Proceeding of the Third International & the Fifth Scientific Conference of College of Science - Tikrit University
Int.3, Loc.5, Article ID:2022-P4-03

Purposeful scientific research is a basic pillar for the advancement of Iraq

Survey the parasites of the common Carp (*Cyprinus carpio*) fish from Daquq farms in Kirkuk province in Iraq

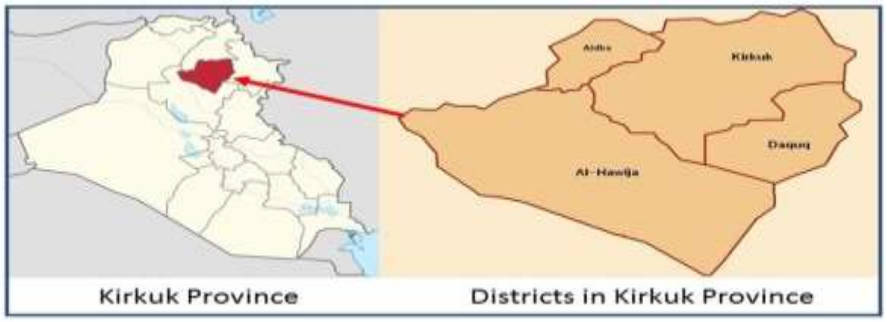
Mohammed Adnan Al-badrani
Dept. of Biology, College of Sciences, University of Duhok, Kurdistan Region, Iraq
mohammed.ibrahim@uod.ac

ABSTRACT
The majority of fish farms now primarily cultivate carp, which is also widespread in Iraq's inland waterways. Realizing that parasites can impair carp populations or play a significant part in their demise or growth restriction, causing financial losses for aquacultures. A total of 70 common carp *Cyprinus carpio* were collected in Daquq fish farm, situated southeast Kirkuk city, from March to the end of July 2022. The percentage of infection was found when these fish were checked for parasites 60% (42/70). Nine parasite species are discovered in the investigation, including: six species of protozoans belonging to the class Ciliata (*Chilodonella cyprinid* (40%), *Ichthyophthirius multifiliis* (10%), *Tetrahymena pyriformis* (14%), *Balantidium polyvacuolum* (11%), *Trichodina acuta* (6%) and *Trichodina nobilis* (8.5%). Three species of Monogenea trematode (*Dactylogyrus extensus* (6%), *Dactylogyrus minutus* (7%), and *Gyrodactylus kherulensis* (3%). Injuries to the tissues and internal organs, gill infestation, damage to the eyes, and parasite infestation are among the ways that parasites can harm their hosts. This is the first survey study on parasitic fauna of some carp fishes in Daquq farms in Kirkuk province in Iraq.

Keywords: *Cyprinus carpio*, Kirkuk Province of Iraq, Monogenea, *Trichodina*.

Introduction
Fish is a high-protein, easily-digested source of animal protein that can supply all of a person's daily nutritional requirements. Thus, millions of people around the world rely on fish as their primary source of income. Fish white meat has a nutritional value of 300–1600 calories per pound and includes 16–29% protein [1]. Consequently, there is a growing demand for animal protein sources made from fish [2]. In 1955, the common carp *Cyprinus carpio* (Linnaeus, 1748) was introduced into Iraq for the first time into the Al- Zaafaraniya fish farm in Baghdad [3]. This species can be found in all major rivers and wetlands and is widely distributed. Several fish farms and ponds had been built, mostly in Iraq [4].
Fish from the Tigris and Euphrates rivers were the subjects of the majority of surveys on fish parasites in Iraq. Carp culture has since taken over most fish farms and is very prevalent in Iraq's inland waterways [5]. being aware that parasites can negatively impact carp populations, play a significant role in their death, or slow down their growth, causing financial losses for aquacultures [6]. Injuries to the tissues or organs, gill infection, And damage to the eyes and internal organs are only a few of the ways that parasites can hurt their hosts [7]. Protozoa are a common disease observed in freshwater fish (Ichthyophthiriasis, and Trichodiniasis). According to [8] certain *Dactylogyrus species* have the potential to develop into pathogenic organisms that affect small fish's ability to feed and breathe. All illnesses are mostly brought on by protozoa and trematodes that harm fish gills and skin [9].
The goal of this study is survey and investigate the parasites that infect on *C. carpio* fish of Daquq farms in Kirkuk province of Iraq.

