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ORIGINAL ARTICLE

NEW RECORD OF TWO *EURYHALIOTREMA* KRITSKY & BOEGER, 2002 SPECIES (MONOGENOIDEA, DACTYLOGYRIDAE) FROM LUTJANID FISHES FROM MARINE COAST OFF IRAQ

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ABSTRACT

The snappers (Lutjanid fish) are an important food source for the Iraqi people. Three species of lutjanid fishes- the Blackspot snapper *Lutjanus ehrenbergii* (Peters, 1869), Dory snapper *L. fulviflamma* (Forsskål, 1775) and *L. indicus* Allen, White & Erdmann, 2013 were caught from Iraqi marine waters in the Arabian Gulf during 2024. The Blackspot snapper *L. ehrenbergii* and the Dory snapper *L. fulviflamma* were found to be infested with both *Euryhaliotrema adelpha* Kritsky & Justine in Kritsky, 2012 (reported here as a new host) and *E. spirotubiforum* (Zhang, 2001) Wu, Zhu, Xie & Li, 2006. *L. indicus* was infested only with *E. spirotubiforum* which is reported here for the first time from this host species and this geographical area (the Arabian Gulf). Illustrations of whole- mount specimens are given for *E. adelpha* for the first time. This investigation represents the first report of monogenoids from lutjanid fishes in Iraq.

Keywords: Arabian Gulf, Ectoparasite, Fish, Gills, Iraq, Snappers.

INTRODUCTION

The Arabian Gulf environment is unique due to its harsh ecological conditions, such as extreme temperatures (ranging between 12 C and 36 C), shallow depth (average 35 meters), and salinity reaching 45 ppt. These conditions encourage the study of fish diversity in this region (Taghavimotlagh *et al*., 2024).

Lutjanidae includes some of the most economically important demersal fishes in the Middle East; the Blackspot Snapper *Lutjanus ehrenbergii* (Peters, 1869), Dory snapper *L. fulviflamma* (Forsskål, 1775) and *L. indicus* Allen, White & Erdmann, 2013 are three Indo-Pacific species, which have significant economic and ecological relevance in the Red Sea,

Arabian Sea, and Arabian Gulf region (Kuiter and Tonozuka, 2001; Allen *et al*., 2013). However, knowledge of these species in the Arabian Gulf region remains limited. In Iraq, Lutjanidae is represented by five genera and 16 species (Ali *et al*., 2018; Al-Faisal and Mutlak, 2018). The blackspot Snapper is a general carnivore, feeding on benthic invertebrates (e.g. amphipods, isopods) and small fish (Randall, 1995, D'Agostino *et al*., 2020*)*. The dory snapper feeds chiefly on fishes, crabs, shrimps, and other crustaceans (Froese and Pauly, 2025). *Lutjanus indicus* Allen, White & Erdmann 2013 is found in coral-reef habitats, usually occurring alone or in small groups of about 5-15 m depth. This species is often confused with *L. russelli* (Bleeker 1849) in the populations are distributed in the western Indian Ocean (Allen *et al*., 2013; Froese and Pauly, 2025), including the Arabian Gulf (Ali, 2016).

Over nearly half a century of parasitological studies in Iraq (1969-2017), only 21 monogenean parasite species were recorded from marine fishes in Iraq (Mhaisen *et al.*, 2018). Subsequently, 28 additional species, belonging to two families- Dactylogyridae (12 species) and Diplectanidae (16 species) were reported (Al-Darwesh *et al*., 2022a, b; Al-Darwesh, 2023; Al-Darwesh *et al*., 2025). Furthermore, two more species, including a new *Platycephalotrema* species (Dactylogyridae) and a new combination species (Diplectanidae) were described by Kritsky *et al.* (2024).

Due to the absence of previous studies on monogenoid parasites of Lutjanidae in Iraq, this study was conducted by collecting fresh specimens of lutjanid fishes and properly fixing their parasites to get additional information on the biodiversity of monogenoids infecting lutjanid fishes in Iraq and parts of the Arabian Gulf.

