24'1"N 33°40'22"E	44
<i>Rhabdochona sp.</i>	<i>Cyprinus carpio**</i>	Not reported	Seydiköy Dam Lake (Çankırı)† 40°34'23"N 33°27'33"E	44
	<i>Capoeta pestai**</i>	Not reported	Sarıöz Stream (Beyşehir-Konya)† 37°44'08.1"N 31°45'22.8"E*	54
Nematoda gen. sp.	<i>Lepomis gibbosus</i>	Liver	Dipsiz-Çine Stream 37°45'49.99"N 27°50'0.99"E	105
CLASS ENOPLA				
Family Capillariidae				
<i>Pseudocapillaria (Pseudocapillaria) tomentosa</i> (Dujardin, 1843) Lomakin & Trofimenko, 1982	<i>Cyprinus carpio</i>	Not reported	Alpsarı Pond (Çankırı)† 40°40'80"N 33°30'31"E	44
Family Dioctophymidae				
<i>Eustrongylides excisus</i> Jägerskiöld, 1909	<i>Aphanius iconii**</i>	Abdominal cavity, muscle	Lake Eğirdir (Isparta) 38°15'N 30°52'E	144
	<i>Atherina boyeri</i>	Abdominal cavity, muscle	Lake Eğirdir (Isparta) 38°15'N 30°52'E	144
	<i>Knipowitschia caucasica**</i>	Abdominal cavity, muscle	Lake Eğirdir (Isparta) 38°15'N 30°52'E	144
	<i>Sander lucioperca</i>	Abdominal cavity, muscle	Lake Eğirdir (Isparta) 38°15'N 30°52'E	144
	<i>Sander lucioperca</i>	Not reported	Derbent Dam Lake (Samsun)† 41°25'6"N, 35°49'52"E	153
	<i>Sander lucioperca</i>	Peritoneal cavity	Lake Eğirdir (Isparta) 37°50'-38°16'N 30°57'-30°44'E	146
	<i>Silurus glanis**</i>	Body cavity	Susurluk stream (Bursa)† 39°48'973"N, 280 10' 714"E	24
<i>Eustrongylides sp.</i>	<i>Lepomis gibbosus**</i>	Mesentery	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E Davuldere Reservoir† 40°54'25.86"N 30°2'21.29"E Dipsiz-Çine Stream† 37°45'49.99"N 27°50'0.99"E Sarıçay River† 37°18'57.99"N 27°42'24.00"E	105
PHYLUM PLATYHELMINTHES				
CLASS CESTODA				
Family Bothriocephalidae				
<i>Schyzocotyle acheilognathi</i> (Yamaguti, 1934) Brabec, Waeschenbach, Scholz, Littlewood & Kuchta, 2015 (Syn: <i>Bothriocephalus acheilognathi</i>	<i>Pseudophoxinus antalyae**</i>	Not reported	Kırkgöz Resources (Antalya)† 37°06'37.3"N 30°34'50.2"E*	86

Yamaguti, 1934)				
<i>Senga magna</i> (Zmееv, 1936) Protasova, 1977 (Syn: <i>Polyonchobothrium magnum</i> (Zmееv, 1936))	<i>Mastacembelus mastacembelus**</i>	Intestine	Tigris River – Bismil† 37°50'02.94"N,40°41'52.10"E Tigris River – Lice† 38°22'5052"N,40°41'02.56"E Euphrates River (Keban Dam)† 38°51' 35.57" N,38° 56'01.87"E	91
Family Diphyllbothriidae				
<i>Ligula intestinalis</i> (Linnaeus, 1758) Gmelin, 1790	<i>Atherina boyeri**</i>	Body cavity	Hirfanlı Dam Lake (Kırşehir) 39°17'04.3"N 33°32'00.6"E*	33
	<i>Pseudorasbora parva**</i>	Not reported	Hirfanlı Dam Lake (Kırşehir) 39°17'04.3"N 33°32'00.6"E*	34
	<i>Acanthobrama marmid</i>	Abdominal cavity	Keban Dam Lake (Elazığ) 38°50'39"N 39°14'24"	85
	<i>Alburnus derjugini**</i>	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
	<i>Alburnus derjugini x Squalius orientalis hybrid**</i>	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°39'50.7"N 39°08'19.5"E*	74
	<i>Alburnus sellal**</i>	Not reported	Upper Tigres River (7 localities between† 38° 01'48"N 40° 15'14"E 37° 40'56"N 44° 04'22"E	25
	<i>Barbus lacerta**</i>	Abdominal cavity	Nemrut Crater Lake† 38°37'24.7"N 42°13'15.2"E*	136
	<i>Tinca tinca</i>	Not reported	Not reported	165
<i>Ligula</i> sp.	<i>Ladigesocypris irideus**</i>	Body cavity	Ula pond (Muğla)† 37°07'N 28°23'E	49
<i>Schistocephalus solidus</i> (Müller, 1776) Steenstrup, 1857*	<i>Gasterosteus aculeatus**</i>	Abdominal cavity	Gökpinar Spring (Dalaman River basin)† 37°20'37.3"N, 29°26'38.3"E	65
Family Lytocestidae				
<i>Khawia sinensis</i> Hsü, 1935	<i>Acanthobrama marmid**</i>	Not reported	Kumlutarla region (Karakaya Dam Lake) 38°42'57.2"N 38°29'38.0"E*	66
	<i>Alburnus mossulensis**</i>	Not reported	Kumlutarla region (Karakaya Dam Lake) 38°42'57.2"N 38°29'38.0"E*	66
CLASS MONOGENEA				
Family Ancylo-discoididae				
<i>Thaparocleidus vistulensis</i> (Sivak, 1932) Lim, 1996 (Syn: <i>Ancylo-discoides vistulensis</i> (Sivak, 1932) Yamaguti, 1963)	<i>Silurus glanis</i>	Gills	Susurluk stream (Bursa)† 39°48'973"N, 280 10' 714"E	24
Family Ancyrocephalidae				
<i>Mastacembelocleidus heteranchorus</i> (Kulkarni, 1969) Kritsky, Pandey, Agrawal & Abdullah, 2004	<i>Mastacembelus mastacembelus</i>	Gills	Tigris River – Bismil 37°50'02.94"N,40°41'52.10"E Tigris River – Lice 38°22'5052"N,40°41'02.56"E Euphrates River (Keban Dam) 38°51' 35.57" N,38° 56'01.87"E	91
<i>Onchocleidus dispar</i> Mueller, 1936*	<i>Lepomis gibbosus**</i>	Gills	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E Davuldere Reservoir† 40°54'25.86"N 30°2'21.29"E	105
Family Dactylogyridae				
<i>Dactylogyryus carpathicus</i> Zakhvatkin, 1951	<i>Barbus oligolepis**</i>	Gills	Susurluk Stream (Balıkesir)† 39°48'973"N, 28°10'14" E	20
<i>Dactylogyryus folkmanovae</i> Ergens, 1956	<i>Squalius fellowesii**</i>	Gills	Kocaalan stream† 36°57' 12.00" N, 28°17' 13.00" E	32

	<i>Squalius orpheus</i> **	Gills	Büyükdoğanca, Söğütlü Creek, Evros basin† 40°46' 07.00'' N, 26°34' 54.00'' E	32
	<i>Squalius pursakensis</i> **	Gills	Seidy Stream, Seyitgazi, Sakarya basin† 39°21' 27.50'' N, 30°35' 37.00'' E	32
	<i>Squalius pursakensis</i> **	Gills	Porsuk River, Kütahya† 39°22' 48.80'' N, 30°03' 58.90'' E	32
<i>Dactylogyrus nanoides</i> Gusev, 1966*	<i>Squalius Orpheus</i> **	Gills	Büyükdoğanca, Söğütlü Creek, Evros basin† 40°46' 07.00'' N, 26°34' 54.00'' E	32
<i>Dactylogyrus nanus</i> Dogiel & Bychowsky, 1934	<i>Squalius cephalus</i>	Gills	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
<i>Dactylogyrus naviculoides</i> Ergens, 1960	<i>Squalius recurvirostris</i> **	Gills	Düzağaç-Akdeğirmen Dam Lake (Afyonkarahisar)† 38°48'32.3"N 30°15'03.6"E	53
	<i>Squalius pursakensis</i> **	Gills	Porsuk River, Kütahya† 39°22' 48.80'' N, 30°03' 58.90'' E	32
<i>Dactylogyrus pulcher</i> Bychowsky, 1957	<i>Capoeta tinca</i>	Gills	Nilüfer stream (Bursa) 40°10'44.8"N 28°58'13.0" E	19
<i>Dactylogyrus vistulae</i> Prost, 1957	<i>Squalius orpheus</i> **	Gills	Büyükdoğanca, Söğütlü Creek, Evros basin† 40°46' 07.00'' N, 26°34' 54.00'' E	32
	<i>Squalius pursakensis</i> **	Gills	Porsuk River, Kütahya† 39°22' 48.80'' N, 30°03' 58.90'' E	32
	<i>Squalius recurvirostris</i> **	Gills	Düzağaç-Akdeğirmen Dam Lake (Afyonkarahisar)† 38°48'32.3"N 30°15'03.6"E	53
<i>Dactylogyrus</i> sp.	<i>Alburnus tarichi</i> **	Gills	Lake Van, River Karasu† 38°40'48.6"N 42°59'38.6"E*	57
	<i>Pseudophoxinus antalyae</i>	Not reported	Kırkgöz Resources (Antalya)† 37°06'37.3"N 30°34'50.2"E*	86
	<i>Cyprinus carpio</i>	Gills	Hirfanlı Dam Lake 39°10'59.3"N 33°36'43.8"E*	43
<i>Dactylogyrus turcicus</i> Aydoğdu, Molnar, Emre & Emre, 2014	<i>Capoeta pestai</i> **	Not reported	Sarıöz Stream (Beyşehir-Konya)† 37°44'08.1"N 31°45'22.8"E*	54
Family Gyrodactylidae				
<i>Gyrodactylus sprostonae</i> Ling, 1962*	<i>Carassius gibelio</i> **	Gills	Onaç Reservoir (Burdur)† 37°30'22.17"N 30°34'31.71"E	194
<i>Gyrodactylus</i> sp.	<i>Alburnus derjugini</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
Family Diplozoidae				
<i>Diplozoon paradoxum</i> von Nordmann, 1832	<i>Cyprinus carpio</i>	Gills	Several localities in Elazığ† 38°37'38.3"N 39°25'27.0"E*	77
<i>Diplozoon</i> sp.	<i>Mastacembelus mastacembelus</i> **	Gills	Tigris River – Bismil† 37°50'02.94"N,40°41'52.10"E Tigris River – Lice† 38°22'50.52"N,40°41'02.56"E Euphrates River (Keban Dam)† 38°51' 35.57" N,38° 56'01.87"E Murat River – Genç† 38°44'30.81"N,40°31'06.62"E	91
<i>Paradiplozoon bingolense</i> Cívánová, Koyun & Koubková,	<i>Cyprinion kais</i> **	Gills	Sinanköy, Akçayır stream (inflow of Batman River), Tigris basin†	117

2013			37°51'56"N 40°59'21"E	
	<i>Garra rufa</i>	Gills	Göynük Stream (Bingöl)† 38°45'41.4"N 40°32'45.2"E*	92
Paradiplozoon bliccae (Reichenbach-Klinke, 1961)	<i>Barbus xanthos**</i>	Gills	Kamışdere stream (Yatağan)† 37°20'30"N 28°06'55"E	117
	<i>Capoeta aydinensis**</i>	Gills	Lake Köyceğiz (Muğla)† 36°55'17.4"N 28°39'59.9"E Kamışdere stream (Yatağan)† 37°20'30"N 28°06'55"E	117
	<i>Ladigesocypris ghigii**</i>	Gills	Kocaalan Stream† 36°57'12"N 28°17'13"E	117
	<i>Luciobarbus kottelatti***</i>	Gills	Kamışdere stream (Yatağan)† 37°20'30"N 28°06'55"E	117
	<i>Petroleuciscus ninae**</i>	Gills	Kamışdere stream (Yatağan)† 37°20'30"N 28°06'55"E Kayırlı Stream (Yatağan)† 37°24'36"N 28°06'49"E	117
	<i>Squalius fellowesii**</i>	Gills	Kamışdere stream (Yatağan)† 37°20'30"N 28°06'55"E Kocaalan stream† 36°57'12"N 28°17'13"E	117
	<i>Vimba mirabilis**</i>	Gills	Çine River (Çiftlikköy)† 37°45'48"N 27°50'03"E	117
	<i>Vimba vimba**</i>	Gills	Çifteler (Eskişehir)† 39°20'40"N 31°18'45"E	117
	<i>Vimba vimba**</i>	Gills	Lake Köyceğiz (Muğla)† 36°55'17.4"N 28°39'59.9"E*	56
Paradiplozoon homoion (Bychowsky & Nagibina, 1959)	<i>Acanthobrama microlepis**</i>	Gills	Ölçek, Ölçeksuyu, Kura basin† 41°08'01"N 42°51'22"E Aralık, Aras, Kura basin† 39°54'26"N 44°30'28"E	117
	<i>Alburnoides eichwaldii**</i>	Gills	Yiğitkonağı, Çakır, Kura basin† 40°58'01"N 42°35'16"E Ardahan, Kura basin 41°06'57"N 42°42'02"E	117
	<i>Alburnoides emineae**</i>	Gills	Taşlıburç, Çağ-Çağ stream, Euphrates basin† 37°11'56"N 41°18'28"	117
	<i>Alburnoides kosswigi**</i>	Gills	Porsuk Tibet† 39°46'06"N 30°28'52"E	117
	<i>Alburnoides manyasensis**</i>	Gills	Nilüfer stream (Bursa)† 40°15'45.5"N 28°46'45.5"E*	21
	<i>Alburnus carianorum**</i>	Gills	Çine River (Çiftlikköy)† 37°45'48"N 27°50'03"E	117
	<i>Alburnus escherichii**</i>	Gills	Barakfakih, Kurutma canal, Nilüfer† 40°13'27"N 29°18'56"E Kütahya† 39°22'49"N 30°03'59"E Porsuk Tibet† 39°46'06"N 30°28'52"E	117
	<i>Alburnus filippii**</i>	Gills	Ardahan, Kura basin† 41°06'57"N 42°42'02"E	117
	<i>Alburnus hohenackeri**</i>	Gills	Aralık, Aras, Kura basin†	117
	<i>Alburnus timarensis**</i>	Gills	Otluca, Kasımoğlu, Karasu stream, Lake Van† 38°41'25"N 43°23'53"E	117
	<i>Barbus oligolepis**</i>	Gills	Susurluk Stream (Balıkesir)† 39°48'973"N, 28°10'14" E	20
	<i>Barbus oligolepis**</i>	Gills	Barakfakih, Kurutma Canal, Nilüfer† 40°13'27"N 29°18'56"E	117
	<i>Barbus tauricus**</i>	Gills	İyidere, İyidere basin† 40°57'39"N 40°22'26"E	117

	<i>Capoeta damascina</i> **	Gills	Otluca, Kasımoğlu, Karasu stream, Lake Van† 38°41'25"N 43°23'53"E	117
	<i>Capoeta tinca</i> **	Gills	Nilüfer stream (Bursa)† 40°10'44.8"N 28°58'13.0" E	19
	<i>Garra variabilis</i> **	Gills	Darköprü, Çelebyian stream, Tigris basin† 38°08'02"N 40°49'15"Eburç	117
	<i>Petroleuciscus borysthenicus</i> **	Gills	Barakfakih, Kurutma canal, Nilüfer† 40°13'27"N 29°18'56"E	117
	<i>Pseudophoxinus antalyae</i>	Not reported	Kırgöz Resources (Antalya) 37°06'37.3"N 30°34'50.2"E*	86
	<i>Squalius agdamicus</i> **	Gills	Ardahan Kura basin† 41°06'57"N 42°42'02"E	117
	<i>Squalius cii</i> **	Gills	Barakfakih, Kurutma canal, Nilüfer† 40°13'27"N 29°18'56"E Inflow to the Sapanca Lake 40°41'54"N 30°14'48"E	117
	<i>Squalius pursakensis</i> **	Gills	Porsuk Tibet† 39°46'06"N 30°28'52"E	117
	<i>Chondrostoma angoranse</i> **	Gills	Susurluk stream (Bursa)† 39°48'973"N, 280 10' 714"E	24
<i>Paradiplozoon koubkovae</i> Řehulková, Nejat & Benovics in Nejat, Benovics, Řehulková, Vukić, Šanda, Kaya, Tarkan, Abdol, Aksu & Šimková, 2023*,‡	<i>Capoeta capoeta</i> **	Gills	Aralık, Aras, Kura basin† 39°54'26"N 44°30'28"E	117
<i>Paradiplozoon</i> sp.	<i>Capoeta pestai</i> **	Not reported	Sarıöz Stream (Beyşehir-Konya)† 37°44'08.1"N, 31°45'22.8"E*	54
	<i>Alburnus derjugini</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E	84
CLASS TREMATODA				
Family Allocreadiidae				
<i>Allocreadium bursensis</i> Aydoğdu, Vainutis, Voronova & Aydoğdu, 2023*,‡	<i>Oxynoemacheilus angorae</i> **	Intestine	Nilüfer stream (Bursa)† 40°10'44.8"N, 28°58'13.0"E	23
<i>Allocreadium isoporum</i> (Looss, 1894) Looss, 1902	<i>Capoeta pestai</i> **	Not reported	Sarıöz Stream (Beyşehir-Konya)† 37°44'08.1"N 31°45'22.8"E*	54
	<i>Capoeta tinca</i> **	Intestine	Nilüfer stream (Bursa)† 40°10'44.8"N 28°58'13.0" E	19
Family Clinostomidae				
<i>Clinostomum complanatum</i> (Rudolphi, 1814) Braun, 1899	<i>Squalius cephalus</i> **	Operculum, mandible, muscle	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
	<i>Chondrostoma angoranse</i> **	Not reported	Susurluk stream (Bursa)† 39°48'973"N, 280 10' 714"E	24
Family Diplostomidae				
<i>Diplostomum spathaceum</i> (Rudolphi, 1819) Olsson, 1876	<i>Chondrostoma regium</i> **	Eyes	Fırat River 39°35'04.0"N 39°54'30.5"E*	26
	<i>Mastacembelus mastacembelus</i>	Eyes	Tigris River – Bismil 37°50'02.94"N, 40°41'52.10"E Tigris River – Lice 38°22'5052"N, 40°41'02.56"E Euphrates River (Keban Dam) 38°51'35.57"N, 38°56'01.87"E Murat River – Genç 38°44'30.81"N, 40°31'06.62"E	91
	<i>Capoeta umbla</i> **	Eye	Dicle River 38°20'44.33"N, 39°41'34.48"E	28,29