Materials and Methods
Study area
Daquq town (located at about 237.5 km northeast of Baghdad city; Location: Latitude 35.13792° north; Longitude 44.44638° east, Daqouq, is the central town of Daquq District in Kirkuk Governorate, Iraq. It is part of the disputed territories of Northern Iraq. The town is a major agricultural area and included many fish frams.



The map of Kirkuk province in Iraq (https://sof.news/iraq/kirkuk/)

Sampling Collection

A total of 70 common carp *C. carpio* were collected from fish Daquq farms in Kirkuk province by Through the use of gill netting and hooks, six attempts be made monthly between March and the end of July 2022 by vendors and neighborhood fisherman. Fish were transported a live in a cool box with water to the laboratories of College of Science, Department of Biology, University of Duhok. Then, according to [10], fish were measured and identified once they were captured (total length). Within three hours of being caught, carp fish were checked, and ectoparasites were investigated from the fish's skin, gills, and fins by lightly scraping the skin, fins, and buccal cavity with a sharp object [11]. The slide is then covered in skin scrapings by cutting the gill sheet directly from both sides, the gills can be viewed. Gills were isolated and kept wet in a petri dish with a physiological saline solution [12]. The bladder, colon, stomach, kidneys, liver, and muscles were among the body cavities that were checked for endo-parasites before the image on the slide was created [13].

Post-collection samples (Samples Examination)

Dissected gills were put on petri dishes with their filaments glued with glycerin [14]. By making smears without the use of any techniques, the protozoan parasites were identified by being studied after one drop of ordinary saline was introduced [15]. And for detection of Trichodinids, the slides were prepared with smears, fixed with absolute methyl alcohol for about 1-2 minutes, stained for 30–40 minutes with Giemsa's stain (1:10), washed and dried once more, then mounted with Canada balsam [16]. While preparation the slide of Monogenia, all smears were subjected to 100% methanol for approximately 15 minutes, washed with alcohol that also contained a drop of iodine solution for several minutes, dried with air, and then fixed in hot 70% alcohol with monogenia [17]. An Olympus ocular micrometer was used to make the parasite examinations. Utilizing the keys from three of the most important publications on parasite identification, the found parasites were morphologically identified by Dino-Eye Microscope Eye-Piece Camera Model AM7023 Series, with 5 Megapixels, was used to take the pictures (Made in Taiwan) [18].

Results and Discussion

In the current study, survey studies on a group of 70 fish were carried out from Daquq farms in Kirkuk province of Iraq. that were included carp, and which nine species of parasites including: six species of protozoans belonging to the class Ciliata (*Chilodonella cyprinid*, *Ichthyophthirius multifiliis*, *Tetrahymena pyriformis*, *Balantidium polyvacuolum*, *Trichodina acuta* and *Trichodina nobilis*). Three species of Monogenea (Trematode) (*Dactylogyrus extensus*, *Dactylogyrus minutus*, and *Gyrodactylus kherulensis*) in Table (1).

Table 1: The distribution of parasites on different sites of *C. carpio* from Daquq fish farm.