MATERIALS AND METHODS

A total of 142 specimens of snappers, including 47 Blackspot snapper *Lutjanus ehrenbergii* (Peters, 1869), 21 Dory snapper *L. fulviflamma* (Forsskål, 1775) and 74 *L. indicus* Allen, White & Erdmann 2013 were obtained by fishermen utilizing trawl nets from the marine waters of Iraq within the coordinates 29°53'-29°85'N and 48°13-48°40'E, during January, February, April and August-December 2024 for helminthological observation.

Detailed procedures related to specimen transport, fixation (hot 5% formalin), clearing of sclerotized structures of some parasite specimens (Gray and Wess medium), or staining (Gomori's trichrome), mounting and of drawing helminths (camera Lucida) were clarified in detail (Kritsky *et al*., 2024). The term" minimum prevalence" is used by Kritsky *et al.* (2013).

All measurements are reported in micrometres, with the mean values presented in parentheses. Host taxonomy was aligned with the classifications provided by Carpenter *et al.* (1997) and subsequently verified by Fricke *et al.* (2025).

RESULTS AND DISCUSSION

Family, Dactylogyridae Bychowsky, 1933

Genus, ***Euryhaliotrema*** Kritsky & Boeger, 2002

Euryhaliotrema adelpha Kritsky & Justine, 2012

Host: Blackspot snapper, *Lutjanus ehrenbergii* (Peters, 1869) and Dory snapper *L. fulviflamma* (Forsskål, 1775).

Locality and date of collection: Arabian Gulf off southern Iraq (29°53'-29°85'N, 48°13-48°40'E), October and December 2024.

Prevalence: 17% (8 infested from 47 examined) and 4.8 % (1 infested from 21 examined).

Site of infestation: Gills.

Voucher deposition: Iraq Natural History Research Center and Museum, INHM TRC 98, INHM TRC 101, INHM TRC 107, INHM TRC 108, INHM TRC 116.

Specimens studied: 13 (8 stained and 5 in Gray and Wess).

Description: Body fusiform in shape, 368 (290-420±59, n=9) in length (Fig.1A), with broadest width 68 (56-85±10, n=9) at the level of testis. Tegument smooth. Cephalic region characterized by a broad structure with moderately developed cephalic lobes. Two pairs of eyespots, with the posterior pair larger than the anterior pair and in closer proximity compared to those of the anterior pair. Pharynx subspherical 23 (18-25±3, n=5) in width. Peduncle broad, showing no significant taper toward posterior end; haptor subhexagonal and exhibiting bilateral lobes, 65 (54-75±7, n=8) in width. Both anchors exhibit a similar morphology; each anchor has a poorly recognized deep root, an elongate and slightly low superficial deep root, gently curved shaft, and a point that extends beyond the tip of the superficial root. The shaft and point of the anchor are continuous in structure, Ventral anchors (Fig. 1B) 34 (33-35±1, n=14) in length and dorsal anchors (Fig. 1C) 34 (33-35±1, n=16) in length. Ventral bar (Fig. 1D) is an undulant rod with protruding ends directed posterolaterally, 36 (30-38±3, n=10) in length. The dorsal bar delicate and V-shaped (Fig. 1E), 34 (32-35±1, n=10) in length. Hook (Fig. 1F) has a regular shank with a standing, intense thumb; 11 (10-12±1, n=26). MCO (Fig. 1G) has a cone-like basal morphology and a loosely coiled shaft with a single, finely formed counterclockwise ring, without accessory piece, 31 (28-36±3, n=9) in length. Testis elongated ovate 73 (50-88±14, n=7) in length and 35 (25-40±6, n=7) in width. Ovary subglobular to cylindrical 48 (30-57±10, n=6) in length and 33 (25-36±5, n=6) in width. Prostate reservoir consists of two parts: an oval-shaped part located to the right of MCO, and a spherical part situated posterior to the MCO. The seminal vesicle spherical and situated posterior to the MCO, to the right of the prostate reservoir. Vitellaria dense, extending from the posterior end of the pharynx, through the intercaecal area to just posterior of the cyclocoel. Egg not observed.