			Uzunçayır Dam Lake 39°1'23.47"N, 39°30'28.45"E	
	<i>Cyprinus carpio</i>	Eye	Dicle River 38°20'44.33"N, 39°41'34.48"E Keban Dam Lake 38°37'26.64"N, 39°28'6.24"E Karakaya Dam lake† 38°25'5.94"N, 38°42'10.27"E Hazar Lake† 38°28'51.04"N, 39°24'38.12"E Uzunçayır Dam Lake† 39°1'23.47"N, 39°30'28.45"E	28
<i>Diplostomum</i> sp.	<i>Acanthobrama marmid</i>	Eye	Kumlutarla, Taranbükü, Gemici regions of Karakaya Dam Lake† 38°42'57.2"N 38°29'38.0"E*	66
	<i>Alburnus mossulensis</i>	Eye	Kumlutarla, Taranbükü, Gemici regions of Karakaya Dam Lake† 38°42'57.2"N 38°29'38.0"E*	66
	<i>Capoeta trutta</i>	Eye	Kumlutarla, Taranbükü, Gemici regions of Karakaya Dam Lake† 38°42'57.2"N 38°29'38.0"E*	66
	<i>Cyprinus carpio</i>	Eyes	Hirfanlı Dam Lake 39°10'59.3"N 33°36'43.8"E*	43
	<i>Capoeta umbla</i>	Eyes	Murat Nehri, Göynük stream (Bingöl)† 38°45'41.4"N 40°32'45.2"E*	89
	<i>Chondrostoma regium</i>	Eyes	Murat Nehri, Göynük stream (Bingöl)† 38°45'41.4"N 40°32'45.2"E*	89
	<i>Cyprinion macrostomum</i> **	Eyes	Murat Nehri, Göynük stream (Bingöl) 38°45'41.4"N 40°32'45.2"E*	89
	<i>Squalius cephalus</i>	Eyes	Murat Nehri, Göynük stream (Bingöl)† 38°45'41.4"N 40°32'45.2"E*	89
<i>Posthodiplostomum centrarchi</i> Hoffman, 1958*	<i>Lepomis gibbosus</i> **	Mesentery, liver, spleen, heart, gonads, muscles, head, eye, coelom	Değirmenköy Reservoir† 41°10'0.09"N 28°1'4.64"E Dipsiz-Çine Stream† 37°45'49.99"N 27°50'0.99"E Sarıçay River† 37°18'57.99"N 27°42'24.00"E	105
<i>Posthodiplostomum cuticola</i> (von Nordmann, 1832) Dubois, 1936	<i>Alburnus escherichii</i> **	Skin	Seydisuyu Creek (Sakarya river)† 39°28'23.7"N 31°00'18.9"E*	72
	<i>Alburnus filippii</i> **	Skin	Pasinler Creek (Aras river) 39°58'11.6"N 41°53'17.2"E* Ağıl Creek (Aras river) 39°58'15.7"N 41°53'35.5"E*	72
	<i>Capoeta tinca</i> **	Skin	Süvari Creek (Sakarya river)† 40°20'19.5"N 32°03'09.9"E* Karaçaltı Creek (Susurluk)† 39°41'17.9"N 28°08'13.8"E*	72
	<i>Chondrostoma angorense</i> **	Skin	Seydisuyu Creek (Sakarya river)† 39°28'23.7"N 31°00'18.9"E*	72
	<i>Chondrostoma colchicum</i> **	Skin	Düzköy Creek (Çoruh river)† 40°49'44.5"N 39°22'15.1"E	72
	<i>Cobitis taenia</i> **	Skin	Çerpeş Creek (Marmara)† 40°05'40"N, 27°36'21"E*	72
	<i>Squalius pursakensis</i> **	Skin	Seydisuyu Creek (Sakarya river)† 39°28'23.7"N 31°00'18.9"E*	72
	<i>Squalius turcicus</i> **	Skin	Pasinler Creek (Aras river)† 39°58'11.6"N 41°53'17.2"E*	72
	<i>Squalius</i>	Gills	Central Anatolia Region	175

	<i>cephalus**</i>		(Kayseri)† 38°43'45.0"N 35°29'07.0"E‡	
<i>Posthodiplostomum</i> sp.	<i>Squalius cephalus**</i>	Eyes	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
<i>Tylodelphys clavata</i> (von Nordmann, 1832) Diesing, 1850	<i>Squalius cephalus**</i>	Eyes	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125
Family Lissorchiidae				
<i>Asymphylodora</i> sp.	<i>Pseudophoxinus antalyae</i>	Not reported	Kırgöz Resources (Antalya) 37°06'37.3"N 30°34'50.2"E‡	86
Family Opecoelidae				
<i>Nicolla skrjabini</i> (Iwanitzky, 1928) Dollfus, 1960* (Syn: <i>Crowcrocaecum skrjabini</i> (Iwanitzky, 1928) Skrjabin & Koval, 1956)	<i>Cobitis simplicispina**</i>	Intestine	Pınarbaşı spring (Afyonkarahisar)† 39°02'57.1"N 31°19'40.4"E‡	100
Family Strigeidae				
<i>Ichthyocotylurus</i> sp.	<i>Squalius cephalus**</i>	Body cavity, stomach – intestine	Yalakdere (40°39'50"N, 29°34'12"E)-Kaytazdere (40°41'06"N, 29°31'17"E) streams system (Kocaeli)†	125

Note: (‡indicates discovery for science; *indicates previously not reported parasite record; **indicate previously not reported host record; †indicates new locality record; ‡indicates coordinates not mentioned in published paper and provided by author from Google maps).

Table 3. Parasites, hosts, microhabitats, geographical localities, notes for the occurrence of parasites, and references in cultured marine fishes in Türkiye since 2020

Parasite species	Fish species	Microhabitat	Geographical locality	References
PHYLUM ARTHROPODA				
CLASS COPEPODA				
Family Caligidae				
<i>Caligus minimus</i> Otto, 1821	<i>Dicentrarchus labrax</i>	Buccal cavity	Earthen ponds near Çamlık lagoon (Gulf of İskenderun)† 36°41'11.7"N 35°38'10.3"E‡	185
Family Lernanthropidae				
<i>Lernanthropus kroyeri</i> Beneden, 1851	<i>Dicentrarchus labrax</i>	Gills	Commercial fish farm in Aegean Sea 37°16'40.93"N 27°25'04.40"E	190
	<i>Dicentrarchus labrax</i>	Gills	Commercial fish farm in Aegean Sea (Güllük Bay) 37°16'40.93"N 27°25'04.40"E‡	191
	<i>Dicentrarchus labrax</i>	Gills	Commercial fish farm in Aegean Sea (Güllük Bay) 37°16'40.93"N 27°25'04.40"E‡	188
PHYLUM CILIOPHORA				
CLASS OLIGOHYMENOPHOREA				
Family Uronematidae				
<i>Uronema marinum</i> Dujardin, 1841	<i>Psetta maxima**</i>	Skin, fins	CFRI Turbot Hatchery (Trabzon)† 40°58'01.8"N 39°50'25.8"E‡	181
PHYLUM CNIDARIA				
CLASS MYXOZOA				
Family Ceratomyxidae				
<i>Ceratomyxa diplodae</i> Lubat, Radujkovic, Marques & Bouix, 1989*	<i>Dicentrarchus labrax**</i>	Gall bladder	Muğla† 37°01'49"N, 28°30'23"E İzmir† 38°25'60"N, 27°9'0"E	120

<i>Ceratomyxa labracis</i> Sitjà-Bobadilla & Alvarez-Pellitero, 1993*	<i>Dicentrarchus labrax</i> **	Gall bladder	Muğla† 37°01'49"N, 28°30'23"E İzmir† 38°25'60"N, 27°9'0"E	120
Family Kudoidae				
<i>Kudoa dicentrarchi</i> (Sitjà-Bobadilla & Alvarez-Pellitero, 1992) (Syn: <i>Sphaerospora dicentrarchi</i> Sitjà-Bobadilla & Alvarez-Pellitero, 1992*)	<i>Dicentrarchus labrax</i>	Stomach, gall bladder, testis, intestines, pancreas, heart	Aegean Sea offshore culture cages in Kazıklı (Muğla)† 37°18'52.3"N 27°28'50.6"E* Çandarlı (İzmir)† 38°56'12.7"N 26°55'33.9"E* Taşburun (Aydın)† 37°26'43.9"N 27°13'09.8"E* Güllük (Muğla)† 37°14'30.2"N 27°35'14.3"E*	35
	<i>Dicentrarchus labrax</i>	Gall bladder, gonad	Muğla 37°01'49"N, 28°30'23"E İzmir 38°25'60"N, 27°9'0"E	120
PHYLUM PLATYHELMINTHES				
CLASS MONOGENEA				
Family Diplectanidae				
<i>Diplectanum aequans</i> (Wagener, 1857) Diesing, 1858	<i>Dicentrarchus labrax</i>	Gills	Black Sea (FAO area 37.4.2) 42°23'52.9"N 29°38'00.8"E Aegean Sea (FAO area 37.3.1) 37°30'38.2"N 26°55'59.4"E	18
Note: (*indicates previously not reported parasite record; **indicate previously not reported host record; †indicates new locality record; ‡indicates coordinates not mentioned in published paper and provided by author from Google maps).				

Table 4. Parasites, hosts, microhabitats, geographical localities, notes for the occurrence of parasites, and references in cultured freshwater fishes in Türkiye since 2020

Parasite species	Fish species	Microhabitat	Geographical locality	References
PHYLUM ARTHROPODA				
CLASS COPEPODA				
Family Lernaeidae				
<i>Lernaea</i> sp.	<i>Cyprinus carpio</i>	Not reported	Recirculating aquaculture system	101
CLASS ICHTHOSTRACA				
Family Argulidae				
<i>Argulus foliaceus</i> (Linnaeus, 1758)	<i>Oncorhynchus mykiss</i> **	Gills	Manyas Dam Lake (Balıkesir)† 39°58'42.6"N 27°46'42.5"E	133
	<i>Cyprinus carpio</i>	Not reported	Recirculating aquaculture system†	101
PHYLUM CILIOPHORA				
CLASS OLIGOHYMENOPHOREA				
Family Epistylididae				
<i>Apiosoma</i> sp.	<i>Oncorhynchus mykiss</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
	<i>Salmo</i> sp.**	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
Family Ichthyophthiriidae				
<i>Ichthyophthirius multifiliis</i> Fouquet, 1876	<i>Oncorhynchus mykiss</i>	Gills	Manyas Dam Lake (Balıkesir)† 39°58'42.6"N 27°46'42.5"E	133
	<i>Oncorhynchus mykiss</i>	Not reported	Kürtün Dam Lake	84

			(Gümüşhane)† 40°40'51"N 39°07'29"E*	
	<i>Oncorhynchus mykiss</i>	Skin and fins	Black Sea region (Samsun) 41°16'12.2"N 35°39'53.4"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Black Sea region (Trabzon) 40°48'13.9"N 40°00'14.4"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Black Sea region (Rize) 41°02'04.3"N 40°46'19.5"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Central Anatolia (Kayseri) 38°24'00.5"N 35°17'26.4"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Eastern Anatolia (Elazığ) 38°37'26.9"N 39°22'19.2"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Mediterranean region (Burdur) 37°43'27.6"N 30°13'44.7"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Mediterranean region (Antalya) 37°02'16.8"N 30°45'37.2"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Aegean region (Aydın) 37°50'13.5"N 27°31'18.9"E	156
	<i>Oncorhynchus mykiss</i>	Skin and fins	Aegean region (Muğla) 37°04'06.2"N 28°21'20.3"E	156
	<i>Salmo</i> sp.**	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
Family Scyphidiidae				
<i>Ambiphrya</i> sp.	<i>Oncorhynchus mykiss</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
	<i>Salmo</i> sp.**	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
Family Trichodinidae				
<i>Trichodina</i> sp.	<i>Oncorhynchus mykiss</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
	<i>Salmo</i> sp.**	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
Family Vorticellidae				
<i>Vorticella</i> sp.	<i>Oncorhynchus mykiss</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
	<i>Salmo</i> sp.**	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
PHYLUM CNIDARIA				
CLASS MYXOZOA				
Family Myxobolidae				
<i>Myxobolus</i> sp.*	<i>Oncorhynchus mykiss</i> **	Gills	Keban Dam Lake (Elazığ)† 38°39'57.7"N	79

			39°30'20.3"E*	
			Karakaya Dam Lake†	
			38°26'07.3"N	
			38°39'21.0"E*	

PHYLUM PLATYHELMINTHES

CLASS MONOGENEA

Family Dactylogyridae

<i>Dactylogyrus extensus</i> Mueller & Van Cleave, 1932	<i>Cyprinus carpio</i>	Gills	Ankara University Culture Unit 39°57'21.7"N 32°51'37.9"E*	189
<i>Dactylogyrus</i> sp.	<i>Cyprinus carpio</i>	Gills	Ankara University Culture Unit 39°57'21.7"N 32°51'37.9"E*	182

Family Gyrodactylidae

<i>Gyrodactylus</i> sp	<i>Cyprinus carpio</i>	Not reported	Recirculating aquaculture system	101
	<i>Oncorhynchus mykiss</i> **	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84
	<i>Salmo</i> sp.	Not reported	Kürtün Dam Lake (Gümüşhane)† 40°40'51"N 39°07'29"E*	84

CLASS TREMATODA

Family Clinostomidae

<i>Clinostomum complanatum</i> (Rudolphi, 1814) Braun, 1899	<i>Garra rufa</i> **	Peritoneal cavity, skin, head	Southern Türkiye	40
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Note: (*indicates previously not reported parasite record; **indicate previously not reported host record; †indicates new locality record; *indicates coordinates not mentioned in published paper and provided by author from Google maps)

Table 5. Parasites, hosts, microhabitats, geographical localities, notes for the occurrence of parasites, and references in aquarium fishes in Türkiye since 2020

Parasite species	Fish species	Microhabitat	Geographical locality	References
PHYLUM ARTHROPODA				
CLASS COPEPODA				
Family Lernaeidae				
<i>Lernaea cyprinacea cyprinacea</i> Linnaeus, 1758 (Syn: <i>Lernaea cyprinacea</i> Linnaeus, 1758)	<i>Poecilia</i> sp.**	Under the jaw, the bases of dorsal, anal and caudal fins, around operculum and eyes	Not reported	47
CLASS ICTHYOSTARACA				
Family Argulidae				
<i>Argulus japonicus</i> Thiele, 1900	<i>Carassius auratus</i> (Goldfish)	Gills	Mersin 36°45'58.5"N 34°33'22.4"E*	95
	<i>Carassius auratus</i> (Telescope fish)	Skin, fins	Mersin 36°45'58.5"N 34°33'22.4"E*	94
	<i>Cyprinus carpio</i> (Koi)	Skin, fins, gills	Mersin 36°45'58.5"N 34°33'22.4"E*	93
<i>Argulus</i> sp.	Not specified	Not reported	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
PHYLUM CILIOPHORA				
CLASS PHYLLOPHARYNGEA				

Family Chilodonellidae				
<i>Chilodonella</i> sp.*	Characidae sp. (Tetra)**	Gills	Konya† 37°51'53.4"N 32°29'43.7"E*	50
	<i>Hypostomus</i> sp. (Catfish)**	Gills	Konya† 37°51'53.4"N 32°29'43.7"E*	50
	Not specified	Gills, fins, scales	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
CLASS OLIGOHYMENOPHOREA				
Family Epistylididae				
<i>Apiosoma</i> sp.	Not specified	Skin, fins	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
<i>Epistylis</i> sp.	Not specified	Skin, fins	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
Family Ichthyophthiriidae				
<i>Ichthyophthirius multifiliis</i> Fouquet, 1876	<i>Carassius auratus</i> (Telescope fish)	Skin, fins	Mersin 36°45'58.5"N 34°33'22.4"E*	97
	<i>Carassius auratus</i> (Goldfish)	Gills	Mersin 36°45'58.5"N 34°33'22.4"E*	95
	<i>Cyprinus carpio</i> (Koi)	Skin	Mersin 36°45'58.5"N 34°33'22.4"E*	98
	<i>Hypostomus</i> sp. (Catfish)**	Gills	Konya† 37°51'53.4"N 32°29'43.7"E*	50
	Not specified	Not reported	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
	Characidae sp. (Tetra)	Gills	Konya† 37°51'53.4"N 32°29'43.7"E*	50
Family Tetrahymenidae				
<i>Tetrahymena</i> sp.	Not specified	Not reported	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
Family Trichodinidae				
<i>Trichodina</i> sp.	<i>Carassius auratus</i> (Goldfish)	Gills	Mersin 36°45'58.5"N 34°33'22.4"E*	95
	Characidae sp. (Tetra)	Gills	Konya 37°51'53.4"N 32°29'43.7"E	50
	Not specified	Gills, skin	Kırıkkale† 39°50'37.2"N 33°30'28.4"E*	63
Family Vorticellidae				
<i>Vorticella</i> sp.	Characidae sp. (Tetra)	Gills	Konya† 37°51'53.4"N 32°29'43.7"E*	50
	Not specified	Gills	Kırıkkale† 39°50'37.2"N 33°30'28.4"E	63
CLASS PROSTOMATEA				
Family Holophryidae				
<i>Cryptocaryon irritans</i> Brown, 1951*	<i>Oreochromis niloticus</i> **	Not reported	Ankara University culture unit† 39°57'21.7"N 32°51'37.9"E*	192
	<i>Sarpa salpa</i> **	Not reported	Exhibition aquarium in Ankara† 39°53'17.8"N 32°56'02.8"E*	192
PHYLUM EUGLENOZOA				
CLASS KINETOPLASTEA				
Family Ichthyobodonidae				
<i>Ichthyobodo</i> sp.	Characidae sp. (Tetra)	Gills	Konya 37°51'53.4"N 32°29'43.7"E*	50
	<i>Hypostomus</i> sp. (Catfish)**	Gills	Konya 37°51'53.4"N 32°29'43.7"E*	50
	Not specified	Not reported	Kırıkkale 39°50'37.2"N 33°30'28.4"E*	63

PHYLUM METAMONADA				
CLASS EOPHARYNGEA				
Family Spironucleidae				
<i>Spironucleus</i> sp.*	<i>Pterophyllum scalare</i> **	Intestinal wall, bile contents	Production facility	187
PHYLUM MYZOOA				
CLASS CONOIDASIA				
Family Eimeriidae				
<i>Eimeria</i> sp.**	Characidae sp. (Tetra)**	Intestine	Konya† 37°51'53.4"N 32°29'43.7"E‡	50
CLASS DINOFLAGELLATA incertae sedis				
<i>Piscinoodinium</i> sp.	Not specified	Not reported	Kırıkkale† 39°50'37.2"N 33°30'28.4"E‡	63
PHYLUM NEMATODA				
CLASS CHROMADOREA				
Family Camallanidae				
<i>Camallanus</i> sp.	Not specified	Gut	Kırıkkale† 39°50'37.2"N 33°30'28.4"E‡	63
CLASS ENOPLEA				
Family Capillariidae				
<i>Capillaria</i> sp.	Not specified	Not reported	Kırıkkale† 39°50'37.2"N 33°30'28.4"E‡	63
PHYLUM PLATYHELMINTHES				
CLASS MONOGENEA				
Family Ancylostoididae				
<i>Thaparocleidus caecus</i> (Mizelle & Kritsky, 1969) Lim, 1996	<i>Pangasianodon hypophthalmus</i> **	Gills	Commercial suppliers in Ankara† 39°57'52.8"N 32°52'05.0"E‡	174
Family Dactylogyridae				
<i>Dactylogyrus vastator</i> Nybelin, 1924*	<i>Carassius auratus</i> (Goldfish)**	Gills	Mersin† 36°45'58.5"N 34°33'22.4"E‡	95
<i>Dactylogyrus</i> sp.	<i>Hypostomus</i> sp. (Catfish)	Gills	Konya 37°51'53.4"N 32°29'43.7"E‡	50
	<i>Carassius auratus</i> (Goldfish)	Gills	Mersin 36°45'58.5"N 34°33'22.4"E‡	95
	Not specified	Not reported	Kırıkkale 39°50'37.2"N 33°30'28.4"E‡	63
Family Gyrodactylidae				
<i>Gyrodactylus shulmani</i> Ling, 1962 (Syn: <i>Gyrodactylus chinensis</i> Ling in Gusev, 1962)*	<i>Carassius auratus</i> (Goldfish)**	Gills	Mersin† 36°45'58.5"N 34°33'22.4"E‡	95
<i>Gyrodactylus</i> sp	<i>Hypostomus</i> sp. (Catfish)	Gills	Konya 37°51'53.4"N 32°29'43.7"E‡	50
	<i>Carassius auratus</i> (Goldfish)	Gills	Mersin† 36°45'58.5"N 34°33'22.4"E‡	95
	Not specified	Not reported	Kırıkkale† 39°50'37.2"N 33°30'28.4"E‡	63

Note: (*indicates previously not reported parasite record; **indicate previously not reported host record; †indicates new locality record; ‡indicates coordinates not mentioned in published paper and provided by author from Google maps).