Groups	Parasites	No. of infected fish	Prevalence (%) for 70 fish	Site of infection
Protozoa	*Chilodonella cyprinid*	28	40	Gill
	Ichthyophthirius multifiliis	7	10	Gill, skin
	Tetrahymena pyriformis	10	14	Skin
	Balantidium polyvacuolum	8	11	Intestine
	Trichodina acuta	4	6	Gill
	Trichodina nobilis	6	8.5	Gill
Monogenea	*Dactylogyrus extensus*	4	6	Gill
	Dactylogyrus minutus	5	7	Gill
	Gyrodactylus kherulensis	2	3	Gill

Protozoa

Four species of Protozoa were recorded in the present study: -

1- *Chilodonella cyprini* (Moroff, 1902) 40%

This parasite was found on the gills of *C. carpio* from Daquq fish farms with a prevalence of 40% (Table 1). This is a big pear-shaped. Dorsoventrally part, dorsal side convex, and ventral concave describe the body. The body is 40–70 m long and 20–35 m wide. Only ventrally do cilia appear in the shape of a broad band made up of numerous bigger cilia lying anterior to the cytostome and several lateral parallel arching rows.

absence of cilia in the posterior area. Nearer to the posterior end is a round macronucleus. The micronucleus, which has two contractile vacuoles, is located next to the macronucleus.

Who initially reported it in Iraq on the skin and gills of *Mystus pelusius* caught in the Tigris River in Baghdad. Whereas certain fish parasites are noteworthy, such as the parasite *Chilodonella cyprini*, is found in types of fish as: *Cyprinion macrostomum, Cyprinus carpio* [19]

2- *Ichthyophthirius multifiliis* (Fauquet, 1876)

The gill filaments and skin of C. *carpio* both contained this ciliated protozoan. *carpio* with prevalence of 10% (Table 1). The macronucleus of this huge, spherical particle is 0.5–1.0 mm in diameter and is clearly fashioned like a horseshoe. The macronucleus is located behind the micronucleus. It was Mugil Dussmien who first reported this parasite in Iraq. The cilia cover whole body surface and the parasites *Ichthyophthirius multifiliis* is found in *Carasobarbus luteus, Garra rufa, Leuciscus vorax, Mesopotamichthys sharpeyi, Planiliza abu* [20].

3- *Tetrahymena pyriformis* (Ehrenberg, 1930)

This parasite was found on the skin of *C. carpio* with prevalence of 14% (Table 1). This is pyriform, measuring 25–50 m long and 15–30 m wide. Vestibulum, located along the body's ventral axis. The macronucleus is spherical and situated in the middle or posterior part of the body. Its dimensions are 4-7 x 5-10 mm, whereas the micronucleus has a 1.5 mm diameter.

This parasite was previously discovered in Iraq on *C. carpio* at the Baghdad fish farm Al- Zaafaranya [21].

4- *Balantidium polyvacuolum* (Li, 1963)

The intestine of *C. carpio* contained this ciliated protozoan with prevalence of 11% (Table 1). Trophozoite is oval in shape, massive (40–130 x 20–80 m), and anteriorly somewhat compressed [22]. Cilia winding slightly toward the posterior pole in longitudinal rows. At the front are rows of cilia and a cytopharynx. Macro and micronuclei are found in the cytoplasm. The macronucleus is elongate-ovoid and has a length to width ratio of roughly 3:1, whereas the micronucleus is polymorphic in location, ranging in length from 4-6 m and width from 2 m. It is 12 to 40 meters long and 7 to 15 meters wide.

It was gathered from three fish farms in the hamlet of Grdda Rasha, which is southernly located to Erbil, in the Kurdistan region of Iraq [23] in plate -1-.