Euryhaliotrema adelpha was originally described from the five-lined snapper *Lutjanus quinquelineatus* (Bloch, 1790), in New Caledonia by Kritsky (2012). This description did not include an illustration of the whole specimen. According to Kritsky (2019, 2023), *E. adelpha* belongs to a group of species that lack an accessory piece in the MCO. This group includes two *Euryhaliotrema* species from chaetodontid fishes: *Euryhaliotrema cribbi* (Plaisance & Kritsky, 2004) and *E. monoporosum* (Pan & Zhang, 2000); six species from lutjanid fishes: *E.*

adelpha Kritsky & Justine, 2012, *E. nanaoense* (Li, Yan, Lan & Huang, 2005), *E. paululum* Kritsky & Justine, 2012, *E. russellum* Sun & Yang, 2015; *E. spirotubiforum* (Zhang, 2001) Wu, Zhu, Xie & Li, 2006, and *Euryhaliotrema youngi* Kritsky, 2012; one *Euryhaliotrema* species from a monodactylid: *E. solenophallus* Kritsky, 2019; and two *Euryhaliotrema* species from sparid fishes: *Euryhaliotrema kurodai* (Ogawa & Egusa, 1978) and *E. spariense* (Roubal, 1981).

Within *Euryhaliotrema* species infested lutjanid fishes, *Euryhaliotrema adelpha* differs from *E. nanaoense* by being short having a single coil in the MCO shaft, in contrast to the long and straight shaft of MCO and by variation in the shape of the anchors between the two species. *E. adelpha* and *E. paululum* have similar bars, anchors and MCO, but the postmedial process on the dorsal bar is present only in *E. paululum*.

Euryhaliotrema russellum differs from *E. adelpha* by possessing a straight MCO shaft, whereas *E. adelpha* has a coiled shaft. *E. adelpha* has less robust dorsal and ventral anchors than in *E. spirotubiforum*; the distal end of the shaft in *E. spirotubiforum* comprises a complete coil, which is absent in *E. adelpha*.

Euryhaliotrema youngi differs from *E. adelpha* in that the MCO shaft comprises a wide coil with more than one ring. The present specimens of *E. adelpha* collected from *L. ehrenbergii* (Peters, 1869) in Iraq are identical to those from *L. quinquelineatus* (Bloch, 1790) in New Caledonia, but our specimens have larger soft tissues (Tab. 1).