Table 6. Hosts, parasites, and references in wild marine fishes in Türkiye since 2020 (*indicates new host records previously not investigated for parasite fauna)

Fish species	Parasite species	References
Phylum CHORDATA		

Class TELEOSTEI		
Family Anguillidae		
<i>Anguilla anguilla</i> (Linnaeus, 1758)	<i>Anguillicola crassus</i>	67, 161
Family Alodisae		
<i>Alosa immaculata</i> Bennett, 1835 (Syn: <i>Caspialosa pontica</i> (Eichwald, 1838))	<i>Helicometra fasciata</i>	13
	<i>Hysterothylacium aduncum</i>	13
<i>Sardina pilchardus</i> (Walbaum, 1792)	<i>Anisakis simplex</i>	103
	<i>Hysterothylacium aduncum</i>	103
Family Atherinidae		
<i>Atherina boyeri</i> Risso, 1810	<i>Mothocya epimerica</i>	8
Family Blenniidae		
<i>Parablennius sanguinolentus</i> (Pallas, 1814)	<i>Phyllodistomum acceptum</i>	69
	<i>Nerocila orbignyi</i>	123
	<i>Trichodina rectuncinata</i>	148
	<i>Trichodina ovonucleata</i>	148
<i>Salaria pavo</i> (Risso, 1810)	<i>Myxidium parvum</i>	68
Family Bothidae		
<i>Arnoglossus laterna</i> (Walbaum, 1792)*	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
Family Carangidae		
<i>Trachurus mediterraneus</i> (Steindachner, 1868)	<i>Prodistomum polonii</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Philometra</i> sp.	13
<i>Trachurus trachurus</i> (Linnaeus, 1758)	<i>Ceratothoa oestroides</i>	8
	<i>Hysterothylacium</i> sp.	7
	<i>Anisakis phseteris</i>	7
	<i>Scolex pleuronectis</i>	149
	<i>Hysterothylacium</i> larval type VIII	62
	<i>Hysterothylacium</i> larval type IX	62
	<i>Hysterothylacium aduncum</i>	193
Family Echeneidae		
<i>Echeneis naucrates</i> Linnaeus, 1758*	<i>Caligus minimus</i>	130
Family Engraulidae		
<i>Engraulis encrasicolus</i> (Linnaeus, 1758)	<i>Anisakis pegreffii</i>	9
	<i>Anisakis simplex</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Aphanurus stossichii</i>	150
	<i>Ascaridoid nematode</i>	3
	<i>Hysterothylacium</i> larval type VIII	62
	<i>Ortholinea hamsiensis</i>	127
Family Gaidropsaridae		
<i>Gaidropsarus mediterraneus</i> (Linnaeus, 1758)	<i>Progrillotia dasyatidis</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Acanthocephaloides irregularis</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Trichodina rectuncinata</i>	148

	<i>Trichodina ovonucleata</i>	148
Family Gadidae		
<i>Merlangius merlangus</i> (Linnaeus, 1758)	<i>Scolex pleuronectis</i>	149
	<i>Grillotia (Grillotia) erinaceus</i>	149
	<i>Hysterothylacium aduncum</i>	13
	<i>Hysterothylacium</i> larval type VIII	62
	<i>Hysterothylacium</i> larval type IX	62
<i>Micromesistius poutassou</i> (Risso, 1827)	<i>Anisakis pegreffii</i>	151
Family Gobiidae		
<i>Chromogobius zebratus</i> (Kolombatović, 1891)*	<i>Gnathia larvae</i>	51
<i>Gobius cruentatus</i> Gmelin, 1789*	<i>Phyllodistomum</i> sp.	69
	<i>Scolex pleuronectis</i>	13
<i>Gobius niger</i> Linnaeus, 1758	<i>Progrillotia dasyatidis</i>	13
	<i>Helicometra fasciata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Capillaria (Procapillaria) gracilis</i>	13
	<i>Acanthocephaloides irregularis</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	58
	<i>Ortholinea gobiusi</i>	127
<i>Gobius ophiocephalus</i> Pallas, 1814 (Syn: <i>Zosteriosessor ophicephalus</i> (Pallas, 1814))	<i>Progrillotia dasyatidis</i>	149
	<i>Scolex pleuronectis</i>	149
<i>Mesogobius batrachocephalus</i> (Pallas, 1814)	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Nerocila bivittata</i>	123
<i>Neogobius melanostomus</i> (Pallas, 1814)	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Ortholinea gobiusi</i>	127
Family Holocentridae		
<i>Sargocentron rubrum</i> (Forsskål, 1775)	<i>Gnathia larvae</i>	132
Family Labridae		
<i>Labrus viridis</i> Linnaeus, 1758*	<i>Gnathia larvae</i>	102
<i>Symphodus cinereus</i> (Bonnaterre, 1788)	<i>Nerocila bivittata</i>	123
	<i>Gaevskajatrema perezii</i>	147
	<i>Proctoeces maculatus</i>	147
	<i>Condyllocotyle pilodora</i>	147
	<i>Ortholinea divergens</i>	127
<i>Symphodus ocellatus</i> (Linnaeus, 1758)	<i>Phyllodistomum crenilabris</i>	69
	<i>Phyllodistomum crenilabris</i>	147
	<i>Metadena pauli</i>	147
<i>Symphodus roissali</i> (Risso, 1810)*	<i>Helicometra fasciata</i>	147
	Opecoelidae gen. sp.	147
	<i>Gaevskajatrema perezii</i>	147
	<i>Proctoeces maculatus</i>	147
	<i>Metadena pauli</i>	147
<i>Symphodus tinca</i> (Linnaeus, 1758)	<i>Helicometra insolata</i>	13
	<i>Hysterothylacium aduncum</i>	13

	<i>Dichelyne (Cucullanellus) minutus</i>	13
	<i>Phyllodistomum crenilabri</i>	69
	<i>Helicometra fasciata</i>	147
	Opecoelidae gen. sp.	147
	<i>Gaevskajatrema perezii</i>	147
	<i>Proctoeces maculatus</i>	147
	<i>Phyllodistomum crenilabri</i>	147
	<i>Galactosomum lacteum</i>	147
	<i>Metadena pauli</i>	147
Family Merlucciidae		
<i>Merluccius merluccius</i> (Linnaeus, 1758)	<i>Anisakis typica</i>	152
Family Moronidae		
<i>Dicentrarchus labrax</i> (Linnaeus, 1758)	<i>Diplectanum aequans</i>	18
Family Mugilidae		
<i>Chelon auratus</i> (Risso, 1810)	<i>Parabrachiella mugilis</i>	116
	<i>Caligus apodus</i>	135
	<i>Neoechinorhynchus agilis</i>	184
<i>Chelon labrosus</i> (Risso, 1827)	<i>Ergasilus lizae</i>	183
<i>Chelon saliens</i> (Risso, 1810)	<i>Myxobolus parvus</i>	139
	<i>Myxobolus</i> sp.	139
	<i>Sphaerospora mugilis</i>	139
	<i>Ligophorus szidati</i>	139
	<i>Solostamenides mugilis</i>	139
	<i>Saccocoelium tensum</i>	139
	<i>Saccocoelium obesum</i>	139
	<i>Schikhobalotrema sparisomae</i>	139
	<i>Neoechinorhynchus</i> sp.	139
	<i>Hysterothylacium aduncum</i>	139
	<i>Ergasilus lizae</i>	139
<i>Mugil cephalus</i> Linnaeus, 1758	<i>Myxobolus ichkeulensis</i>	37
	<i>Myxobolus spinacurvatura</i>	186
	<i>Nerocila orbignyi</i>	131
	<i>Caligus pageti</i>	135
	<i>Caligus turkiyensis</i>	135
Family Mullidae		
<i>Mullus barbatus</i> Linnaeus, 1758	<i>Hysterothylacium fabri</i>	176
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
<i>Mullus ponticus</i> Essipov, 1927*	<i>Hysterothylacium</i> larval type III	62
	<i>Hysterothylacium</i> larval type IV	62
	<i>Hysterothylacium</i> larval type VIII	62
<i>Mullus surmuletus</i> Linnaeus, 1758	<i>Progrillotia dasyatidis</i>	13
	<i>Monascus filiformis</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Capillaria (Procapillaria) gracilis</i>	13
	<i>Progrillotia dasyatidis</i>	124
	<i>Proctotrema bacilliovatum</i>	124
	<i>Ortholinea</i> sp.	124

	<i>Hysterothylacium</i> sp	124
<i>Parupeneus forsskali</i> (Fourmanoir & Guézé, 1976)*	<i>Gnathia</i> larvae	132
<i>Upeneus moluccensis</i> (Bleeker, 1855)*	<i>Gnathia</i> larvae	132
Family Nemipteridae		
<i>Nemipterus randalli</i> Russell, 1986*	<i>Lernanthropus</i> sp.	96
Family Ophidiidae		
<i>Ophidion rochei</i> Müller, 1845*	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
Family Pleuronectidae		
<i>Platichthys flesus</i> (Linnaeus, 1758)	<i>Helicometra fasciata</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Grillotia (Grillotia) erinaceus</i>	149
Family Pomatomidae		
<i>Pomatomus saltatrix</i> (Linnaeus, 1766)	<i>Microcotyle pomatomi</i>	122
	<i>Stephanostomum</i> sp.	122
	<i>Hysterothylacium aduncum</i>	122
	<i>Philometra saltatrix</i>	122
Family Serranidae		
<i>Epinephelus marginatus</i> (Lowe, 1834)	<i>Nerocila bivittate</i>	13
<i>Mycteroperca rubra</i> (Bloch, 1793)	<i>Nerocila bivittata</i>	41
Family Sparidae		
<i>Boops boops</i> (Linnaeus, 1758)	<i>Ceratothoa oestroides</i>	8
	<i>Ceratothoa parallela</i>	8
	<i>Ceratothoa italica</i>	8
	<i>Anisakis pegreffii</i>	9
	<i>Contracaecum</i> sp.	7
	<i>Anisakis</i> sp.	7
	<i>Anisakis simplex</i>	103
	<i>Hysterothylacium aduncum</i>	103
	<i>Phocanema decipiens</i>	103
<i>Pagellus erythrinus</i> (Linnaeus, 1758)	Coccidian parasite of unknown taxonomy	2
<i>Spicara flexuosum</i> Rafinesque, 1810*	<i>Scolex pleuronectis</i>	149
<i>Spicara maena</i> (Linnaeus, 1758)	<i>Ceratothoa oestroides</i>	8
	<i>Ceratothoa parallela</i>	8
	<i>Emetha audouini</i>	8
<i>Spicara smarís</i> (Linnaeus, 1758)	<i>Hysterothylacium aduncum</i>	13
Family Sciaenidae		
<i>Sciaena umbra</i> Linnaeus, 1758	<i>Anilocra frontalis</i>	8
	<i>Hysterothylacium aduncum</i>	13
Family Scombridae		
<i>Sarda sarda</i> (Bloch, 1793)	<i>Hysterothylacium aduncum</i>	13
<i>Scomber japonicus</i> Houttuyn, 1782	<i>Anisakis pegreffii</i>	9, 10, 42
	<i>Anisakis typica</i>	7,9,10
	<i>Didymozoon</i> sp.	10
	<i>Contracaecum pelagicum</i>	7
	<i>Grubea cochlear</i>	6
<i>Scomber scombrus</i> Linnaeus, 1758	<i>Clavellisa scombri</i>	10

	<i>Anisakis pegreffii</i>	10
	<i>Didymozoon sp</i>	10
<i>Thunnus thynnus</i> (Linnaeus, 1758)	<i>Caligus quadratus</i>	83
	<i>Euryphorus brachypterus</i>	10
Family Scopthalmidae		
<i>Scophthalmus maeoticus</i> (Pallas, 1814)	<i>Trichodina jadranica</i>	148
	<i>Trichodina ovonucleata</i>	148
	<i>Ceratomyxa scopthalmi</i>	141
	<i>Myxidium finnmarchicum</i>	141
Family Scorpaenidae		
<i>Pterois miles</i> (Bennett, 1828)*	<i>Nerocila milesensis</i>	134
	<i>Nerocila bivittata</i>	134
	<i>Nerocila bivittata</i>	184
<i>Scorpaena porcus</i> Linnaeus, 1758	<i>Progrillotia dasyatidis</i>	13
	<i>Helicometra fasciata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Acanthocephaloides irregularis</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Bothriocephalus scorpii</i>	149
	<i>Ceratomyxa scorpaeni</i>	126
<i>Scorpaena scrofa</i> Linnaeus, 1758	<i>Nerocila bivittata</i>	8
	<i>Anisakis pegreffii</i>	17
	<i>Anisakis typica</i>	17
	<i>Anisakis ziphidarum</i>	17
Family Soleidae		
<i>Solea solea</i> (Linnaeus, 1758)	<i>Nerocila bivittata</i>	123
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Trichodina jadranica</i>	148
	<i>Trichodina domerguei</i>	148
	<i>Helicometra fasciata</i>	13
	<i>Helicometra insolata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Dichelyne (Cucullanellus) minutus</i>	13
	<i>Solearhynchus rhytidotes</i>	13
Family Sphyraenidae		
<i>Sphyraena chrysotaenia</i> Klunzinger, 1884	<i>Paragnathia sp.</i>	96
Family Trachinidae		
<i>Trachinus draco</i> Linnaeus, 1758	<i>Hysterothylacium aduncum</i>	13
	<i>Philometra sp.</i>	13
	<i>Scolex pleuronectis</i>	149
Family Triglidae		
<i>Chelidonichthys lucerna</i> (Linnaeus, 1758)	<i>Progrillotia dasyatidis</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Scolex pleuronectis</i>	149
Family Uranoscopidae		
<i>Uranoscopus scaber</i> Linnaeus, 1758	<i>Anisocladium fallax</i>	13

	<i>Anisocladium gracile</i>	13
	<i>Anisocoelium capitellatum</i>	13
	<i>Hysterothylacium aduncum</i>	13
Class ELASMOBRANCHII		
Family Gymnuridae		
<i>Gymnura altavela</i> (Linnaeus, 1758)*	<i>Pontobdella muricata</i>	58
Family Rajidae		
<i>Raja clavata</i> Linnaeus, 1758	<i>Grillotia (Grillotia) erinaceus</i>	149
	<i>Tetrarhynchobothrium tenuicolle</i>	149
	<i>Echeneibothrium variabile</i>	149
	<i>Acanthobothrium coronatum</i>	149
	<i>Bothriocephalus sp.</i>	149
Family Scyliorhinidae		
<i>Scyliorhinus canicula</i> (Linnaeus, 1758)	<i>Anisakis sp.</i>	179
Family Squalidae		
<i>Squalus acanthias</i> Linnaeus, 1758	<i>Tetrarhynchobothrium tenuicolle</i>	149
	<i>Acanthobothrium coronatum</i>	149
	<i>Yamaguticestus squali</i>	149
	<i>Pandarus bicolor</i>	128
	<i>Pandarus boscii</i>	128

Table 7. Hosts, parasites, and references in wild marine fishes in Türkiye since 2020 (*indicates new host records previously not investigated for parasite fauna)

Fish species	Parasite species	References
Phylum CHORDATA		
Class TELEOSTEI		
Family Anguillidae		
<i>Anguilla anguilla</i> (Linnaeus, 1758)	<i>Anguillicola crassus</i>	67, 161
Family Alodisae		
<i>Alosa immaculata</i> Bennett, 1835 (Syn: <i>Caspialosa pontica</i> (Eichwald, 1838))	<i>Helicometra fasciata</i>	13
	<i>Hysterothylacium aduncum</i>	13
<i>Sardina pilchardus</i> (Walbaum, 1792)	<i>Anisakis simplex</i>	103
	<i>Hysterothylacium aduncum</i>	103
Family Atherinidae		
<i>Atherina boyeri</i> Risso, 1810	<i>Mothocya epimerica</i>	8
Family Blenniidae		
<i>Parablennius sanguinolentus</i> (Pallas, 1814)	<i>Phyllodistomum acceptum</i>	69
	<i>Nerocila orbignyi</i>	123
	<i>Trichodina rectuncinata</i>	148
	<i>Trichodina ovonucleata</i>	148
<i>Salaria pavo</i> (Risso, 1810)	<i>Myxidium parvum</i>	68
Family Bothidae		
<i>Arnoglossus laterna</i> (Walbaum, 1792)*	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
Family Carangidae		
<i>Trachurus mediterraneus</i> (Steindachner, 1868)	<i>Prodistomum polonii</i>	13
	<i>Hysterothylacium aduncum</i>	13

	<i>Philometra</i> sp.	13
<i>Trachurus trachurus</i> (Linnaeus, 1758)	<i>Ceratothoa oestroides</i>	8
	<i>Hysterothylacium</i> sp.	7
	<i>Anisakis phseteris</i>	7
	<i>Scolex pleuronectis</i>	149
	<i>Hysterothylacium</i> larval type VIII	62
	<i>Hysterothylacium</i> larval type IX	62
	<i>Hysterothylacium aduncum</i>	193
Family Echeneidae		
<i>Echeneis naucrates</i> Linnaeus, 1758*	<i>Caligus minimus</i>	130
Family Engraulidae		
<i>Engraulis encrasicolus</i> (Linnaeus, 1758)	<i>Anisakis pegreffii</i>	9
	<i>Anisakis simplex</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Aphanurus stossichii</i>	150
	<i>Ascaridoid nematode</i>	3
	<i>Hysterothylacium</i> larval type VIII	62
	<i>Ortholinea hamsiensis</i>	127
Family Gaidropsaridae		
<i>Gaidropsarus mediterraneus</i> (Linnaeus, 1758)	<i>Progrillotia dasyatidis</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Acanthocephaloides irregularis</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Trichodina rectuncinata</i>	148
	<i>Trichodina ovonucleata</i>	148
Family Gadidae		
<i>Merlangius merlangus</i> (Linnaeus, 1758)	<i>Scolex pleuronectis</i>	149
	<i>Grillotia (Grillotia) erinaceus</i>	149
	<i>Hysterothylacium aduncum</i>	13
	<i>Hysterothylacium</i> larval type VIII	62
	<i>Hysterothylacium</i> larval type IX	62
<i>Micromesistius poutassou</i> (Risso, 1827)	<i>Anisakis pegreffii</i>	151
Family Gobiidae		
<i>Chromogobius zebratus</i> (Kolombatović, 1891)*	<i>Gnathia</i> larvae	51
<i>Gobius cruentatus</i> Gmelin, 1789*	<i>Phyllodistomum</i> sp.	69
	<i>Scolex pleuronectis</i>	13
<i>Gobius niger</i> Linnaeus, 1758	<i>Progrillotia dasyatidis</i>	13
	<i>Helicometra fasciata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Capillaria (Procapillaria) gracilis</i>	13
	<i>Acanthocephaloides irregularis</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	58
	<i>Ortholinea gobiusi</i>	127
<i>Gobius ophiocephalus</i> Pallas, 1814 (Syn: <i>Zosteriosessor ophicephalus</i> (Pallas, 1814))	<i>Progrillotia dasyatidis</i>	149
	<i>Scolex pleuronectis</i>	149