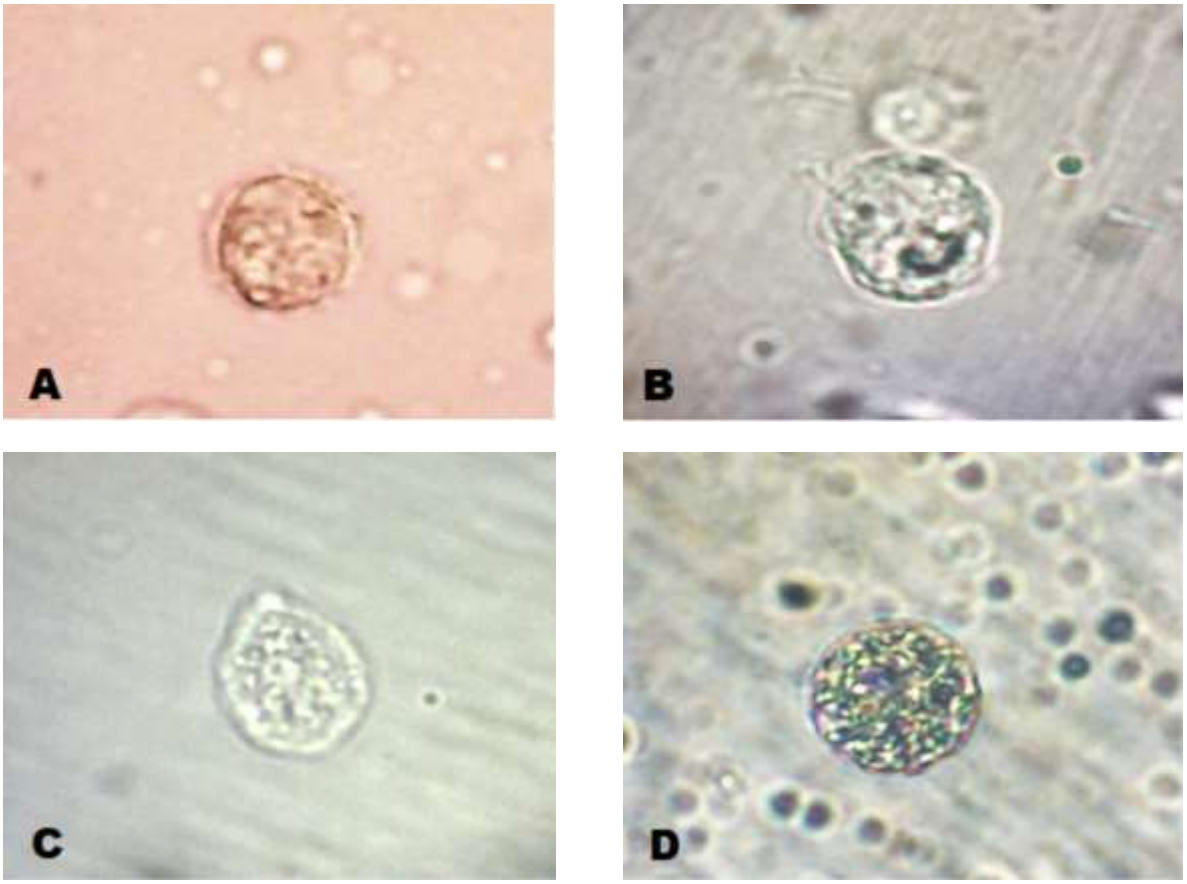


Plate -1- (A): *Chilodonella cyprini* under light microscope (40X).
(B): *Ichthyophthirius multifiliis* under light microscope (40X).
(C): *Tetrahymena pyriformis* under light microscope (40X).
(D): *Balantidium polyvacuolum* under light microscope (40X).

Genus: *Trichodina* Ehrenberg, 1831

Two species of Protozoa *Trichodina* were recorded in the present study: -

5- *Trichodina acuta* (Lom, 1961)

This parasite was found on the gills of *C. carpio* with a prevalence of 6% (Table 1). When viewed from below, this genus has a circular shape, and when viewed from the side, it has a bell-shaped shape. Expanded and saucer-shaped at the posterior end, the sticky disc or apparatus has a denticular ring that houses the teeth. The teeth form a corona with visible rays and blades. Blades can be straight or curved, internal rod-like, or can take the shape of spines or needles that are different lengths. teeth 18 to 23. While the interior teeth are thread-like and sharp, the central portion of the external teeth is large. The arrangement of the teeth, both internal and external, is level. A border membrane with finely striated, distinct, and broad bands like stripes surrounds the concave sticky disc. The denticulate ring is 28–32 m in diameter and has 20–23 denticles (Figure 1).