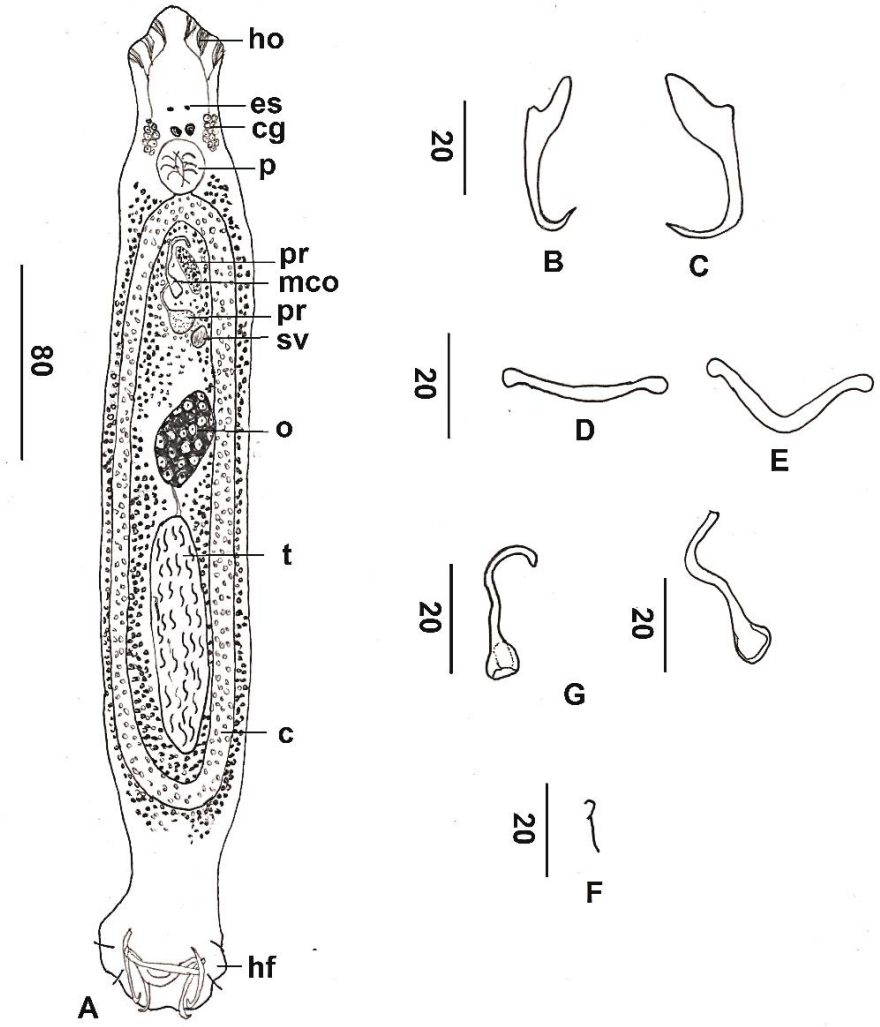

Figure (1): *Euryhaliotrema adelpha*; **(**A) Entire-ventral view, (B) Ventral anchor, (C) dorsal anchor, (D) ventral bar, (E) Dorsal bar, (F) hook, (G) MCO. [Abbreviations: c: caecum, cg: cephalic glands, es: Eyespot, hf: hold fast, ho: head organ, mco: male copulatory organ, o: ovary, P: pharynx, pr: prostatic reservoirs, sv: seminal vesicle, t: testis].

Table (1): Comparison of the morphological characters of *Euryhaliotrema adelpha* recorded in the present study with the original description by Kritsky (2012).

The character	Present study *L. ehrenbergii* N=11	Present study *L. fulviflamma* N=2	Kritsky (2012) *L. quinquelineatus*
Body length	384 (300-420±50, n=7)	290, n=1	167-245
Body width	71 (63-85±9, n=7)	56, n=1	39-61
Haptor width	68 (63-75±5, n=7)	54, n=1	38-58
Pharynx width	23 (20-25±2, n=5)	18, n=1	13-20
Ventral anchor length	34 (33-35±1, n=12)	34, n=2	34-39
Dorsal anchor length	34 (33-35±1, n=14)	34, n=2	31-35
Ventral bar length	36 (30-38±3, n=10)	30, n=1	38-45
Dorsal bar length	34 (32-35±1, n=10)	33, n=1	36-46
Hook length	11 (10-12±1, n=26)	11, n=1	11-14
MCO length	32 (30-36±3, n=7)	28-30, n=2	26-41
Testis length	78 (70-88±8, n=6)	50, n=1	27-42
Testis Width	37 (35-40±2, n=6)	25, n=1	11-24
Germarium length	52 (50-57±3, n=5)	30, n=1	21-29
Germarium width	35 (32-36±2, n=5)	25, n=1	12-20

Euryhaliotrema spirotubiforum (Zhang, 2001) Wu, Zhu, Xie & Li, 2006

Host: Blackspot snapper *L. ehrenbergii* (Peters, 1869), *L. indicus* Allen, White & Erdmann 2013 and Dory snapper *L. fulviflamma* (Forsskål, 1775).