<i>Mesogobius batrachocephalus</i> (Pallas, 1814)	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Nerocila bivittata</i>	123
<i>Neogobius melanostomus</i> (Pallas, 1814)	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Ortholinea gobiusi</i>	127
Family Holocentridae		
<i>Sargocentron rubrum</i> (Forsskål, 1775)	<i>Gnathia</i> larvae	132
Family Labridae		
<i>Labrus viridis</i> Linnaeus, 1758*	<i>Gnathia</i> larvae	102
<i>Symphodus cinereus</i> (Bonnaterre, 1788)	<i>Nerocila bivittata</i>	123
	<i>Gaevskajatrema perezii</i>	147
	<i>Proctoeces maculatus</i>	147
	<i>Condylcotyle pilodora</i>	147
	<i>Ortholinea divergens</i>	127
<i>Symphodus ocellatus</i> (Linnaeus, 1758)	<i>Phyllodistomum crenilabri</i>	69
	<i>Phyllodistomum crenilabri</i>	147
	<i>Metadena pauli</i>	147
<i>Symphodus roissali</i> (Risso, 1810)*	<i>Helicometra fasciata</i>	147
	Opecoelidae gen. sp.	147
	<i>Gaevskajatrema perezii</i>	147
	<i>Proctoeces maculatus</i>	147
	<i>Metadena pauli</i>	147
<i>Symphodus tinca</i> (Linnaeus, 1758)	<i>Helicometra insolata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Dichelyne (Cucullanellus) minutus</i>	13
	<i>Phyllodistomum crenilabri</i>	69
	<i>Helicometra fasciata</i>	147
	Opecoelidae gen. sp.	147
	<i>Gaevskajatrema perezii</i>	147
	<i>Proctoeces maculatus</i>	147
	<i>Phyllodistomum crenilabri</i>	147
	<i>Galactosomum lacteum</i>	147
	<i>Metadena pauli</i>	147
Family Merlucciidae		
<i>Merluccius merluccius</i> (Linnaeus, 1758)	<i>Anisakis typica</i>	152
Family Moronidae		
<i>Dicentrarchus labrax</i> (Linnaeus, 1758)	<i>Diplectanum aequans</i>	18
Family Mugilidae		
<i>Chelon auratus</i> (Risso, 1810)	<i>Parabrachiella mugilis</i>	116
	<i>Caligus apodus</i>	135
	<i>Neoechinorhynchus agilis</i>	184
<i>Chelon labrosus</i> (Risso, 1827)	<i>Ergasilus lizae</i>	183
<i>Chelon saliens</i> (Risso, 1810)	<i>Myxobolus parvus</i>	139
	<i>Myxobolus</i> sp.	139
	<i>Sphaerospora mugilis</i>	139
	<i>Ligophorus szidati</i>	139
	<i>Solostamenides mugilis</i>	139

	<i>Saccocoelium tensum</i>	139
	<i>Saccocoelium obesum</i>	139
	<i>Schikhobalotrema sparisomae</i>	139
	<i>Neoechinorhynchus</i> sp.	139
	<i>Hysterothylacium aduncum</i>	139
	<i>Ergasilus lizae</i>	139
<i>Mugil cephalus</i> Linnaeus, 1758	<i>Myxobolus ichkeulensis</i>	37
	<i>Myxobolus spinacurvatura</i>	186
	<i>Nerocila orbignyi</i>	131
	<i>Caligus pageti</i>	135
	<i>Caligus turkiyensis</i>	135
Family Mullidae		
<i>Mullus barbatus</i> Linnaeus, 1758	<i>Hysterothylacium fabri</i>	176
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
<i>Mullus ponticus</i> Essipov, 1927*	<i>Hysterothylacium</i> larval type III	62
	<i>Hysterothylacium</i> larval type IV	62
	<i>Hysterothylacium</i> larval type VIII	62
<i>Mullus surmuletus</i> Linnaeus, 1758	<i>Progrillotia dasyatidis</i>	13
	<i>Monascus filiformis</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Capillaria (Procapillaria) gracilis</i>	13
	<i>Progrillotia dasyatidis</i>	124
	<i>Proctotrema bacilliovatum</i>	124
	<i>Ortholinea</i> sp.	124
	<i>Hysterothylacium</i> sp.	124
<i>Parupeneus forsskali</i> (Fourmanoir & Guézé, 1976)*	<i>Gnathia</i> larvae	132
<i>Upeneus moluccensis</i> (Bleeker, 1855)*	<i>Gnathia</i> larvae	132
Family Nemipteridae		
<i>Nemipterus randalli</i> Russell, 1986*	<i>Lernanthropus</i> sp.	96
Family Ophidiidae		
<i>Ophidion rochei</i> Müller, 1845*	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
Family Pleuronectidae		
<i>Platichthys flesus</i> (Linnaeus, 1758)	<i>Helicometra fasciata</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Grillotia (Grillotia) erinaceus</i>	149
Family Pomatomidae		
<i>Pomatomus saltatrix</i> (Linnaeus, 1766)	<i>Microcotyle pomatomi</i>	122
	<i>Stephanostomum</i> sp.	122
	<i>Hysterothylacium aduncum</i>	122
	<i>Philometra saltatrix</i>	122
Family Serranidae		
<i>Epinephelus marginatus</i> (Lowe, 1834)	<i>Nerocila bivittate</i>	13
<i>Mycteroperca rubra</i> (Bloch, 1793)	<i>Nerocila bivittata</i>	41
Family Sparidae		
<i>Boops boops</i> (Linnaeus, 1758)	<i>Ceratothoa oestroides</i>	8
	<i>Ceratothoa parallela</i>	8

	<i>Ceratothoa italica</i>	8
	<i>Anisakis pegreffii</i>	9
	<i>Contracaecum</i> sp.	7
	<i>Anisakis</i> sp.	7
	<i>Anisakis simplex</i>	103
	<i>Hysterothylacium aduncum</i>	103
	<i>Phocanema decipiens</i>	103
<i>Pagellus erythrinus</i> (Linnaeus, 1758)	Coccidian parasite of unknown taxonomy	2
<i>Spicara flexuosum</i> Rafinesque, 1810*	<i>Scolex pleuronectis</i>	149
<i>Spicara maena</i> (Linnaeus, 1758)	<i>Ceratothoa oestroides</i>	8
	<i>Ceratothoa parallela</i>	8
	<i>Emetha audouini</i>	8
<i>Spicara smaris</i> (Linnaeus, 1758)	<i>Hysterothylacium aduncum</i>	13
Family Sciaenidae		
<i>Sciaena umbra</i> Linnaeus, 1758	<i>Anilocra frontalis</i>	8
	<i>Hysterothylacium aduncum</i>	13
Family Scombridae		
<i>Sarda sarda</i> (Bloch, 1793)	<i>Hysterothylacium aduncum</i>	13
<i>Scomber japonicus</i> Houttuyn, 1782	<i>Anisakis pegreffii</i>	9, 10, 42
	<i>Anisakis typica</i>	7,9,10
	<i>Didymozoon</i> sp.	10
	<i>Contracaecum pelagicum</i>	7
	<i>Grubea cochlear</i>	6
<i>Scomber scombrus</i> Linnaeus, 1758	<i>Clavellisa scombri</i>	10
	<i>Anisakis pegreffii</i>	10
	<i>Didymozoon</i> sp.	10
<i>Thunnus thynnus</i> (Linnaeus, 1758)	<i>Caligus quadratus</i>	83
	<i>Euryphorus brachypterus</i>	10
Family Scophthalmidae		
<i>Scophthalmus maeoticus</i> (Pallas, 1814)	<i>Trichodina jadranica</i>	148
	<i>Trichodina ovonucleata</i>	148
	<i>Ceratomyxa scophthalmi</i>	141
	<i>Myxidium finnmarchicum</i>	141
Family Scorpaenidae		
<i>Pterois miles</i> (Bennett, 1828)*	<i>Nerocila milesensis</i>	134
	<i>Nerocila bivittata</i>	134
	<i>Nerocila bivittata</i>	184
<i>Scorpaena porcus</i> Linnaeus, 1758	<i>Progrillotia dasyatidis</i>	13
	<i>Helicometra fasciata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Acanthocephaloides irregularis</i>	13
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Bothriocephalus scorpii</i>	149
	<i>Ceratomyxa scorpaeni</i>	126
<i>Scorpaena scrofa</i> Linnaeus, 1758	<i>Nerocila bivittata</i>	8
	<i>Anisakis pegreffii</i>	17

	<i>Anisakis typica</i>	17
	<i>Anisakis ziphidarum</i>	17
Family Soleidae		
<i>Solea solea</i> (Linnaeus, 1758)	<i>Nerocila bivittata</i>	123
	<i>Scolex pleuronectis</i>	149
	<i>Progrillotia dasyatidis</i>	149
	<i>Trichodina jadratica</i>	148
	<i>Trichodina domerguei</i>	148
	<i>Helicometra fasciata</i>	13
	<i>Helicometra insolata</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Dichelyne (Cucullanellus) minutus</i>	13
	<i>Solearhynchus rhytidotes</i>	13
Family Sphyraenidae		
<i>Sphyraena chrysotaenia</i> Klunzinger, 1884	<i>Paragnathia</i> sp.	96
Family Trachinidae		
<i>Trachinus draco</i> Linnaeus, 1758	<i>Hysterothylacium aduncum</i>	13
	<i>Philometra</i> sp.	13
	<i>Scolex pleuronectis</i>	149
Family Triglidae		
<i>Chelidonichthys lucerna</i> (Linnaeus, 1758)	<i>Progrillotia dasyatidis</i>	13
	<i>Hysterothylacium aduncum</i>	13
	<i>Scolex pleuronectis</i>	149
Family Uranoscopidae		
<i>Uranoscopus scaber</i> Linnaeus, 1758	<i>Anisocladium fallax</i>	13
	<i>Anisocladium gracile</i>	13
	<i>Anisocoelium capitellatum</i>	13
	<i>Hysterothylacium aduncum</i>	13
Class ELASMOBRANCHII		
Family Gymnuridae		
<i>Gymnura altavela</i> (Linnaeus, 1758)*	<i>Pontobdella muricata</i>	58
Family Rajidae		
<i>Raja clavata</i> Linnaeus, 1758	<i>Grillotia (Grillotia) erinaceus</i>	149
	<i>Tetrarhynchobothrium tenuicolle</i>	149
	<i>Echeneibothrium variabile</i>	149
	<i>Acanthobothrium coronatum</i>	149
	<i>Bothriocephalus</i> sp.	149
Family Scyliorhinidae		
<i>Scyliorhinus canicula</i> (Linnaeus, 1758)	<i>Anisakis</i> sp.	179
Family Squalidae		
<i>Squalus acanthias</i> Linnaeus, 1758	<i>Tetrarhynchobothrium tenuicolle</i>	149
	<i>Acanthobothrium coronatum</i>	149
	<i>Yamaguticestus squali</i>	149
	<i>Pandarus bicolor</i>	128
	<i>Pandarus boscii</i>	128

Table 8. Hosts, parasites, and references in wild freshwater fishes in Türkiye since 2020 (*indicates new host records previously not investigated for parasite fauna)

Fish species	Parasite species	References
CLASS TELEOSTEI		
Family Aphaniidae		
<i>Anatolichthys iconii</i> (Akşiray, 1948) (Syn: <i>Aphanius iconii</i> (Akşiray, 1948))*	<i>Eustrongylides excisus</i>	144
Family Atherinidae		
<i>Atherina boyeri</i> Risso, 1810	<i>Ligula intestinalis</i>	33
	<i>Eustrongylides excisus</i>	144
Family Cobitidae		
<i>Cobitis simplicispina</i> Hankó, 1925	<i>Nicolla skrjabini</i>	100
<i>Cobitis taenia</i> Linnaeus, 1758	<i>Posthodiplostomum cuticola</i>	72
Family Centrarchidae		
<i>Lepomis gibbosus</i> (Linnaeus, 1758)	<i>Myxobolus dechtiari</i>	105
	<i>Onchocleidus dispar</i>	105
	<i>Posthodiplostomum centrarchi</i>	105
	<i>Eustrongylides</i> sp.	105
	<i>Contracaecum</i> sp.	105
	<i>Paraquimperia tenerrima</i>	105
	Acuariidae gen. sp.	105
	Nematoda gen. sp.	105
	<i>Lernaea cyprinacea cyprinacea</i>	105
Family Cyprinidae		
<i>Acanthobrama marmid</i> Heckel, 1843	<i>Diplostomum</i> sp.	66
	<i>Khawia sinensis</i>	66
	<i>Ligula intestinalis</i>	85
<i>Acanthobrama microlepis</i> (De Filippi, 1863)*	<i>Paradiplozoon homoion</i>	117
	<i>Paradiplozoon homoion</i>	117
<i>Alburnoides eichwaldii</i> (De Filippi, 1863)*	<i>Paradiplozoon homoion</i>	117
	<i>Paradiplozoon homoion</i>	117
<i>Alburnoides emineae</i> Turan, Kaya, Ekmekçi & Doğan, 2014*	<i>Paradiplozoon homoion</i>	117
<i>Alburnoides kosswigi</i> Turan, Kaya, Bayçelebi, Bektaş & Ekmekçi, 2017*	<i>Paradiplozoon homoion</i>	117
<i>Alburnoides manyasensis</i> Turan, Ekmekçi, Kaya & Güçlü, 2013*	<i>Paradiplozoon homoion</i>	21
<i>Alburnus baliki</i> Bogutskaya, Küçük & Ünlü, 2000	<i>Lernaea cyprinacea cyprinacea</i>	73
<i>Alburnus carianorum</i> Freyhof, Kaya, Bayçelebi, Geiger & Turan, 2019*	<i>Paradiplozoon homoion</i>	117
<i>Alburnus derjugini</i> Berg, 1923*	<i>Gyrodactylus</i> sp.	84
	<i>Trichodina</i> sp.	84
	<i>Vorticella</i> sp.	84
	<i>Apiosoma</i> sp.	84
	<i>Chilodonella piscicola</i>	84
	<i>Ligula intestinalis</i>	84
	<i>Paradiplozoon</i> sp.	84
	<i>Posthodiplostomum cuticola</i>	72
<i>Alburnus escherichii</i> Steindachner, 1897	<i>Argulus foliaceus</i>	145
	<i>Paradiplozoon homoion</i>	117
	<i>Paradiplozoon homoion</i>	117
	<i>Posthodiplostomum cuticola</i>	72

	<i>Posthodiplostomum cuticola</i>	72
	<i>Paradiplozoon homoion</i>	117
<i>Alburnus hohenackeri</i> Kessler, 1877*	<i>Paradiplozoon homoion</i>	117
<i>Alburnus mossulensis</i> Heckel, 1843	<i>Diplostomum</i> sp.	66
	<i>Khawia sinensis</i>	66
<i>Alburnus sellal</i> Heckel, 1843*	<i>Ligula intestinalis</i>	25
<i>Alburnus tarichi</i> (Güldenstädt, 1814)*	<i>Dactylogyrus</i> sp.	57
<i>Alburnus timarensis</i> Kuru, 1980*	<i>Paradiplozoon homoion</i>	117
<i>Alburnus</i> sp.	<i>Rhabdochona gnedini</i>	44
<i>Alburnus derjugini</i> x <i>Squalius orientalis</i> hybrid*	<i>Ligula intestinalis</i>	74
<i>Barbus lacerta</i> Heckel, 1843 (Syn: <i>Barbus ercisianus</i> Karaman, 1971)	<i>Ligula intestinalis</i>	136
	<i>Lamproglena pulchella</i>	78
<i>Barbus oligolepis</i> Battalgil, 1941*	<i>Dactylogyrus carpathicus</i>	20
	<i>Paradiplozoon homoion</i>	20
	<i>Paradiplozoon homoion</i>	117
<i>Barbus plebejus</i> Bonaparte, 1839	<i>Argulus foliaceus</i>	145
<i>Barbus tauricus</i> Kessler, 1877*	<i>Paradiplozoon homoion</i>	117
<i>Barbus xanthos</i> Güçlü, Kalayci, Küçük & Turan 2020	<i>Paradiplozoon bliccae</i>	117
<i>Capoeta aydinensis</i> Turan, Küçük, Kaya, Güçlü & Bektaş, 2017*	<i>Paradiplozoon bliccae</i>	117
	<i>Paradiplozoon bliccae</i>	117
<i>Capoeta capoeta</i> (Güldenstädt, 1773)	<i>Paradiplozoon koubkovae</i>	117
<i>Capoeta caelestis</i> Schöter, Özuluğ & Freyhof, 2009	<i>Rhabdochona fortunatowi</i>	22
<i>Capoeta damascina</i> (Valenciennes, 1842) (Syn: <i>Capoeta angorae</i> (Hankó, 1925))	<i>Rhabdochona fortunatowi</i>	22
<i>Capoeta damascina</i> (Valenciennes, 1842) (Syn: <i>Capoeta kosswigi</i> Karaman, 1969)	<i>Unio crassus</i>	14
	<i>Paradiplozoon homoion</i>	117
<i>Capoeta pestai</i> (Pietschmann, 1933) (Syn: <i>Capoeta mauricii</i> Küçük, Turan, Şahin & Gülle, 2009)*	<i>Paradiplozoon</i> sp.	54
	<i>Dactylogyrus turcicus</i>	54
	<i>Allocreadium isoporum</i>	54
	<i>Rhabdochona</i> sp.	54
	<i>Pomphorhynchus spindlet truncatus</i>	54
<i>Capoeta tinca</i> (Heckel, 1843)	<i>Dactylogyrus pulcher</i>	19
	<i>Paradiplozoon homoion</i>	19
	<i>Allocreadium isoporum</i>	19
	<i>Rhabdochona fortunatowi</i>	19
	<i>Posthodiplostomum cuticola</i>	72
	<i>Myxobolus anatolicus</i>	155
	<i>Myxobolus karaeri</i>	155
	<i>Myxobolus samsunensis</i>	155
	<i>Myxobolus cakmaki</i>	155
	<i>Myxobolus ekingeni</i>	155
	<i>Argulus foliaceus</i>	145
	<i>Rhabdochona gnedini</i>	44
	<i>Rhabdochona denudata</i>	44
	<i>Rhabdochona fortunatowi</i>	19
<i>Paracapoeta trutta</i> (Heckel, 1843) (Syn: <i>Capoeta trutta</i> (Heckel, 1843))	<i>Diplostomum</i> sp.	66