Which were isolated from the skin, fins, and gills of *C. carpio* and taken from the Ankawa Fish Hatchery in the Kurdistan region of Iraq, northwest of Erbil city [24].

Fig. 1: *Trichodina acuta* under light microscope (40X).

6- *Trichodina nobilis* (Chen, 1963)

This parasite isolated on the gills of *C. Carpio* with a prevalence of 8.5% (Table 1). 60-80 m for the body, 60-71 m for the adhesive disc, and 50-60 m for the denticular ring. the sticky disc's core, lacking big granules. teeth range from 22 to 26. External teeth depressed at the apex and widened at the base. Internal teeth have a pointed end that threads. 2-3 mm central conical portion (Figure 2).

On the skin, fins, and gills of *C. carpio* from the Ainkawa fish hatchery in the province of Erbil were where this parasite was discovered for the first time in Iraq [25].

Fig. 2: *Trichodina nobilis* under light microscope (40X).

Monogenea

Genus: *Dactyogyrus* (Diesing, 1850)

Three species of Monogenea were recorded in the present study: -

***Dactylogyrus extensus* (Mueller *et* Van Cleave, 1932)**

This Monogenean was reported from the gills of *C. Carpio* with a prevalence of 6% (Table 1). The species in this genus are two pairs of elongations and a flattened anterior end characterize the body. Two eyes are present in the majority. The haptor's adhesive armament is made up of one or two connecting and supplemental bars, one or two median hook pairs, and fourteen hooklets. The ovary is behind the single testis. Two prostatic glands are beside the chitinod copulatory organ, which is made up of a tube and an auxiliary component (Figure 3).

D. extensus has been recorded for the first time in Iraq from *C. carpio* from fish ponds in Baghdad's Suwairah and Latifiyah [26].

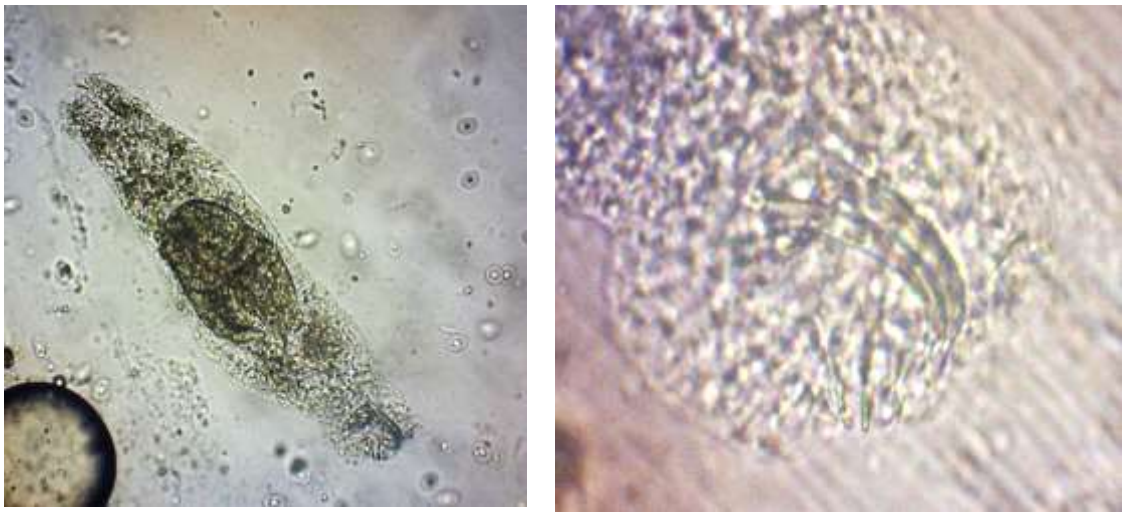


Fig. 3: *Dactylogyrus expenses* under light microscope (4 - 40X).

***Dactylogyrus minutus* (Kulwiec, 1927)**

This species was detected from the gills of *C. Carpio* with a prevalence of 7% (Table 1). Worms with a body width of 0.010 mm and a length of 0.48 mm. Hooklets' lengths range from 0.018 to 0.026 mm. Short median hooks with a strong outer root and inner root that repeat from the base. a single, substantial connecting bar with almost straight, rounded, and expanded ends (Figure 4).