Locality and date of collection: Arabian Gulf off southern Iraq (29°53'-29°85'N, 48°13-48°40'E), *L. indicus* Allen, White & Erdmann 2013 in February 2024, *L. ehrenbergii* (Peters, 1869) in October and December 2024 and *L. fulviflamma* (Forsskål, 1775) in December 2024.

Prevalence: 17% (5 infested from 47 examined), 2.7% (2 from 74 examined) and 14.3% (3 from 21 examined).

Site of infestation: Gills.

Voucher deposition: Iraq Natural History Research Center and Museum, INHM TRC 94, INHM TRC 95, INHM TRC 97, INHM TRC 98, INHM TRC 99, INHM TRC 106, INHM TRC 110, INHM TRC 111.

Specimens studied: 14 (4 stained; 1 smash-stained, 9 in Gray and Wess).

Description: Body fusiform 380 (270-440±87, n=4) in length, with a maximum width of 63 (60-65±3, n=4) typically at midlength of the trunk or at level of the testis. Tegument smooth. Cephalic end narrow, with cephalic lobes ranging from poorly to moderately develop. Two pairs of eyespots: the posterior pair, is larger and closer together than the anterior one, which is tiny. Pharynx subspherical 23 (20-25±3, n=4) in diameter. Peduncle wide, short, reducing toward haptor; haptor globular 64 (57-65±1, n=3) in width. Ventral anchor 34 (30-35±1, n=24) long (Fig. 2A) and dorsal anchors 32 (30-35±1, n=24) long (Fig. 2B), similar in shape; each featuring a moderately elongated superficial root, a knob-like deep root, a short shaft, and an extended point surpassing the tip of the superficial root. Ventral bar 35 (25-40±5, n=11) in length (Fig. 2C), rod-shaped and slightly arched; dorsal bar 35 (30-42±4, n=11) in length (Fig. 2D), U or V shaped, with ends directed laterally. Hook 11 (10-12±1, n=33) long (Fig. 2H), with a uniform shank and upright acute thumb. MCO consists of a fragile, curving tube originating from a swollen base 27 (20-35±4, n=9) in length, with the coil forming a counterclockwise loop, 8 (6-10±2, n=3) in MCO – ring diameter (Fig. 2F). No accessory

piece is present. Testis ovate, 71 (50-75±5, n=4) long and 31 (28-32±2, n=4) wide; seminal vesicle globular, posteriorolateral to the base of MCO; prostatic reservoir small, at the right base of the MCO. Germarium pyriform, 52 (40-54±2, n=4) long and 27 (25-32±2, n=4) wide; uterus not observed. Vaginal pore dextromarginal. Vitellaria dense, extending from the posterior end of the through, the intercaecal area to slightly posterior of the cyclocoel. Egg not observed.

E. spirotubiforum was initially described as *Haliotrema spirotubiforum* by Zhang (2001) from *Lutjanus russellii* (Bleeker, 1849) based on the MCO and the absence of an accessory piece, off China; Wu *et al.* (2006) transferred the species to *Euryhaliotrema*, citing the lack of an accessory piece in the MCO of lutjanids with molecular analysis. Wu *et al*. (2007) situated this species beside *Haliotrema kurodai* [= *Euryhaliotrema kurodai* (Ogawa & Egusa, 1978)] and *Haliotrema anguiformis* [=*Euryhaliotrema anguiforme* (Zhang in Zhang, Yang & Liu, 2001)], in *Aliatrema* Plaisance & Kritsky, 2004, based on the absence of the accessory piece in the MCO. According to Kritsky (2012), the genus *Aliatrema* is proposed to be a synonym of *Euryhaliotrema*. Kritsky (2012) redescribed the species from nine species of *Lutjanus* species across the Indo-Pacific; then Kritsky (2019) added *L. fulviflamma* (Forsskål, 1775) and *L. russellii* (Bleeker, 1849) as new hosts from Australia.