	<i>Neoechinorhynchus (Neoechinorhynchus) rutili</i>	27,66,76
	<i>Myxobolus cyprini</i>	78
<i>Capoeta umbla</i> (Heckel, 1843)	<i>Diplostomum</i> sp.	66
	<i>Diplostomum spathaceum</i>	28,29
	<i>Lamproglena pulchella</i>	90
	<i>Ichthyophthirius multifiliis</i>	90
	<i>Diplostomum</i> sp.	89
<i>Carassius gibelio</i> (Bloch, 1782)	<i>Contracaecum rudolphii</i>	71
	<i>Argulus foliaceus</i>	145
	<i>Gyrodactylus sprostonae</i>	194
	<i>Trichodina</i> sp.	194
<i>Cyprinion kais</i> Heckel, 1843*	<i>Paradiplozoon bingolense</i>	117
<i>Cyprinion macrostomum</i> Heckel, 1843	<i>Diplostomum</i> sp.	89
	<i>Ergasilus sieboldi</i>	90
	<i>Ichthyophthirius multifiliis</i>	90
<i>Cyprinus carpio</i> Linnaeus, 1758	<i>Argulus foliaceus</i>	145
	<i>Diplostomum spathaceum</i>	28
	<i>Diplostomum</i> sp.	43
	<i>Trichodina</i> sp.	43
	<i>Dactylogyrus</i> sp.	43
	<i>Myxobolus</i> sp.	43
	<i>Eimeria</i> sp.	43
	<i>Pseudocapillaria (Pseudocapillaria) tomentosa</i>	44
	<i>Rhabdochona</i> sp.	44
	<i>Diplozoon paradoxum</i>	77
<i>Garra rufa</i> (Heckel, 1843)	<i>Paradiplozoon bingolensis</i>	92
<i>Garra variabilis</i> (Heckel, 1843)*	<i>Paradiplozoon homoion</i>	117
<i>Luciobarbus graecus</i> (Steindachner, 1895) (Syn: <i>Luciobarbus kottelati</i> Turan, Ekmekçi, İlhan & Engin, 2008)*	<i>Paradiplozoon bliccae</i>	117
Family Gasterosteidae		
<i>Gasterosteus aculeatus</i> Linnaeus, 1758	<i>Schistocephalus solidus</i>	65
Family Gobiidae		
<i>Knipowitschia caucasica</i> (Berg, 1916)	<i>Eustrongylides excisus</i>	144
<i>Pomatoschistus anatoliae</i> Engin & Innal, 2017*	<i>Lernaea cyprinacea cyprinacea</i>	73
Family Gobionidae		
<i>Pseudorasbora parva</i> (Temminck & Schlegel, 1846)	<i>Ligula intestinalis</i>	34
Family Leuciscidae		
<i>Chondrostoma angorense</i> Elvira, 1987*	<i>Posthodiplostomum cuticola</i>	72
	<i>Myxobolus arrabonensis</i>	154
	<i>Myxobolus polati</i>	154
	<i>Paradiplozoon homoion</i>	24
	<i>Clinostomum complanatum</i>	24
	<i>Contracaecum rudolphii</i>	24
<i>Chondrostoma colchicum</i> Derjugin, 1899*	<i>Posthodiplostomum cuticola</i>	72
<i>Chondrostoma regium</i> (Heckel, 1843)	<i>Diplostomum</i> sp.	66,89
	<i>Diplostomum spathaceum</i>	26
	<i>Ichthyophthirius multifiliis</i>	90

	<i>Lamproglena pulchella</i>	90
	<i>Trichodina</i> sp.	90
<i>Ladigesocypris irideus</i> (Ladiges, 1960)*	<i>Ligula</i> sp.	49
<i>Petroleuciscus borysthenicus</i> (Kessler, 1859)	<i>Paradiplozoon homoion</i>	117
<i>Petroleuciscus ninae</i> Turan, Kalayci, Kaya, Bektaş & Küçük 2018*	<i>Paradiplozoon bliccae</i>	117
	<i>Paradiplozoon bliccae</i>	117
<i>Pseudophoxinus antalyae</i> Bogutskaya, 1992	<i>Paradiplozoon homoion</i>	86
	<i>Dactylogyrus</i> sp.	86
	<i>Rhabdochona denudata</i>	86
	<i>Contracaecum</i> sp.	86
	<i>Schyzocotyle acheilognathi</i>	86
	<i>Asymphylodora</i> sp.	86
<i>Squalius agdamicus</i> Kamensky, 1901*	<i>Paradiplozoon homoion</i>	117
<i>Squalius cephalus</i> (Linnaeus, 1758) (Syn: <i>Leuciscus cephalus</i> (Linnaeus, 1758))	<i>Diplostomum</i> sp.	89
	<i>Posthodiplostomum cuticola</i>	175
	<i>Argulus foliaceus</i>	145
	<i>Rhabdochona gnedini</i>	44
	<i>Rhabdochona denudata</i>	44
	<i>Lamproglena pulchella</i>	90
	<i>Ichthyophthirius multifiliis</i>	90
	<i>Ergasilus sieboldi</i>	90
	<i>Trichodina</i> sp.	90
	<i>Clinostomum complanatum</i>	125
	<i>Tylodelphys clavata</i>	125
	<i>Posthodiplostomum</i> sp.	125
	<i>Ichthyocotylurus</i> sp.	125
	<i>Dactylogyrus nanus</i>	125
	<i>Rhabdochona denudata</i>	125
	<i>Myxobolus</i> spp.	125
<i>Squalius cii</i> (Richardson, 1857)*	<i>Paradiplozoon homoion</i>	117
<i>Squalius fellowesii</i> (Günther, 1868)*	<i>Paradiplozoon bliccae</i>	117
	<i>Dactylogyrus folkmanovae</i>	32
<i>Squalius orpheus</i> Kottelat & Economidis, 2006*	<i>Dactylogyrus folkmanovae</i>	32
	<i>Dactylogyrus nanoides</i>	32
	<i>Dactylogyrus vistulae</i>	32
<i>Squalius pursakensis</i> (Hankó, 1925)*	<i>Dactylogyrus folkmanovae</i>	32
	<i>Dactylogyrus vistulae</i>	32
	<i>Dactylogyrus naviculoides</i>	32
	<i>Posthodiplostomum cuticola</i>	72
	<i>Paradiplozoon homoion</i>	117
<i>Squalius recurvirostris</i> Özüluğ & Freyhof, 2011*	<i>Dactylogyrus naviculoides</i>	53
	<i>Dactylogyrus vistulae</i>	53
<i>Squalius turcicus</i> De Filippi, 1865*	<i>Posthodiplostomum cuticola</i>	72
<i>Squalius ghigii</i> (Gianferrari, 1927) (Syn: <i>Ladigesocypris ghigii</i> (Gianferrari, 1927))*	<i>Paradiplozoon bliccae</i>	117
<i>Vimba mirabilis</i> (Ladiges, 1960)*	<i>Paradiplozoon bliccae</i>	117
<i>Vimba vimba</i> (Linnaeus, 1758)	<i>Paradiplozoon bliccae</i>	56,117
Family Mastacembelidae		

<i>Mastacembelus mastacembelus</i> (Banks & Solander, 1794)	<i>Ichthyophthirius multifiliis</i>	91
	<i>Mastacembelocleidus heteranchorus</i>	91
	<i>Diplozoon</i> sp.	91
	<i>Diplostomum spathaceum</i>	91
	<i>Senga magna</i>	91
	<i>Procamallanus viviparus</i>	91
	<i>Rhabdochona denudata</i>	91
	<i>Ergasilus sieboldi</i>	91
	<i>Argulus foliaceus</i>	91
	<i>Piscicola geometra</i>	91
	<i>Unio pictorum</i>	91
Family Mugilidae		
<i>Chelon ramada</i> (Risso, 1827)	<i>Lernaea cyprinacea cyprinacea</i>	73
Family Nemacheilidae		
<i>Oxyoemacheilus angorae</i> (Steindachner, 1897)*	<i>Allocreadium bursensis</i>	23
	<i>Contracaecum rudolphii</i>	24
<i>Oxyoemacheilus simavicus</i> (Balik & Bănărescu, 1978)*	<i>Contracaecum rudolphii</i>	24
Family Percidae		
<i>Sander lucioperca</i> (Linnaeus, 1758)	<i>Eustrongylides excisus</i>	144
	<i>Eustrongylides excisus</i>	153
	<i>Eustrongylides excisus</i>	146
Family Siluridae		
<i>Silurus glanis</i> Linnaeus, 1758	<i>Ichthyophthirius multifiliis</i>	142
	<i>Thaparocleidus vistulensis</i>	24
	<i>Eustrogylides excicus</i>	24
Family Tincidae		
<i>Tinca tinca</i> (Linnaeus, 1758)	<i>Ligula intestinalis</i>	165

Table 9. Hosts, parasites, and references in cultured marine fishes in Türkiye since 2020 (*indicates new host records previously not investigated for parasite fauna)

Fish species	Parasite species	References
Family Moronidae		
<i>Dicentrarchus labrax</i> (Linnaeus, 1758)	<i>Caligus minimus</i>	185
	<i>Lernanthropus kroyeri</i>	188,190,191
	<i>Ceratomyxa diplodae</i>	120
	<i>Ceratomyxa labracis</i>	120
	<i>Kudoa dicentrarchi</i>	35
	<i>Kudoa dicentrarchi</i>	120
	<i>Diplectanum aequans</i>	18
Family Scophthalmidae		
<i>Scophthalmus maximus</i> (Linnaeus, 1758) (Syn: <i>Psetta maxima</i> (Linnaeus, 1758))	<i>Uronema marinum</i>	181

Table 10. Hosts, parasites, and references in cultured freshwater fishes in Türkiye since 2020 (*indicates new host records previously not investigated for parasite fauna)

Fish species	Parasite species	References
Family Cyprinidae		
<i>Cyprinus carpio</i> Linnaeus, 1758	<i>Argulus japonicus</i>	101
	<i>Dactylogyrus extensus</i>	189
	<i>Dactylogyrus</i> sp.	182
	<i>Gyrodactylus</i> sp	101
	<i>Lernaea</i> sp.	101
<i>Garra rufa</i> (Heckel, 1843)	<i>Clinostomum complanatum</i>	40
Family Salmonidae		
<i>Oncorhynchus mykiss</i> (Walbaum, 1792)	<i>Ambiphrya</i> sp.	84
	<i>Apiosoma</i> sp.	84
	<i>Trichodina</i> sp.	84
	<i>Vorticella</i> sp	84
	<i>Ichthyophthirius multifiliis</i>	84,133,156
	<i>Argulus foliaceus</i>	133
	<i>Gyrodactylus</i> sp.	84
<i>Salmo</i> sp.	<i>Myxobolus</i> sp.	79
	<i>Ambiphrya</i> sp.	84
	<i>Apiosoma</i> sp.	84
	<i>Gyrodactylus</i> sp.	84
	<i>Ichthyophthirius multifiliis</i>	84
	<i>Trichodina</i> sp.	84
	<i>Vorticella</i> sp.	84

Table 11. Hosts, parasites, and references in aquarium fishes in Türkiye since 2020 (*indicates new host records previously not investigated for parasite fauna)

Fish species	Parasite species	References
Family Characidae		
<i>Characidae</i> sp. (Tetra)	<i>Chilodenella</i> sp.	50
	<i>Ichthyobodo</i> sp.	50
	<i>Eimeria</i> sp.	50
	<i>Ichthyophthirius multifiliis</i>	50
	<i>Trichodina</i> sp.	50
	<i>Vorticella</i> sp.	50
Family Cichlidae		
<i>Oreochromis niloticus</i> (Linnaeus, 1758)	<i>Cryptocaryon irritans</i>	192
<i>Pterophyllum scalare</i> (Schultze, 1823)	<i>Spironucleus</i> sp.	187
Family Cyprinidae		
<i>Carassius auratus</i> (Linnaeus, 1758) (Telescope fish)	<i>Argulus japonicus</i>	94
	<i>Ichthyophthirius multifiliis</i>	97
<i>Carassius auratus</i> (Linnaeus, 1758) (Goldfish)	<i>Argulus japonicus</i>	95
	<i>Dactylogyrus</i> sp.	95
	<i>Dactylogyrus vastator</i>	95
	<i>Gyrodactylus</i> sp.	95
	<i>Gyrodactylus shulmani</i>	95
	<i>Ichthyophthirius multifiliis</i>	95

	<i>Trichodina</i> sp.	95
<i>Cyprinus carpio</i> Linnaeus, 1758 (Koi)	<i>Ichthyophthirius multifiliis</i>	98
	<i>Argulus japonicus</i>	93
Family Loricariidae		
<i>Hypostomus</i> sp (catfish)*	<i>Chilodenella</i> sp.	50
	<i>Dactylogyrus</i> sp.	50
	<i>Gyrodactylus</i> sp.	50
	<i>Ichthyophthirius multifiliis</i>	50
	<i>Ichthyobodo</i> sp.	50
Family Pangasiidae		
<i>Pangasianodon hypophthalmus</i> (Sauvage, 1878)*	<i>Thaparocleidus caecus</i>	174
Family Poeciliidae		
<i>Poecilia</i> sp.	<i>Lernaea cyprinacea cyprinacea</i>	47
Family Sparidae		
<i>Sarpa salpa</i> (Linnaeus, 1758)	<i>Cryptocaryon irritans</i>	192
Family Not specified		
Not specified	<i>Apiosoma</i> sp.	63
	<i>Argulus</i> sp.	63
	<i>Capillaria</i> sp.	63
	<i>Camallanus</i> sp.	63
	<i>Chilodonella</i> sp.	63
	<i>Dactylogyrus</i> sp.	63
	<i>Epistylis</i> sp.	63
	<i>Gyrodactylus</i> sp.	63
	<i>Ichthyobodo</i> sp.	63
	<i>Ichthyophthirius multifiliis</i>	63
	<i>Piscinoodinium</i> sp.	63
	<i>Tetrahymena</i> sp.	63
	<i>Trichodina</i> sp.	63
	<i>Vorticella</i> sp.	63

A previously published very comprehensive checklist book by Özer (2021) provided details on the parasites, their fish hosts, microhabitats, and geographical occurrences in wild and cultured marine and freshwater environments as well as aquariums in Türkiye, which contained 641 articles and presentations published in the period from 1961 to 2020. A total of 624 nominal and genus-level identified species of parasites were reported from 287 different nominal and genus-level identified fish species in Türkiye by 2020 (Özer, 2021, 2022). The present study, however, encompasses the last 5 years and has documented 158 species-level and 41 genus-level identified parasites belonging to 11 phyla reported from 152 nominal and genus-level identified fish species from marine, freshwater, and aquarium environments in 137 articles and presentations. When comparing these two periods of parasitological outcomes, it can be said that an increasing effort for both publications and parasitological reports has been achieved mainly for the parasitological surveys on endemic fish species in the latter period, which provided new parasitological results on previously not studied 37 freshwaters, 14 marine, and 2 aquarium fish species. Moreover, 46 new parasite species including 11 discoveries for science were included in the Turkish parasite fauna of fishes in the latter period.

Many biotic and abiotic factors can influence the richness of parasitic taxa of fishes, e.g., environmental factors (the presence/absence of intermediate as well as definitive hosts, water parameters, concentrations of nutrients, pollution), sampling period (season/all-year round investigation), host factors (sex, behavior, host size, reproductive phase, wild/cultured) (Kuris et al., 1980; Lafferty, 1997; Dušek et al., 1998; Lafferty and Kuris, 1999; Guidelli et al., 2003; Takemoto et al., 2004; Marcogliese, 2005; BlascoCosta et al., 2014; Lacerda et al., 2017; Özer et al., 2017; Falkenberg et al., 2019; Santoro et al., 2020; Bommarito et al., 2022; Timi and Buchmann, 2023). In addition, some other factors, e.g., focus/lack/neglection of research interests in specific taxa, the limited number of professionals with more comprehensive knowledge revealing the whole parasite fauna of any investigated fish,

the limitations on financing in more countrywide parasitic investigations, the limitations in facilities enabling more thorough and accurate species identifications also influence the actual definitions of the parasitic fauna of fishes (Özer, 2022).

Trematodes, nematodes, and cestodes involve several hosts to complete their complex life cycles in which they are transmitted trophically between two or more successive hosts; on the other hand, myxozoans require a second host mostly in freshwater for a two-host life cycle, and protozoans and arthropods have simple and direct life cycle strategies involving several developmental stages of the same parasite species in water columns and fish hosts (Cribb et al., 2003; Benesh et al., 2014; Atkinson et al., 2018). Of the highly reported parasitic taxa in Türkiye, Trematoda, Myxozoa, Nematoda, and Cestoda were the most specious groups and are among the inherent parts of food webs in aquatic environments reflecting the biodiversity of free-living host animals (Hechinger and Lafferty, 2005). Understanding the diversity and distribution of parasitic groups with either complex life cycles or two-host life cycles with alternate hosts and their transmission pathways is essential not only for grasping their epidemiology and implementing preventive measures but also for supporting biodiversity conservation efforts (Dobson et al., 2008; Selbach et al., 2020). Türkiye involves marine, freshwater, and brackishwater environments enriching its vertebrate and invertebrate diversity with a high degree of endemism, which, not surprisingly, provided suitable conditions for high diversities of these parasitic groups, as was mentioned by Lafferty (2008) and Madhavi (2011). This checklist supported these indications by providing new records of 9, 7, and 2 nematode, trematode, and cestode parasites, respectively, for the previously reported Turkish parasite fauna reported by Özer (2021).

Phylum Arthropoda is the second most specious taxon reported in Türkiye, and it has three main parasitic groups affecting wild and commercially important aquacultured fish species: Copepoda, Isopoda, and Branchiura with both free-living and parasitic stages in their life cycles (Jithendran et al., 2008; Misganaw and Getu, 2016). Information concerning these parasites of fishes is vital as they have either direct effects on the health status of host fishes by causing significant economic losses or playing a role in fish secondary infections after detachment as well as being a mechanical vector for some other fish pathogens (McKiernan et al., 2005; Yavuzcan Yıldız and Ötgücüoğlu, 2021). In the present checklist, 3 new copepods and 1 isopod species are registered for the Turkish parasite fauna, indicating their occurrences in the freshwater and marine habitats of Türkiye in addition to previously reported parasites by Özer (2021).

Myxozoans (phylum Cnidaria) are among the most reported parasites of mainly fishes globally distributed in marine and freshwater habitats, and they have been reported as responsible agents for significant economic losses in wild and cultured fishes (Sitja-Bobadilla, 2008; Alama-Bermejo et al., 2023). They have a two-host life cycle involving annelids and bryozoans as definitive invertebrate hosts and predominantly fishes as intermediate vertebrate hosts. This checklist updates the current myxozoan fauna of both wild and cultured fishes in Türkiye by adding 16 new myxozoan records (see Tables 6,7,8 for details), 3 of which are previously known as pathogenic marine species in cultured European seabass *D. labrax* elsewhere (Alvarez-Pellitero and Sitja-Bobadilla, 1993; Fioravanti et al., 2004; Sitja-Bobadilla, 2008; Castro et al., 2018; Özer, 2021).