D. minutus has been recorded for the first time in Iraq from *C. carpio* from Al-Zaafaraniya on the Tigris River [27].

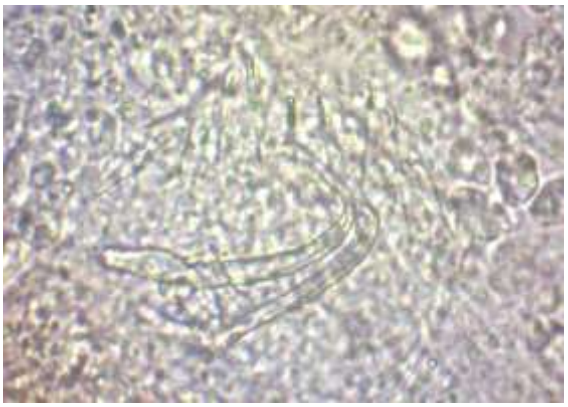


Fig. 4: *Dactylogyrus minutus* under light microscope (40X).

***Gyrodactylus kherulensis* (Ergens, 1974)**

This parasite was recorded from the gills of *C. Carpio* with a prevalence of 3% (Table 1). 0.08 to 0.11 mm in width and 0.35-0.42 mm in length. Hooklets range in length from 0.025 to 0.032 mm. Size of dorsal bar: 0.003 X 0.011-0.017 mm, Total length of median hooks: 0.060-0.076 mm, Main part: 0.047-0.055 mm (Figure 5).

For the first time in Iraq, *G. kherulensis* was discovered in a *C. carpio* fish farm in Babylon [28]. The monogenean parasite *Dactylogyrus extensus* is found in *Carasobarbus luteus*, *Cyprinus carpio*, *Garra rufa*, *Leuciscus vorax*, *Luciobarbus xanthopterus*, *Mesopotamichthys sharpeyi*, *Mystus pelusius*, *Planiliza abu* [29].

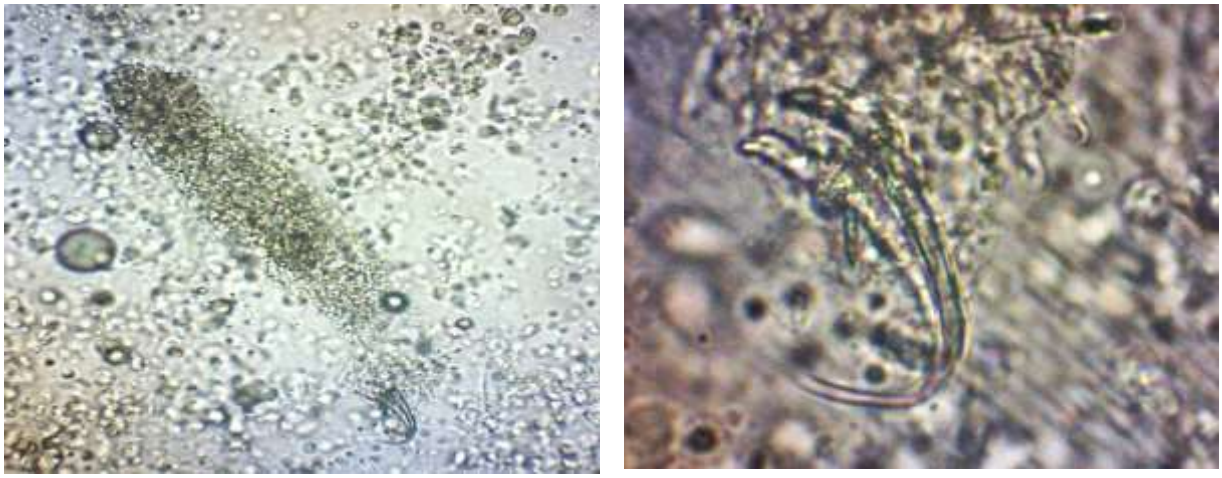


Fig. 5: *Gyrodactylus kherulensis* under light microscope (4 - 40X).