Euryhaliotrema spirotubiforum belongs to a group that contains ten *Euryhaliotrema* species which lack an accessory piece in the MCO. These species are described from Lutjanids (6 species), sparids (1species), chaetodontids (2 species), and Monodactylid (1 species).

E. nanaoense, E. russellum, E. monoporosum and *E. kurodai* differ from *H. spirotubiforum* by possessing a straight or simple MCO shaft. (coiled shaft of MCO in *H. spirotubiforum).* The group containing *H. spirotubiforum* differs from *E. youngi* by the MCO ring diameter (small in the distal end of the shaft vs large and near the basal; *H. spirotubiforum* differs from *E. paululum* by the absence of a posteromedial process on the dorsal bar; *H. spirotubiforum* differs from *E. solenophallus* by the shape of the ventral and dorsal bars (the bars is dissimilar vs the bars is v-shaped and similar); *E. spirotubiforum* has more robust anchors than *E. adelpha*; the distal end of the MCOs shaft comprises a complete coil in *E. spirotubiforum*, which is absent in *E. adelpha*. *H. spirotubiforum* is similar to *E. cribbi* in most hard parts, except in MCO (Curved proximal part of the shaft and well-developed distal coil part of the shaft, while in *E. cribbi*, the proximal ring is large and the distal ring small.

The occurrence of *E. spirotubiforum* on *L. indicus* Allen, White & Erdmann, 2013 in the Arabian Gulf represents a new geographical record for the helminth.

The present *E. spirotubiforum* collected from *L. ehrenbergii* (Peters, 1869) and *L. indicus* in Iraq are identical with the species from *L. quinquelineatus* (Bloch, 1790) in New Caledonia, but our specimens have larger soft tissues (Tab. 2).

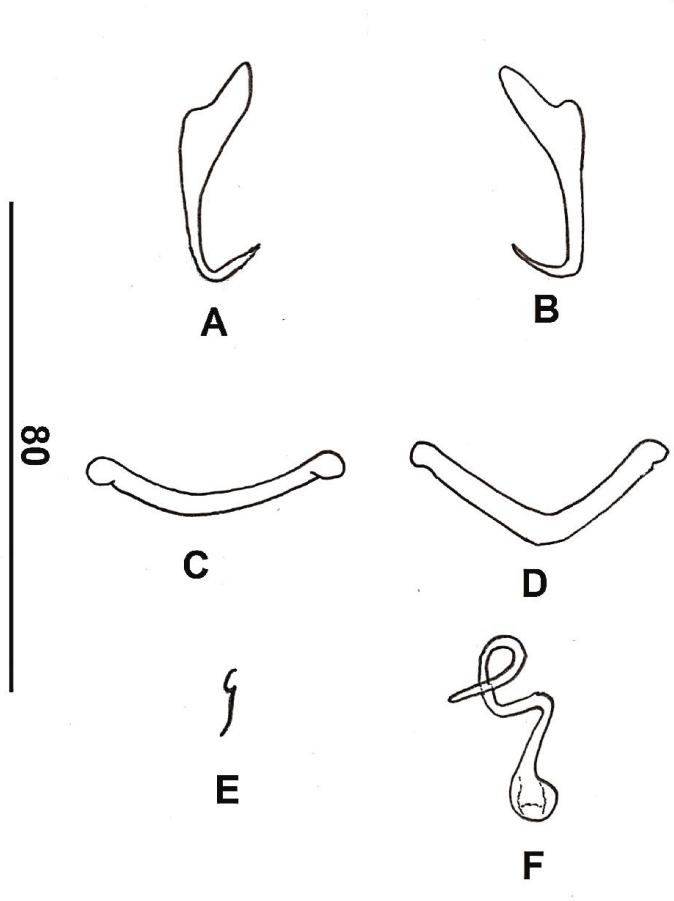

Figure (2): *Euryhaliotrema spirotubiforum*; *(*A) Ventral anchor, (B) Dorsal anchor, (C) Ventral bar, (D) Dorsal bar, (E) Hook, (F) MCO.