Ectoparasites belonging to the phylum Ciliophora are among the most common parasites encountered in cultured fishes and are frequently found in wild fishes (Noga, 2010). They are responsible for the pathological alterations in tissues and organs leading to diseases, the reductions in the growth of fish, and favoring secondary bacterial infections and mortality (Martins et al., 2015). These parasites have a direct and simple life cycle affected by host and environmental-related factors. In the previous checklist reported by Özer (2021, 2022), a total of 78 ciliophoran parasites were reported, and in this checklist, 1 more species was added to the Turkish ciliophoran parasite fauna.

Members of Acanthocephala, Annelida, Mollusca, Myxozoa, Euglenozoa, and Metamonada have been reported in low proportions in the last 5-year period (see Figure 1 for details). Parasites belonging to some of these phyla either use intermediate and/or final hosts or are directly in contact with their hosts, and these life cycle strategies affect their infection processes. Thus, the presence/absence of intermediate and/or final hosts in the aquatic habitats could be one of the limiting factors among others, such as water temperature, total dissolved solids, turbidity, dissolved oxygen, and eutrophication, which limited the diversity of these parasites (Smith, 1998; Bennett et al., 2001; Sures, 2008; Putra et al., 2020).

The habitat of fishes, whether wild or farmed, is another factor influencing parasite diversity. In the present checklist, the total number of reported parasites in each wild marine and freshwater fish is far higher than those of cultured fish in the same environments. Timi and Buchmann (2023) correlated this situation with the described vast number of fish species (33000), and the host specificity of some parasites naturally would result in a correspondingly high number of parasites in the wild fishes in contrast to a minimal number of cultured fish species (369) as was indicated by the Food and Agriculture Organization of the United Nations (2022). Moreover, some other factors, such as parasitological investigations, mainly focus on the specific parasites when significant negative impacts on cultured fish hosts have arisen, and the usage of more controlled water inlets results in the elimination of parasites (Timi and Buchmann, 2023). Parasites reported from cultured marine fishes,

Dicentrarchus labrax and *Psetta maxima*, in Türkiye belong to different taxa, dominated by the myxozoans in the previous species. Still, all are well-known and previously reported species from the same hosts both in Türkiye and other countries (see Table 3 for details) (Sitja-Bobadilla and Alvarez-Pelitero, 1992, 1993; Ragias et al., 2004; Dezfuli et al., 2007; Saraiva et al., 2015). The same situation is also valid for cultured freshwater fishes, and a ciliophoran *I. multifiliis*, the agent of one of the most devastating and common diseases worldwide, and *A. foliaceus*, an agent responsible for argulosis worldwide, are the most commonly reported parasites of cultured *Oncorhynchus mykiss* in geographically different areas in Türkiye (see Table 4 for details) (Nolan et al. 2000; Jaafar et al., 2020; Syahputra et al., 2019).

Ornamental fishery, dominated by freshwater fish species (~2000 spp.), accounting for 90% of the market, with the remaining 10% comprising marine species, is another globally significant sector involving more than 125 countries participating in the trade of live fish, estimated to be worth between \$15 and 20 billion per annum (King, 2019; Pouil et al., 2019; Jones et al., 2021). Parasites are among the most significant factors causing negative impacts on fish welfare throughout their supply chain, some end up in domestic/public aquaria. The parasite species reported from aquarium fishes in Türkiye demonstrate a diverse composition of involved members with low host specificity belonging to 8 higher taxa, mostly phylum Ciliophora (see Table 5 for details).

CONCLUSIONS

This is a comprehensive review of marine, freshwater, and aquarium fish parasites in cultured and wild environments encompassing 5 years since 2020. In Türkiye, 153 wild marines, 106 wild freshwater, 18 cultured marine, 12 cultured freshwater, and 32 aquarium fish species were previously reported to be the host for 400, 242, 44, 41, and 38 species and genus-level identified parasites, respectively, by Özer (2021, 2022). This checklist reports species-level and genus-level identified parasites as 102 in 67 wild marines, 77 in 73 wild freshwater, 7 in 2 cultured marine, 12 in 4 cultured freshwater, and 21 in 10 aquarium fishes. Froese and Pauly (2024) reported 491 marine and 415 freshwater fish species in Türkiye. The number of parasitologically investigated 167 marine and 141 freshwater fish species is very low. A large part of fish communities in both aquatic environments remains to be investigated to reveal actual parasite diversity in Turkish waters. However, the lists of parasites in this compilation clearly show increasing significant efforts in studying fish parasites in Türkiye over the last 5 years, and more efforts in the future will yield more parasitological results in discovering the true diversity of parasites in wild and cultured marine, freshwater, and aquarium environments. These studies will also contribute to the growing aquaculture industry in Türkiye by understanding pathogenic threats and taking control measures over them. The required much more effort to describe the actual species diversity and host preferences of any given species should combine morphological and molecular taxonomy in future studies.

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Conflicts of Interest

The authors declare that they do not have any conflict of interest.

REFERENCES

1. Aguilar-Aguilar R, Islas-Ortega AG. A checklist of ciliate parasites (Ciliophora) of fishes from Mexico. *Zootaxa*. 2015; 4027:270–280.
2. Akaylı T, Ürkü Ç. Coccidian infestation in cultured common pandora (*Pagellus erythrinus*). *Aquatic Research*. 2023; 6(4):245–252.
3. Akkuş G, Gücü AK. Spatial variation of larval ascaridoid nematode (Nematoda: Chromadorea: Ascaridoidea) infections in the Black Sea anchovy (*Engraulis encrasicolus*). *Turk J Zool*. 2021; 45:108–116.
4. Aktop Y, Yılmaz HE, Çağatay T. Geographical Distribution of Freshwater Fish Parasite *Clinostomum* spp. *Menba J Fish Faculty*. 2021; 7(1):58–63.
5. Alama-Bermejo G, Hernández-Orts JS, García-Varela M, Oceguera-Figueroa A, Pecková H, Fiala I. Diversity of myxozoans (Cnidaria) infecting Neotropical fishes in southern Mexico. *Scientific Reports*. 2023; 13:12106. <https://doi.org/10.1038/s41598-023-38482-2>
6. Aldık R, Çakır F. The presence of the Monogenean helminth *Grubea cochlear* Diesing, 1858 from Chub mackerel (*Scomber japonicus*) caught in the Çanakkale Strait, Türkiye. *COMU J Mar Sci Fish*. 2023; 6:90–94.
7. Aldık R, Çakır F, Tonguç-Yayıntaş Ö, Altınağaç U. Endoparasite investigation in some fish species with high economic value obtained from Çanakkale, Turkey. *J Adv VetBio Sci Tech*. 2021; 6(3):202–210.

8. Aldık R, Öktener A, Çakır F, Şen Y, Uğur GE, Tuncer S. New host findings of two parasitic isopods (Flabellifera: Cymothoidae) found on some fish caught in the Dardanelles Strait (Çanakkale, Turkey). J. BAUN Inst Sci Technol. 2022; 24(1):391-407.
9. Aldık R, Çakır F, Tonguç-Yayıntaş Ö. Molecular investigation of nematodes isolated from three economical fish species taken from Çanakkale (Türkiye) fish market. Ege J Fish Aquat Sci. 2023a; 40(2):90-95.
10. Aldık R, Çakır F, Tonguç-Yayıntaş Ö, Öktener A, Kızılyıldırım S, Eroğlu HA. Investigation of some fish species of Scombridae family in terms of parasites. Transylv Rev Syst Ecol Res. 2023b; 25(3):41-54.
11. Alvarez-Pelitero P, Sitja-Bobadilla A. *Ceratomyxa* spp. (Protozoa: Myxosporea) infections in wild and cultured sea bass, *Dicentrarchus labrax*, from the Spanish Mediterranean area. J Fish Biol. 1993; 42(6):889-901.
12. Arthur JR, Te BQ. Checklist of the parasites of fishes of Viet Nam. FAO Fisheries Technical Paper. No. 369/2. Rome, FAO. 2006; 133 p
13. Aslan Çelik B, Oğuz MC. Endohelminth fauna of teleost fishes from coasts of Şile region of the Black Sea. Helminthologia. 2021; 58(3):263-270.
14. Atıcı AA, Kankaya E. Biological characteristics of siraz fish, *Capoeta kosswigi* (Teleostei: Cyprinidae) and host relationship with ectoparasitic *Glochidia* larvae of freshwater mussel, *Unio stevenianus* (Bivalvia: Unionidae) in the Karasu River (Van, Türkiye). Turkish J Fish Aquat Sci. 2024; 24(3): TRJFAS24692. <http://doi.org/10.4194/TRJFAS24692>
15. Atkinson SD, Bartholomew JL, Lotan T. Myxozoans: Ancient metazoan parasites find a home in phylum Cnidaria. Zoology. 2018; 129:66-68.
16. Ayas D, Koyuncu CE, Ergüden D. Parasitic isopod *Anilocra physodes* (Linnaeus, 1758) from Mersin Bay (Turkey) with a new host record. Adv Underwater Sci. 2024; 4(1):22-26.
17. Aydın C, Pekmezci GZ. Molecular identification and infection levels of *Anisakis* species (Nematoda: Anisakidae) in the red scorpionfish *Scorpaena scrofa* (Scorpaenidae) from the Aegean Sea. Parasitol Inter. 2023a; 92: 102691. <https://doi.org/10.1016/j.parint.2022.102691>.
18. Aydın C, Pekmezci GZ. An integrative study of morphological and molecular characterization of *Diplectanum aequans* (Diplectanidae: Monogenea) infecting European sea bass *Dicentrarchus labrax* (Linnaeus, 1758) from Turkish coasts. Ankara Univ Vet Fak Dergisi. 2023b; 70(3):245-251.
19. Aydoğdu N, Torcu-Koç H. Helminth parasites on the Anatolian khramulya, *Capoeta tinca* (Heckel, 1843) from northwestern Türkiye, with new host and geographical records. Biherean Biologist. 2023a; 17(2):47-55.
20. Aydoğdu N, Torcu-Koç H. The first ectohelminth ichthyo-parasitic fauna of the Turkish endemic fish, Marmara barbel, *Barbus oligolepis* Battalgi, 1941, with new host and geographical record. LIMNOFISH - J Limnol Freshwater Fish Res. 2023b; 9(3):130-137.
21. Aydoğdu N, Avenant Oldewage A, Dos Santos QM, Aydoğdu A. Prevalence and intensity of *Paradiplozoon homoion* (Monogenea: Diplozoidae) from Manyas spiralin, *Alburnoides manyasensis*, an endemic fish of Turkey: new host and geographical record. Iranian J Fish Sci. 2020; 19(6):3301-3309.
22. Aydoğdu N, Emre Y, Emre N, Yabacı A. Occurrence of *Rhabdochona fortunatowi* Dinnik, 1933 (Nematoda: Rhabdochonidae) in two endemic cyprinid species (*Capoeta* spp.) in Turkey. Acta Zool Bulgarica. 2021; 73(4):607-612.
23. Aydoğdu N, Vainutis KS, Voronova AN, Aydoğdu A. Morphological and molecular evidence for the recognition of *Allocreadium bursensis* n. sp. (Trematoda: Allocreadiidae) from Angora loach *Oxyneomacheilus angorae* from Turkey. J Helminthol. 2023; 97: e48. <https://doi.org/10.1017/S0022149X23000287>
24. Aydoğdu N, Emre N, Aco-Alburquerque R, Mattiucci S, Aydoğdu A. Observations on helminth parasites in endemic and native fish from Susurluk basin, Türkiye using a genetic-molecular approach: With new host and geographical records. J Hell Vet Med Soc. 2024; 75(2):7281-7290.
25. Aytan Ü, Başak Esensoy F, Arifoğlu E, İpek ZZ, Kaya C. Plastics in an endemic fish species (*Alburnus sellal*) and its parasite (*Ligula intestinalis*) in the Upper Tigris River, Türkiye. Sci Total Environ. 2023; 900: 165604
26. Barata SD, Önalın Ş. Effects of preservation conditions on DNA quality to be used in parasitic studies in fisheries. Ecol Life Sci. 2022a; 17(4):170-178.
27. Barata SD, Önalın Ş. Investigation of the morphological characteristics of *Neoechinorhynchus rutili* parasites isolated from *Capoeta trutta*, and their lifestyle at different temperatures. Ecol Life Sci. 2022b; 17(3):24-130.
28. Barata SD, Dörücü M, Gürses M. Identification and molecular investigation of *Diplostomum* in *Capoeta umbla* caught from freshwater sources, Turkey. Genetics Aquat Org. 2022; 6(2): GA454. <http://doi.org/10.4194/GA454>
29. Barata SD, Dörücü M, Sağlam N, Gürses M, Otlı Ö. Molecular diversity of *Diplostomum spathaceum* (Digenea: Diplostomidae) on the *Capoeta umbla* and *Cyprinus carpio* (Cypriniformes) Using Mitochondrial DNA Barcode. Turkish J Fish Aquat Sci. 2023; 23(2): TRJFAS20576. <http://doi.org/10.4194/TRJFAS20576>
30. Benesh DP, Chubb JC, Parker GA. The trophic vacuum and the evolution of complex life cycles in trophically transmitted helminths. Proc R Soc B. 2014; 281:20141462. <https://doi.org/10.1098/rspb.2014.1462>
31. Bennett EM, Carpenter SR, Caraco NF. Human impact on erodible phosphorus and eutrophication: a global perspective. Bioscience. 2001; 51:227-234.

32. Benovics M, Vukic J, Sanda R, Nejat F, Charmpila EA, Buj I, et al. Monogeneans and chubs: Ancient host-parasite system under the looking glass. *Molecular Phylogenetics and Evolution*. 2023; 179:107667. <https://doi.org/10.1016/j.ympev.2022.107667>
33. Benzer S. *Ligula intestinalis* (L. 1758) infection of euryhaline fish the sans smelt *Atherina boyeri* Risso, 1810. *Pakistan J Mar Sci*. 2020a; 29(1):1-8.
34. Benzer S. *Ligula intestinalis* infection of *Pseudorasbora parva* in Hirfanlı Dam Lake, Kırşehir, Turkey. *J Fish*. 2020b; 8(1):762-767.
35. Birincioğlu S, Avcı H, Ipek E, Berke E, Birincioğlu B, Aydoğan A. Pathological and ultrastructural findings of *Sphaerospora dicentrarchi* (Myxosporea: Bivalvulida) infection in European seabass (*Dicentrarchus labrax*) farmed in Turkey. *J Hell Vet Med Soc*. 2023; 74(4):6335-6342.
36. Blasco-Costa I, Rouco C, Poulin R. Biogeography of parasitism in freshwater fish: spatial patterns in hot spots of infection. *Ecography*. 2014; 37:1-10.
37. Bölükbaş CS, Pekmezci GZ, Yardımcı B, Özpiçak M, Yılmaz S, Polat N. First molecular data on the validity of *Myxobolus ichkeulensis* (Cnidaria: Myxosporea) from *Mugil cephalus* (Mugilidae) in Turkish waters. *Ankara Üniv Vet Fak Dergisi*. 2020; 67:169-174.
38. Castro R., Cavaleiro FI, Rangel LF, Rocha S, Severino R, Casal G, et al. Myxozoan parasites of the European sea bass, *Dicentrarchus labrax* (Teleostei: Moronidae): Correlates of infections at the micro- and macroenvironment scales. *Aquaculture*. 2018; 485:17-24.
39. Cribb T, Bray R, Olson P, Timothy D, Littlewood J, et al. Life cycle evolution in the Digenea: a New perspective from Phylogeny. *Adv Parasitol*. 2003; 54:197-254.
40. Çağatay İT, Aydın B, Aktop Y, Yılmaz HE. Molecular and morphologic study of *Clinostomum complanatum* (Digenea Clinostomidae) in *Garra rufa* (Doctor fish) from Southern Turkey. *Fresenius Environ Bull*. 2022; 31(05): 4791-4800.
41. Çelik S, Korun J, Gökoğlu M. First occurrences of *Nerocila bivittata* on dusky grouper (*Ephinephelus marginatus*) and mottled grouper (*Mycteroperca rubra*). *J Hell Vet Med Soc*. 2020; 71(3):2309-2314.
42. Çelik EŞ, Kanat RE, Dermancı P, Kahraman Yılmaz D, Turgay E, Karataş S, et al. Effect of *Anisakis pegreffii* (nematoda: anisakidae) on biochemical and haematological characteristics of chub mackerel (*Scomber japonicus* Houttuyn, 1782) caught in the Dardanelles at Çanakkale, Türkiye. *COMU J Mar Sci Fish*. 2022; 5 (Special Issue):55-62.
43. Çilli E, Yeşilöz H, Gökçecik ÖF, Nuhay Ç, Çağırğan AA, Pekmez K, et al. Parasitological, bacteriological and virological research of carp (*Cyprinus carpio*) in a case in Hirfanlı Dam Lake in Türkiye. *Etlik Vet Mikrobiyol Dergisi*. 2023; 34(1):108-113.
44. Dede E, Pekmezci GZ, Yücesan B, Özkan Ö. Investigation of endoparasites in some freshwater fish caught in Çankırı Province from Türkiye. *J. Anatolian Env Anim Sci*. 2023; 8(2):157-161.
45. Dezfuli B, Luisa G, Edi S, Roberto M, Shinn A, Maurizio M. Gill histopathology of cultured European sea bass, *Dicentrarchus labrax* (L.), infected with *Diplectanum aequans* (Wagener 1857) Diesing 1958 (Diplectanidae: Monogenea). *Parasitol Res*. 2007; 100:707-713.
46. Djikanovic V, Paunovic M, Nikolic V, Simonovic P, Cakic P. Parasitofauna of freshwater fishes in the Serbian open waters: a checklist of parasites of freshwater fishes in Serbian open waters. *Rev Fish Biol Fisheries*. 2012; 22:297-324.
47. Dinçtürk E, Tanrıkuş TT, Kumaş K. *Lernae cyprinacea* infestation in balloon molly. 6th International Congress on Veterinary and Animal Sciences, (Eds, Yipel, M., Ekici, H.), 2-4 September, Congress Book, 2021; p. 133
48. Dobson A, Lafferty K, Kuris A, Hechinger R, Jetz W. Homage to Linnaeus: How many parasites? How many hosts? *Proceed Nat Acad Sci*. 2008; 105:11482-11489.
49. Doosti S, Yılmaz F. Occurrence of *Ligula* sp. plerocercoids in *Ladigesocypris irideus* (Ladiges, 1960) from South-Western Turkey: new host and new locality records. *J Inst Sci Tech*. 2020; 10(4):2416-2423.
50. Durgun B, Özdemir Ö. Pathological and parasitological investigations on stingray fish (*Hypostomus* sp) and tetra fish (*Characidae* sp) from aquarium fish. *MJAVL Sci*. 2021;11(2):145-157.
51. Durucan F. First record of a praniza larva of the family Gnathiidae (Crustacea, Isopoda) living on *Chromogobius zebratus* (Pisces, Gobiidae) in the eastern Mediterranean Sea. *J Black Sea/Mediterranean Environ*. 2022; 28(1):121-3
52. Dušek L, Gelnar M, Šebelová S. Biodiversity of parasites in a freshwater environment with respect to pollution: Metazoan parasites of chub (*Leuciscus cephalus* L.) as a model for statistical evaluation. *Int J Parasitol*. 1998; 28:1555-1571.
53. Elbay MZ, Öztürk MO. An investigation on dactylogyrid parasite fauna of *Squalius recurvirostris* Özuluğ & Freyhof, 2011. *J Grad School Nat Appl Sci Mehmet Akif Ersoy Univ*. 2021; 12(2):255-262.
54. Emre N, Kubilay A. A research on helminth parasites of *Capoeta mauricii* (Küçük, Turan, Şahin & Güllü, 2009) from Sarıöz stream (Beyşehir, Konya). *LimnoFish*. 2022; 8(1):92-100.
55. Emre N, Aydoğdu N, Aydoğdu A, Emiroğlu Ö. Investigations on *Paradiplozoon bliccae* (Reichenbach-Klinke, 1961) (Monogenea: Diplozoidae) found in *Capoeta aydinensis*, an endemic fish in Türkiye, based on ecological, molecular and host related factor approaches. *Ege J Fish Aquat Sci*. 2023; 40(4):244-250.