In this study, the percentage of infection was 60% (42/70). The parasite biology of certain carp fish from Daquq farms in the Iraqi province of Kirkuk has never been studied before [30]. The findings of this study were consistent with previous research, which showed that more than 50% of fish had infections, most of which were mild, because environmental conditions that are unfavorable to infection were discovered, such as salinity, improper water temperature, and poorly maintained water ponds [31], where the highest prevalence (63.33%), mean intensity (20.41%) of parasites were recorded pre-monsoon. The identities of each parasite species discovered in carp have all been established. *Trichodina sp.* were the most prevalent protozoa discovered on the skin and gills of *Cyprinus carpio* (ciliate), while in the intestines, the most prevalent protozoa are (Balantidium) [32]. Protozoa and monogeans, which may infect the skin and gills, were the most common [33]. The management of the fish's habitat has a direct impact on the presence of fish illnesses [34]. Therefore, additional research on fish parasites is required to identify new species and to better understand the parasitic ecology of freshwater fish in Iraq. Fish disease is one of the issues that fish farmers frequently run across. In fact, numerous studies from throughout the world have shown instances of carps being infected with a variety of parasites. The mortality and morbidity rates associated with certain parasite diseases can be extremely high [35].

References

[1] Mhaisen, F. T.; Al-Mayali; H. M. and Al-Abodi, H. R. (2019). Checklists of parasites of fishes of al-Diwaniyah. Bull. *Iraq nat. Hist. Mus*. 15 (3): 293-318. https: //doi.org/ 10.26842/ binhm.7.2019.15.3.0293.

[2] Kumar, V.; Nugraha, A. B.; Cahyaningsih, U. and Rahmani, T. D. (2021). Parasitic Protozoa found in the skin, gills, and intestines of Patin Catfish (*Pangasius hypophthalmus*) and Common Carp (*Cyprinus carpio*). *Journal Nat. Science, and Math*. Res. 7(2): 86-91. http://journal. walisongo.ac.id/index.php/jnsmr

[3] Abdullah, Y. S. and Abdullah, Sh. M. (2013). Monogenean Infections on Fishes from Darbandikhan Lake in Kurdistan Region, Iraq. *Basrah Journal Agric. Sc.*, 26(1).

[4] Mhaisen, F. T.; Al- Rubaie, A. L. and Al-Sa'adi, B. A. (2015). Monogenean Parasites of Fishes from the Euphrates River at Al-Musaib City, Mid Iraq. *American Journal of Biology and Life Sciences*. 3(2): 50-57.
http://www.openscienceonline.com/journal/ajbls.

[5] Mama, K. S. and Abdullah, Sh. M. (2012). A Comparative Study on the Parasitic Fauna of the Common Carp *Cyprinus carpio* from Ainkawa Fish Hatchery (Erbil) and Lesser Zab River in Kurdistan Region, Iraq. Thesis of the Degree of Master of Science in Biology

[6] Omeji, S.; Solomon, S. G. and Idoga, E. S. (2011). A Comparative Study of the Common Protozoan Parasites of *Clarias gariepinus* from the Wild and Cultured Environments in Benue State, Nigeria. *Journal Parasitol Res*. p:8. doi:10.1155/2011/916489.

[7] Al-Saadi, A. J. and Rabab, R. A. (2016). The occurrence of three monogenean parasite species for the first time in Iraq on gills of the common Carp *Cyprinus carpio* linnaeus, 1758 (cypriniformes, cyprinidae). Bull. *Iraq nat. Hist. Mus*.14 (2): 99-108.

[8] Ahmed A. T. A. (1981). Helminth infection in freshwater fishes of Bangladesh. Fish Pathol.; 15(3, 4): 229-236.