Table (2): Comparison of the morphological characters of *Euryhaliotrema spirotubiforum* recorded in the present study with the redescription by Kritsky (2012).

The character	***L. ehrenbergii* Present study N=6**	***L. indicus* Present study N=2**	***L. fulviflamma* Present study N=6**	**Kritsky (2012) *L. vitta*, *L. fulviflamma*, *L. ehrenbergii*, *L. quinquelineatus***
Body length	380 (280-440±87, n=3)	270, n=1	-	263 (207–294; n = 10)
Body width	63 (60-65±3, n=3)	63, n=1	-	67 (46–78; n = 11)
Haptor width	64 (63-65±1, n=2)	57, n=1	-	61 (54–70; n = 12)
Pharynx width	23 (20-25±3, n=3)	20, n=1	-	19 (16–22; n = 12)

Ventral anchor length	34 (32-35±1, n=10)	30 (30-30±0, n=4)	32 (31-34±1, n=10)	31–40
Dorsal anchor length	33 (32-35±1, n=10)	30 (30-30±0, n=4)	30 (30-32±1, n=10)	33-44
Ventral bar length	38 (33-40±3, n=4)	37 (35-38±2, n=2)	32 (25-35±4, n=5)	36-45
Dorsal bar length	39 (34-42±3, n=4)	35(35-35±0, n=2)	32 (30-34±2, n=5)	33-44
Hook length	11 (11-12±1, n=13)	11(10-12±1, n=10)	12 (11-12±1, n=11)	12-15
MCO – ring diameter	8 (6-10±2, n=2)	5, n=2	7 (6-8±1, n=4)	10-16
Testis length	71 (65-75±5, n=3)	50, n=1	-	44 (33–54; n = 11)
Testis Width	31(28-32±2, n=3)	30, n=1	-	25 (17–32; n = 11)
Germarium length	52(50-54±2, n=3)	40, n=1	-	32 (22–43; n = 7)
Germarium width	27(25-28±2, n=3)	32, n=1	-	18 (12–22; n = 8)

CONCLUSIONS

The current investigation addeds a new dactylogyrid monogenoids to the parasite fauna of Lutjanidae fishes in Iraq, Taking previous parasite records into consideration, Lutjanidae fishes harbours are now known to harbor six parasite species, which include two of each monogenoids, nematodes and crustaceans.

CONFLICT OF INTEREST STATEMENT

" The authors affirm that there is no conflict related to this work ".

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تسجيل جديد لنوعين من الديدان احادية المنشأ للجنس *Euryhaliotrema* Kritsky & Boeger, 2002 (مونوجينويديا: داكتيلوجايريديا) من اسماك النهاش من الساحل البحري للعراق

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الخلاصة

تعد أسماك النهاش Lutjanids fish مهمة كغذاء للفرد العراقي. تم اصطياد نوعين من اسماك النهاش من المياه البحرية العراقية في الخليج العربي خلال عام2024: النهاش أسود البقعة *Lutjanus ehrenbergii* (Peters, 1869) والنهاش الهندي *L. indicus* Allen, White & Erdmann, 2013. وجد أن أسماك النهاش أسود البقعة والنهاش *L. fulviflamma* (Forsskål, 1775) مصابة بكل من أحادية المنشأ *Euryhaliotrema adelpha* Kritsky & Justine, 2012 (يعد مضيفا جديدا) و *E. spirotubiforum* (Zhang, 2001) Wu, Zhu, Xie & Li, 2006 و أصيب النهاش الهندي *L. indicus* فقط. ويعد تسجيله في الخليج العربي كمنطقة انتشار جديدة.

اضافت الدراسة الحالية لأول مرة رسومات النماذج الكاملة للنوع *E. adelpha* وتعد هذه الدراسة الأولى على الديدان أحادية المنشأ المتطفلة على اسماك النهاش اسود البقعة والنهاش الاصفر والنهاش الهندي في العراق.