56. Emre N, Aydoğdu N, Aydoğdu A, Emiroğlu Ö. Occurrence of *Paradiplozoon* spp. in vimba bream *Vimba vimba* from Lake Köyceğiz, southwest Türkiye, with new data on their distribution. *Oceanol Hydrobiol Stud.* 2024; 53(2):123-126.
57. Erdemir AN, Alkan Z, Azizoğlu Ergöz B, Sepil A, Oğuz Kaval E, Oğuz AR. Histopathology of the gills of Lake Van fish *Alburnus tarichi* (Güldenstädt, 1814) infected with *Dactylogyrus* spp. parasites. *The Palawan Scientist.* 2023; 15(1):34-40.
58. Ergüden D, Uygur N, Ayas D. The presence of *Pontobdella muricata* (Hirudinea: Piscicolidae), on the new host *Gymnura altavela* (Linnaeus, 1758) in the Eastern Mediterranean, Turkey. *Adv Underwater Sci.* 2023; 3(2):26-30.
59. Falkenberg JM, Golzio JESA, Pessanha A, Patrício J, Vendel AL, Lacerda ACF. Gill parasites of fish and their relation to host and environmental factors in two estuaries in northeastern Brazil. *Aquat Ecol.* 2019; 53:109–118.
60. Fioravanti ML, Caffara M, Florio D, Gustinelli A, Marcer F, *Sphaerospora dicentrarchi* and *S. testicularis* (Myxozoa: Sphaerosporidae) in farmed European seabass (*Dicentrarchus labrax*) from Italy. *Folia Parasitol.* 2004; 51:208–210.
61. Food and Agriculture Organization of the United Nations. The state of world fisheries and aquaculture 2022. Towards blue transformation. Rome, FAO. 2022. 261 p. <https://doi.org/10.4060/cc0461en>.
62. Gelen MY, Pekmezci GZ. Morphological and molecular characterization of *Hysterothylacium* larval morphotypes (Nematoda: Raphidascarididae) infecting edible marine fish in the Black Sea. *Parasitol Res.* 2023; 122:1863–1872.
63. Gökpınar S, Akkuş GN, Akdeniz S. A parasitological examination on aquarium fish sold in pet shops in Kırıkkale. *Turkish J Parasitol.* 2023; 47(3):160-165.
64. Guidelli GM, Isaac A, Takemoto RM, Pavanelli GC. Endoparasite infracommunities of *Hemisorubim platyrhynchos* (Valenciennes, 1840) (Pisces: Pimelodidae) of the Baía river, upper Paraná River floodplain, Brazil: specific composition and ecological aspects. *Braz J Biol.* 2003; 63:261–268.
65. Güçlü SS, Yıldırım UG, İnnal D, Özmen O. *Schistocephalus solidus* (Cestoda: Ligulidae) infection characteristics and pathology at the highest elevation record environment (Dalaman river basin, turkey). *J Adv Parasitol.* 2021; 8(3):32-36.
66. Gün A, Dörücü M. A study of endohelminthes in some fish species caught between Kumlutarla-Gemici regions of Karakaya Dam Lake. *Iranian J Fish Sci.* 2020; 19(1):488-495.
67. Gürkan Ş, Taylan B, Taşkavak E. Determination of the swim bladder parasite *Anguillicola crassus* (Nematoda, Dracunculoidea) in the European Eel, *Anguilla anguilla* (Linnaeus, 1758) from the locality Çamaltı Tuzla of İzmir Bay, Eastern Aegean Sea. *Turkish J Agriculture - Food Sci Tech.* 2022; 10(2):276-279.
68. Gürkanlı CT, Okkay S, Çiftçi Y, Özer A. Molecular and morphological description of *Myxidium parvum* (Cnidaria) from *Salaria pavo* (Blenniidae) in the Black Sea. *Parasitol Int.* 2022; 87:102520. <https://doi.org/10.1016/j.parint.2021.102520>
69. Güven A, Öztürk T. Morphological features of three species of *Phyllodistomum* (Trematoda: Gorgoderidae) from some marine fishes in the southern Black Sea. *Mar Biol J.* 2022; 7(1):46–54.
70. Hechinger RF, Lafferty KD. Host diversity begets parasite diversity: bird final hosts and trematodes in snail intermediate hosts. *Proc R Soc B: Biol Sci.* 2005; 272(1567):1059-1066.
71. İnnal D, Stavrescu-Bedivan M, Öztürk MO, Özmen Ö. First record of *Contracaecum rudolphii* Hartwich, 1964 in *Carassius gibelio* (Bloch, 1782) from Turkey. *Aquat Sci Eng.* 2020a; 35(1):1–5.
72. İnnal D, Özdemir F, Stavrescu-Bedivan M, Özmen O, Öztürk M. Occurrence of black spot disease induced by *Posthodiplostomum cuticola* (Nordmann, 1832) (Digenea: Diplostomatidae) in endemic and native fish of Turkey: seven new host records. *J Hell Vet Med Soc.* 2020b; 71(2):2120–2126.
73. İnnal D, Stavrescu-Bedivan MM, Özmen O. Prevalence and histopathological effects of parasitic copepod *Lernaea cyprinacea* in estuarine fishes from Mediterranean region of Turkey, with a new host record. *Agriculture and Forestry.* 2021; 67(4):165-174.
74. İpek ZZ, Kaya C, Kayış Ş. *Ligula intestinalis* infection in a native Leuciscid hybrid (*Alburnus derjugini* x *Squalius orientalis*) in the Kürtün Dam Lake, Northeast Anatolia. *Helminthologia.* 2022; 59(1):83–93.
75. İpek ZZ, Miaz M, Kayış Ş. Determination of the use of *Ligula intestinalis* as a bioindicator in malathion residues. *Env Sci Poll Res.* 2023; 30:80732–80740.
76. İspir İ, Özcan M. *Neoechinorhynchus rutili* (Acanthocephala) from *Capoeta trutta* as a bioindicator for heavy metal pollution in the Keban Dam Lake. *J Res Agriculture and Anim Sci.* 2023; 10(12):45-49.
77. İtik Ekinci A, Önalın Ş. Comparative molecular characterization of *Diplozoon* species from fishes. *Hydrobiol Res.* 2024; 2(2):35-41.
78. İtik Ekinci A, Sağlam N, Özkaraca M, Kılınç Ü. Morphological identification and pathology of *Myxobolus cyprini* and *Lamproglana pulchella* in some fish in Turkey. *Etlik Vet Mikrobiyol Dergisi.* 2022; 33(2):53-58.
79. İtik Ekinci A, Sağlam N, Türkan AT, Kılınç Ü, Çatalkaya M, Balcı M, et al. The study of myxosporean (Myxozoa) species in rainbow trout (*Oncorhynchus mykiss*) farmed in cages. *Ecol Life Sci.* 2024; 19(1):31-42.

80. Jaafar R, Ødegård J, Mathiessen H, et al. Quantitative trait loci (QTL) associated with resistance of rainbow trout *Oncorhynchus mykiss* against the parasitic ciliate *Ichthyophthirius multifiliis*. J Fish Dis. 2020; 43(12):1591–1602.
81. Jithendran KP, Natarajan M, Azad IS. Crustacean parasites and their management in brackishwater finfish culture. Marine Finfish Aquaculture Network, July–September: 2008; p. 47-50.
82. Jones M, Alexander ME, Snellgrove D, et al. How should we monitor welfare in the ornamental fish trade? Rev Aquac. 2022; 14:770–790.
83. Kamanlı SA. The discovery of *Caligus quadratus* Shiino, 1954 (Copepoda: Caligidae) in the Mediterranean Sea, with a new host record and supplementary morphological information obtained using confocal laser scanning microscope (CLSM) and 3D image processing. Parasitol Int. 2020; 79:102174.
84. Kayış Ş, Bingöl A, Er A, İpek ZZ. Parasitic examination of cultured trout species and Georgian shemaya (*Alburnus derjugini*) live in Kürtün Dam Lake. J Anatolian Env Anim Sci. 2020; 5(2):236-240.
85. Kesik HK, Çelik F, Türk C. Günyaktı Kılınç Ş, Şimşek S, Gül A. Sequence and haplotype analyses of *Ligula intestinalis* in *Acanthobrama marmid* (Cyprinidae) in Turkey. Acta Parasitol. 2024; 69:453–464.
86. Kestek S, Emre Y. Determination of helminth fauna and seasonal variations of *Pseudophoxinus antalyae* Bogutskaya, 1992. LimnoFish. 2021; 7(1):49-60.
87. King T. Wild caught ornamental fish: a perspective from the UK ornamental aquatic industry on the sustainability of aquatic organisms and livelihoods. J Fish Biol. 2019; 94(6):925-936.
88. Kirjušina M, Vismanis K. Checklist of the parasites of fishes of Latvia. FAO Fisheries Technical Paper. No. 369/3. Rome, FAO. 2007. 106 p.
89. Korkut N, Koyun M. Host type, host size and seasonal variations of infestation with *Diplostomum* sp. on some cyprinid fishes living in Murat River. Bingöl Araştırmaları Dergisi. 2020; 6(2):127-139.
90. Korkut N, Koyun M. Crustacean and protozoan parasites of some cyprinid fish living in the Murat River (Bingöl-Türkiye), with new host records. Aquatic Res. 2022; 5(2):154-164.
91. Koyun M. Prevalence and intensity of metazoan parasites of Mesopotamian spiny eel, *Mastacembelus mastacembelus* (Banks & Solander 1794) according to some parameters of the host, inhabiting in Euphrates-Tigris Basin. Biherean Biol. 2021; 15(2):117-123.
92. Koyun M, Atıcı AA. Growth and reproduction properties of the Doctor Fish, *Garra rufa* (Cyprinidae) infested with *Paradiplozoon bingolensis* Civanova et al., 2013 (Monogenea: Diplozoidae) in the Göynük Stream (Bingöl, Turkey). Acta Aquat Turcica. 2021; 17(4):580-595.
93. Koyuncu CE. *Argulus japonicus* (Thiele, 1900) infestation in Koi (*Cyprinus carpio* Linnaeus, 1758) culture. Acta Aquat Turcica. 2020; 16(1):66-70.
94. Koyuncu CE. The first record of *Argulus japonicus* Thiele, 1900 infestations on Telescope fish (*Carassius auratus*) of Mersin in Turkey. Adv Underwater Sci. 2021a; 1(1):16-20.
95. Koyuncu CE. Gill ectoparasites of Goldfish (*Carassius auratus*) imported from Syria. Adv Underwater Sci. 2021b; 1(1):8-10.
96. Koyuncu CE. The Determination of ectoparasites in two Lessepsian fish species caught in the northeast Mediterranean shores (Mersin). Adv Underwater Scis. 2022a; 2(2):23-26.
97. Koyuncu CE. *Ichthyophthirius multifiliis* (Fouget, 1878) infection in Telescope Goldfish (*Carassius auratus*) culture. MedFAR. 2022b; 5(2):65-70.
98. Koyuncu C E. *Ichthyophthirius multifiliis* (Fouget, 1878) infection in Koi (*Cyprinus carpio*, Linnaeus, 1758) culture, 1758) Culture. Adv Underwater Sci. 2022c; 2(2):37-39.
99. Koyuncu CE, Engin K. Histopathological changes in the gill tissue by some ectoparasites detected in *Poecilia reticulata* (Peters, 1859). Adv Underwater Sci. 2022; 2(1):9-11.
100. Kösem B, Öztürk MO. An investigation on endohelminth parasite fauna of *Cobitis simplicispinna* Hanko, 1924 from Asia Minor. Int J Fish Aquat Stud. 2021; 9(6):55-58.
101. Kumaş K, Dinçtürk E, Tanrıkul TT. Multiparasitism (argulosis, lerneosis, gyrodactylosis) occurred on carp in brackish water conditions. International Symposium on Fisheries and Aquatic Sciences (SOFAS), October 24-26, Trabzon, Türkiye, 2023. 29 p.
102. Kumaş K, Dinçtürk E, Tanrıkul TT. First *Gnathia* sp. (Gnathiidae) Infestation on *Labrus viridis* (Labridae) in Türkiye. Acta Aquat Turcica. 2024; 20(1):62-70.
103. Kuran K. Koç HT, Erdoğan Z, Oğuz MC. *Anisakis simplex* (Rudolphi, 1809), *Hysterothylacium aduncum* (Rudolphi, 1802) and *Pseudoterranova decipiens* (Krabbe 1878) (Nematoda; Anisakidae) parasites in some commercial fish species from Edremit Bay (Northern Aegean Sea). Menba J Fish Faculty. 2021; 7(1):64-76.
104. Kuris AM, Blaustein AR, Alio JJ. Hosts as Islands Amer Naturalist. 1980; 116:570–586.
105. Kvach Y, Tkachenko MY, Giannetto D, Míc R, Bartáková V, Ağdamar S, et al. Low genetic and parasite diversity of invasive pumpkinseed *Lepomis gibbosus* (Centrarchidae) expanding in Türkiye. Diversity. 2024; 16(5):272.
106. Lacerda ACF, Roumbidakis K, Bereta-Junior JGS, Nuñez APO, Petrucio MM, Martins ML. Fish parasites as indicators of organic pollution in southern Brazil. J Helminthol. 2017; 92:322–331.
107. Lafferty KD. Environmental parasitology: What can parasites tell us about human impacts on the environment? Parasitol Today. 1997; 13:251–255.

108. Lafferty KD. Ecosystem consequences of fish parasites. *J Fish Biol.* 2008; 73:2083–2093.
109. Lafferty KD, Kuris AM. How environmental stress affects the impacts of parasites. *Limnol Oceanogr.* 1999; 44:925–931.
110. Luque JL, Cruces C, Chero J, Paschoal F, Alves PV, Da Silva AC, et al. Checklist of metazoan parasites of fishes from Peru. *Neotrop Helminthol.* 2016; 10(2):301–375.
111. Madhavi R. Checklist of digenean trematodes reported from Indian marine fishes. *Syst Parasitol.* 2011; 78:163–232.
112. Marcogliese DJ. Parasites of the superorganism: Are they indicators of ecosystem health? *Int J Parasitol.* 2005; 35:705–1600.
113. Martins ML, Cardoso L, Marchiori N, Pádua SB. Protozoan infections in farmed fish from Brazil: diagnosis and pathogenesis. *Brazil J Vet Parasitol.* 2015; 24:1–20.
114. McKiernan JP, Grutter AS, Davies AJ. Reproductive and feeding ecology of parasitic gnathiid isopods of epaulette sharks (*Hemiscyllium ocellatum*) with consideration of their role in the transmission of a haemogregarine. *Int J Parasitol.* 2005; 35:19–27.
115. Misganaw K, Getu A. Review on Major Parasitic crustacean in fish. *Fish Aquacult J.* 2016; 7:175–179.
116. Montes MM, Castro-Romero R, Öktener A, Balcazar D, Cardarella GFR, Martorelli S. Molecular evidence supports the validity of three *Parabrachiella* species infecting mugilids. *Acta Tropica.* 2022; 225:106211. <https://doi.org/10.1016/j.actatropica.2021.106211>
117. Nejat F, Benovics M, Řehulková E, Vukić J, Šanda R, Kaya C, et al. Diversity, phylogeny and intraspecific variability of *Paradiplozoon* species (Monogenea: Diplozoidae) parasitizing endemic cyprinoids in the Middle East. *Parasitol.* 2023; 150:705–722.
118. Noga EJ. Fish disease: Diagnosis and treatment, 2nd ed., Wiley-Blackwell, Iowa, 2010. 519 pp.
119. Nolan DT, Van Der Salm AL, Wendelaar Bonga SE. The host parasite relationship between the rainbow trout (*Oncorhynchus mykiss*) and the ectoparasite *Argulus foliaceus* (Crustacea: Branchiura): epithelial mucous cell response, cortisol and factors which may influence parasite establishment. *Contrib Zool.* 2000; 69:57–63.
120. Odabaş-Alver D, Ertürk Ö, Gürkanlı CT. Biodiversity and parasitological characteristics of Myxozoa (Cnidaria) infecting European seabass, *Dicentrarchus labrax* (Linnaeus, 1758) in the Aegean Sea coasts of Türkiye. *Turkish J Fish Aquat Sci.* 2024; 24(10):TRJFAS25882. <https://doi.org/10.4194/TRJFAS25882>
121. Oğuz AR, Oğuz EK. Histopathology and immunohistochemistry of gills of Van fish (*Alburnus tarichi* Güldenstädt, 1814) infected with myxosporean parasites. *J Histotechnol.* 2019; 43(2):76–82.
122. Okay S, Gümüş H. Detection of parasites in bluefish (*Pomatomus saltatrix* Linnaeus, 1766) from fish markets in Kocaeli, Türkiye. *IMASCON 2024*, 29-30 Nov. 2024; pp. 457–462.
123. Okay S, Özer A. Parasitic isopods on some marine fishes caught from the coasts of Sinop in the Black Sea, Turkey. *Ege J Fish Aquat Sci.* 2021; 38(2):219–222.
124. Okay S, Özer A. Metazoan parasites of *Mullus surmuletus* collected from the Turkish coasts of the western Black Sea. *Sivas International Conference on Scientific and Innovation Research*, 2022 October 13-15; Sivas, Türkiye, pp. 1234–1243
125. Okay S, Özer A. Parasite fauna of chub *Squalius cephalus* (L., 1758) (Actinopterygii: Leuciscidae) from a stream system in Kocaeli Province, Türkiye. *Acta Zool Bulgarica.* 2023; 75(4):549–562.
126. Okay S, Gürkanlı CT, Çiftçi Y, Yurakhno V, Özer A. First report of *Ceratomyxa scorpaeni* (Cnidaria: Myxozoa) from *Scorpaena porcus* in the Black Sea. *Zootaxa.* 2021; 5067(3):429–438.
127. Okay S, Gürkanlı CT, Çiftçi Y, Özer A. New molecular evidence on the members of the genus *Ortholinea* (Cnidaria, Myxozoa) and the description of *Ortholinea hamsiensis* n. sp. infecting the urinary bladder of European anchovy *Engraulis engrasicolus* in the Black Sea. *Parasitol.* 2024; 151:485–494.
128. Öktener A. Morphological description of the parasitic copepod *Pandarus boscii* (Siphonostomatoida: Pandaridae) found on the Picked dogfish *Squalus acanthias* (Squaliformes: Squalidae) in Turkish waters. *Rev Biol Mar Oceanogr.* 2022; 57(3):124–134.
129. Öktener A, Bănăduc D. Ecological interdependence of pollution, fish parasites, and fish in freshwater ecosystems of Turkey. *Water.* 2023; 15(7):1385. <https://doi.org/10.3390/w15071385>
130. Öktener A, Sazima I. *Caligus minimus* (Copepoda: Caligidae) parasitic on the gills of a remora *Echeneis naucratus* attached to a seabass *Dicentrarchus labrax* in Köyceğiz-Dalyan Lagoon Lake, Aegean Sea, Turkey. *Annales Ser Hist Nat.* 2021; 31(1):159–164
131. Öktener A, Trilles JP. Host selectivity of *Nerocila orbingyi* (Guerin-Meneville, 1832) (Isopoda, Cymothoidae) with a record of a new host from the Sea of Marmara (Turkey). *Transylv Rev Syst Ecol Res.* 2021; 23(1):37–57.
132. Öktener A, Tuncer S. Occurrence of *Gnathia* larvae (Crustacea, Isopoda, Gnathiidae) in three lessepsian fish species in the southern Turkish coast of the Aegean Sea. *Annales Ser Hist Nat.* 2020; 30(1):87–97.
133. Öktener A, Ünal A. Infestation of fish louse *Argulus foliaceus* (Linnaeus, 1758) (Crustacea: Branchiura) on rainbow trout farm in Manyas Dam Lake, Turkey. *J Wetlands Biodiversity.* 2020; 10:95–111.

134. Öktener A, Tuncer S, Trilles JP. *Nerocila milesensis* n. sp. (Isopoda: Cymothoidae) parasitic on devil firefish *Pterois miles* (Bennett, 1828) from the South Aegean Sea, Turkey. *Vie et milieu - Life Environ.* 2020; 70(1):7-17.
135. Öktener A, Montes M, Romero RC, Türker D, Trilles JP. *Caligus turkiyensis* n. sp. (Copepoda: Caligidae) on the flathead grey mullet, *Mugil cephalus* (Linnaeus) (Mugiliformes: Mugilidae) from the Sea of Marmara, Turkey. *Vie et milieu - Life Environ.* 2024; 74(1-2):44-66.
136. Önalın Ş, Atıcı AA, Sepil A, Şen F. First report of *Ligula intestinalis* (Cestoda: Pseudophyllidae) in *Barbus ercisianus* (Cypriniformes: Cyprinidae) from the Nemrut Crater Lake, Turkey. *Yüzüncü Yıl University J Agricult Sci.* 2022; 32(1):11-20.
137. Özer A. Checklist of marine, freshwater, and aquarium fish parasites in Turkey. Turkish Marine Research Foundation (TUDAV) Publication No: 62, Istanbul, Turkey, 2021.
138. Özer A. Parasite biodiversity of marine, freshwater, and aquarium fishes in Turkey. In: Akar, T., Daşdemir, İ., Cengizler, İ. Editors, *Current Research in Agriculture, Forestry and Aquaculture*, Gece Kitaplığı Yayınevi, 2022. p. 127-143.
139. Özer A, Acar G. Influence of the seasonal and host related factors on the metazoan parasites of *Chelon saliens* (Mugilidae) in the Turkish coast of the Black Sea. *Ann Parasitol.* 2022; 68(2):353-365.
140. Özer A, Yurakhno V, Öztürk T, Kornyychuk M. Myxosporean parasites of *Ceratomyxa merlangi* and *Myxidium gadi* in whiting *Merlangius merlangus*: a comparative epizootiological analysis based on samples from two localities off southern and northern coasts of the Black Sea. *Parasitol Res.* 2017; 116:2463-2469.
141. Özer A, Gürkanlı CT, Okkay S, Çiftçi Y, Yurakhno V. Molecular and morphological description of *Ceratomyxa scopthalmi* sp. nov. (Myxozoa) infecting *Scophthalmus maeoticus* and first report of *Myxidium finnmarkicum* in the Black Sea. *Dis Aquat Org.* 2022; 151:85-96.
142. Özil Ö. Antiparasitic activity of medicinal plants against protozoan fish parasite *Ichthyophthirius multifiliis*. *Israeli J Aquaculture – Bamidgeh.* 2023; 75(2):1-9.
143. Özil Ö, Diler Ö, Nazıroğlu M, Atabay A. The presence and histopathology of encysted metacercaria of *Clinostomum complanatum* (Rudolphi, 1819) (Digenea: Clinostomidae) in *Garra rufa* (Heckel, 1843). *J. Adv Parasitol.* 2022; 9(1):1-7.
144. Özmen Ö, Stavrescu-Bedivan MM, İnnal D. Histopathological aspects caused by nematod parasite *Eustrongylides excisus* observed in some fish species of Eğirdir Lake, Turkey. *AgroLife Sci J.* 2021; 10(1):172-178.
145. Öztürk MO. An investigation on *Argulus foliaceus* (Crustacea) infestation of fishes in the Kunduzlar Dam Lake. *J Limnol Freshwater Fish Res.* 2022; 8(3):282-288.
146. Öztürk K, Öztürk MO. DNA sequence based molecular identification of *Eustrongylides excisus* larvae in *Sander lucioperca* from Lake Eğirdir. *J Grad School Nat Appl Sci Mehmet Akif Ersoy Univ.* 2023; 14(2):346-354.
147. Öztürk T, Güven A. Digenean parasites of labrid fishes (Labridae: *Symphodus*) from Turkish coasts of the Black Sea. *Aquat Sci Eng.* 2021; 36(3):126-132.
148. Öztürk T, Güven A. Trichodinid ectoparasites (Ciliophora: Peritrichida) from gills of some marine fishes of Sinop coasts of the Black Sea, with the first report of *Trichodina rectuncinata*. *Aquat Res.* 2022a; 5(4):295-306.
149. Öztürk T, Güven A. Cestode parasites of some marine fishes from Turkish coast of the Black Sea. In: *New Trends in Agriculture, Forestry and Aquaculture Sciences* (Eds: Ersoy, N.). 2022b. p. 355-380.
150. Öztürk T, Güven A. First report of *Aphanurus stossichii* (Digenea: Hemiuridae) from *Engraulis encrasicolus* on the Turkish coast of the Black Sea, with light and Scanning Electron Microscopic observations. *Turkish Parasitol J.* 2023; 47(1):42-48.
151. Pekmezci GZ. Genetic analysis of the mitochondrial rrnS gene of zoonotic *Anisakis pegreffii* (Nematoda: Anisakidae) isolated from *Micromesistius poutassou* (R.) in the Aegean Sea. *J Anatolian Env Anim Sci.* 2021; 6(2):266-269.
152. Pekmezci GZ, Onuk EE. Molecular characterization of *Anisakis typica* (Nematoda: Anisakidae) from the Mediterranean Sea coasts of Turkey: First mitochondrial rrnS sequence data. *J Anatolian Env Anim Sci.* 2020; 5(2):241-244.
153. Pekmezci GZ, Bölükbaş CS. Morphological and molecular characterization of *Eustrongylides excisus* larvae (Nematoda: Dioctophymatidae) in *Sander lucioperca* (L.) from Northern Turkey. *Parasitol Res.* 2021; 120:2269-2274.
154. Pekmezci GZ, Yardımcı B, Bölükbaş CS, Yılmaz S, Polat N. Four novel *Myxobolus* species (Cnidaria: Myxozoa) infecting Anatolian khrumulya *Capoeta tinca* (Cyprinidae) in northern Turkey. *Dis Aquat Org.* 2021a; 144:41-54.
155. Pekmezci GZ, Atkinson SD, Yardımcı B, Bölükbaş CS, Özpiçak M, Yılmaz S. Novel and known myxobolids (Cnidaria, Myxozoa) infecting *Chondrostoma angorense* (Cypriniformes: Leuciscidae) in Turkey. *Parasitol Int.* 2021b; 83:102339.

156. Pekmezci GZ, Yıldırım A, DüzlÜ Ö, Şimşek E, Balta F, Yardımcı B, Onuk EE, Önder Z, Çiloğlu A, Yetişmiş G, Yılmaz E, İnci A. Genetic diversity of *Ichthyophthirius multifiliis* (Fouquet, 1876) infecting farmed rainbow trout (*Oncorhynchus mykiss* Walbaum, 1792) in Turkey. J Fish Dis. 2022; 45:1109–1115.
157. Pouil S, Tlustý MF, Rhyne AL, Metian M. Aquaculture of marine ornamental fish: overview of the production trends and the role of academic in research progress. Rev Aquac. 2019; 12(2):1217-1230.
158. Putra RS, Amri RY, Ayu M. Turbidity removal of synthetic wastewater using biocoagulants based on protein and tannin. Proceedings of the 5th International Symposium on Current Progress in Mathematics and Sciences. 2020; 2242:040028. <https://doi.org/10.1063/5.0007846>
159. Ragias V, Tontis D, Athanassopoulou F. Incidence of an intense *Caligus minimus* Otto 1821, *C. pageti* Russell, 1925, *C. mugilis* Brian, 1935 and *C. apodus* Brian, 1924 infection in lagoon cultured sea bass (*Dicentrarchus labrax* L.) in Greece. Aquaculture. 2004; 242:727-733.
160. Salgado-Maldonado G. Checklist of helminth parasites of freshwater fishes from Mexico. Zootaxa. 2006; 1324:1–357.
161. Salman A. Infection of the swim bladder parasite *Anguillicoloides crassus* in the European eel (*Anguilla anguilla*) caught from the Gediz Delta (Aegean Sea). Ege J Fish Aquat Sci. 2023; 40(1):15-19.
162. Santoro M, Mattiucci S, Cipriani P, Bellisario B, Romanelli F, Cimmaruta R, et al. Parasite communities of icefish (*Chionodraco hamatus*) in the Ross Sea (Antarctica): influence of the host sex on the Helminth Infracommunity Structure. PLoS ONE. 2014; 9(2):e88876 <https://doi.org/10.1371/journal.pone.0088876>
163. Saraiva A, Costa J, Serrão J, Eiras JC, Cruz C. Study of the gill health status of farmed sea bass (*Dicentrarchus labrax* L., 1758) using different tools. Aquaculture. 2015; 441:16-20.
164. Selbach C, Soldánová M, Feld C, Kostadinova A, Sures B. Hidden parasite diversity in a European freshwater system. Scientific Reports. 2020; 10: 2694 <https://doi.org/10.1038/s41598-020-59548-5>
165. Selçuk MA, Çelik F, Şimşek S, Ahmed H, Kesik HK, Günyaktı Kılınç, et al. Genetic, haplotype and phylogenetic analysis of *Ligula intestinalis* by using mt-CO1 gene marker: ecological implications, climate change and eco-genetic diversity. Brazil J Biol. 2024; 84:e258626 <https://doi.org/10.1590/1519-6984.258626>.
166. Shinn AP, Pratoomyot J, Bron JE, Paladini G, Brooker EE, Brooker AJ. Economic costs of protistan and metazoan parasites to global mariculture. Parasitol. 2015; 142(1):196–270.
167. Šimková A. Host-specific monogeneans parasitizing freshwater fish: The ecology and evolution of host-parasite associations. Parasite. 2024; 31: 61. <https://doi.org/10.1051/parasite/2024058>
168. Sitjà-Bobadilla A. Fish Immune Response to Myxozoan Parasites. Parasite. 2008; 15: 420-425.
169. Sitja-Bobadilla A, Alvarez-Pellitero P. Light and electron microscopic description of *Sphaerospora dicentrarchi* n. sp. (Myxosporea: Sphaerosporidae) from wild and cultured sea bass, *Dicentrarchus labrax* L. J Protozoo. 1992; 39:273-281.
170. Sitja-Bobadilla A, Alvarez-Pellitero P. Light and elec-tron microscopical description of *Ceratomyxa labracis* n. sp. and a redescription of *C. diplodae* (Myxosporea: Bivalvulida) from wild and cultured Mediterranean seabass *Dicentrarchus labrax* (L.) (Teleostei: Serranidae). Syst Parasitol. 1993; 26:215–223.
171. Smith VH. Cultural eutrophication of inland, estuarine, and coastal waters. In: Pace ML, Groffman PM (eds) Successes, limitations and frontiers in ecosystem science. Springer, New York, 1998. p. 7–49
172. Sures B. Host parasite interactions in polluted environments. J Fish Biol. 2008; 73:1–10.
173. Syahputra K, Kania PW, Al-Jubury A, Marnis H, Setyawan AC, Buchmann K. Differential immune gene response in gills, skin, and spleen of rainbow trout *Oncorhynchus mykiss* infected by *Ichthyophthirius multifiliis*. PLoS ONE. 2019; 14(6):e0218630 <https://doi.org/10.1371/journal.pone.0218630>
174. Şahin Taner, G, Keskin E, Yavuzcan Yıldız H. A note on *Thaparocleidus caecus* (Mizelle & Kritsky, 1969) (Monogenea: Dactylogyridae) detected with morphological and molecular tools in *Pangasianodon hypophthalmus* (Sauvage, 1878) imported into Türkiye. Aquat Sci Eng. 2022; 37(2):119-122.
175. Şimşek E, Yıldırım A, İnci A, DüzlÜ Ö, Yılmaz E, Önder Z, et al. First molecular characterization of *Posthodiplostomum cuticola* (von Nordmann, 1832) Dubois, 1936 (Trematoda: Diplostomidae) metacercariae infecting the gills of chubs (*Squalius cephalus*) in Turkey. Kocatepe Vet J. 2020; 13(1):1-7.
176. Şimşek E, Sursal N, Karademir GK, Pekmezci GZ. First molecular characterization of *Hysterothylacium fabri* larvae (Nematoda: Raphidascarididae) in the Mediterranean Sea based on the small subunit ribosomal RNA gene sequence. Kocatepe Vet J. 2021; 14:71-76.
177. Takemoto RM, Lizama MAP, Guidelli GM, Pavanelli GC. Parasitos de peixes de águas continentais. In: Ranzani-Paiva MJT Takemoto RM Lizama MLA (eds) Sanidade de Organismos Aquáticos. Editora Varela, São Paulo, 2004. p. 179–197
178. Timi JT, Buchmann K. A century of parasitology in fisheries and aquaculture. J Helminthol. 2023; 97: e4 <https://doi.org/10.1017/S0022149X22000797>
179. Torcu Koç, H., Erdoğan, Z. *Anisakis* spp. (Nematoda: Anisakidae) case in the small spotted dogfish (*Scyliorhinus canicula* (Linnaeus, 1758)) caught from the Sea of Marmara (Turkey). J. BAUN Inst Sci. Technol. 2021; 23(1):65-71.

180. Truong VT, Ngo HTT, Bui TQ, Palm HW, Bray RA. Marine fish parasites of Vietnam: a comprehensive review and updated list of species, hosts, and zoogeographical distribution. *Parasite*. 2022; 29: 36. <https://doi.org/10.1051/parasite/2022033>.
181. Türe M. Molecular identification of *Uronema marinum* (Protozoa, Ciliophora, Scuticociliatia) in cultured turbot (*Psetta maxima*) larvae. *Vet Res Forum*. 2021; 12(1):121-124.
182. Van Q P, Yılmaz BH, Yıldız HY. In vitro antiparasitic activity of ginger (*Zingiber officinale*) bulb and pomegranate (*Punica granatum*) peel against monogenean fish parasite, *Dactylogyrus* sp.. *Acta Aquat Turcica*. 2021; 17(1):56-63.
183. Yalın FB, Emre N, Emre Y, Kaymak N. Influence of the host sex, size, and season on *Ergasilus lizae* infestation of thicklip grey mullet (*Chelon labrosus*, L., 1758) in Beymelek Lagoon Lake (Antalya, Türkiye). *Limnofish*. 2023; 9(3):147-153.
184. Yanar A, Turan C, Doğdu SA. Report of *Nerocila bivittata* (Risso, 1816) (Isopoda: Cymothoidae) parasitic on alien fish, *Pterois miles* (Bennett, 1828) from the Aegean and Mediterranean Sea. *NEsciences*. 2022; 7(2):169-181.
185. Yanar A, Kamanlı SA, Sönmez S, Hamdi İ, Özak AA, Boxshall GA. *Caligus minimus* Otto, 1821 (Copepoda: Caligidae): A commercially important but poorly described parasite of cultured European Sea Bass, *Dicentrarchus labrax* (Linnaeus, 1758). *Parasitol Int*. 2025; 104:102964 <https://doi.org/10.1016/j.parint.2024.102964>
186. Yardımcı B, Pekmezci GZ, Bölükbaş CS, Özpiçak M, Yılmaz S, Polat N. Morphological, histological, and molecular evidence of *Myxobolus spinacurvatura* (Cnidaria: Myxosporidia) from *Mugil cephalus* in the Turkish Black Sea coast. *Turkish J Vet Anim Sci*. 2020; 44:968-974.
187. Yardımcı RE, Turgay E, Karataş S. First case of chronic systemic spironucleosis in freshwater angelfish (*Pterophyllum scalare* Schultze, 1823) in Türkiye. *Ankara Univ Vet Fak Dergisi*. 2023; 70(2):231-236.
188. Yavuzcan H. Validity of visible ectoparasite intensity as a non-invasive biomarker for Fish welfare: Parasitic copepod, *Lernanthropus kroyeri* in sea bass as an example. *Aquat Sci Eng*. 2024a; 39(1):30-35.
189. Yavuzcan Yıldız H. The efficacy of salt treatment for *Dactylogyrus extensus* (Monogenea) infection in carp (*Cyprinus carpio*). *Aquat Res*. 2024b; 7(1):1-7.
190. Yavuzcan Yıldız H, Korkmaz AŞ. Parasitic copepod (*Lernanthropus kroyeri*) on caged sea bass (*Dicentrarchus labrax*): An estimation of abundance and internal infestation pressure. *J Fish Dis*. 2021; 44:1901-1909.
191. Yavuzcan Yıldız H, Ötgücüoğlu Ö. Marine fish parasite, *Lernanthropus kroyeri* (Copepoda) is a repository of *Vibrio anguillarum* as evidenced by Loop-Mediated Isothermal Amplification method. *Ankara Univ Vet Fak Dergisi*. 2021; 68:297-300.
192. Yavuzcan Yıldız H, Harmansa Yılmaz B. Dietary citric acid decreased the theront number of *Cryptocaryon irritans* (Ciliata) in seawater-adapted tilapia (*Oreochromis niloticus*). *J Fish Dis*. 2024; 47:e13881.
193. Yavuzcan Yıldız H, Genç E, Kaya D, Yılmaz B. Predictive model for the nematode (*Hysterothylacium aduncum*) in horse mackerel, *Trachurus trachurus* from the Black Sea. *Mar Life Sci*. 2024; 6(1):10-16.
194. Yıldırım P, Kan Ş, Güçlü S, Özmen Ö, Özdamar A, Bahrioglu E, Kubilay A. Bacterial and parasitic co-infection in *Carassius gibelio* Bloch, 1782 caught in the Onaç Reservoir, Türkiye. *J Hell Vet Med Soc*. 2024; 75(2):7315-7324.