[9] Al-Marjan k. S. N. and Abdullah, SH. M. A. (2008). Some ectoparasites of the common (*Cyprinus carpio*) in Ainkawa Fish Hatchery Erbil, province. The 2ed Kurdistan Conferences on Biological Sciences. *Journal Dohuk Univ*., 12 (1): pp. 102-107.

[10] Coad, B. W. (2010). Fresh water fishes of Iraq. Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario, Canada K1P 6P4. Printed in Bulgaria.

[11] Al-Marjan, k. S. N. and Abdullah, SH. M. A. (2007). Trichodinids ectoparasites (ciliophora: peritrichida: trichodinidae) from common Carp *cyprinus carpio* in Iraq. *Journal Dohuk Univ*., 10(1): pp 50-55.

[12] Al-Marjan k. S. N. and Abdullah, SH. M. A. (2010). *Balantidium polyvacuolum* LI, 1963 (ciliophora: spirotricha): first occurrence in the intestine of *Cyprinus carpio* from three fish farms in Erbil city, Kurdistan region, Iraq. *The 3rd Kurdistan Conference on Biological Sciences Journal Duhok Univ*.13(1): pp 82-85.

[13] Abdullah, SH. M. A. (2005). Parasitic fauna of some freshwater fishes from Darbandikhan lake, north of Iraq. *Journal Dohuk Univ*. 8(1): pp. 29-35.

[14] Ahmad, N.; Ahmadi, A.; Mohammad pour, H. and Ebrahimi, M. (2013). External parasite infection of common carp (*Cyprinus carpio*) and big head (*Hypophthalmichthys nobilis*) in fish farms of Mashhad, northeast of Iran. *Journal of Parasitic Diseases*. DOI: 10.1007/s12639-012-0146-8.

[15] Bilal, S. J. and Abdullah, Sh. M. (2012). *Procamallanus siluri* (Nematoda: Procamallanidae): First record in Iraq from *Silurus glanis* from Greater Zab River, Kurdistan Region. *Journal Tikrit of Agriculture Sciences*. 12(2).

[16] Mansoor, N. T. and Al-Shaikh, S. M. (2010). Protozoans infection of *Cyprinus carpio* L. from Bab Al-Muatham fish markets, Baghdad City. *Iraqi Journal of Veterinary Medicine*. 34(1).

[17] Shwani, A. A.; Abdullah, Sh. M. and Asmat, G. (2015). Two New Species of Trichodina Ehrenberg, 1830 (Ciliophora: Trichodinidae) from *Silurus triostigus* in Iraq. *European Journal of Scientific Research*. 134(3).

[18] Gussev, A.V. (1985). Parasitic metazoans: Class Monogenea. In: Bauer, O.N. (Ed.). Key to the parasites of freshwater fish fauna of the U.S.S.R. Nauka, Leningrad, 2: 1-424.

[19] Al-Nasiri, F. S. and Mhaisen, F. T. (2009). Parasites of Fishes Collected from Tigris River, Salah Al-Deen Province, Iraq. Ibn AL- Haitham *Journal* for pure and Appl. Sci. 22 (2)

[20] Hussain, T. H. (2019). study of some internal parasite funa of fishes of common carp *cyprinus carpio* in cages breeding fish from the Euphrates river, al-mussaib, Babylon, Iraq. *Journal of university of babylon for pure and applied sciences*. 27(6).

[21] Sadek, A.A. (1999). Ectoparasites of the common carp (*Cyprinus carpio* L.) fingerlings intensively stocked during autumn and winter. M. Sc. Thesis, Coll. Educ. (Ibn Al-Haitham), Univ. Baghdad: 100pp.

[22] Liu, S.; Peng, W.; Gao, P.; Fu, M.; Wu, H.; Lu, M.; Gao, J. and Xiao, J. (2010). Digenean parasites of Chinese marine fishes: a list of species, hosts and geographical distribution. *Syst Parasitol*. 75:1–52. DOI 10.1007/s11230-009-9211-9.

[23] Lynn, D. H. (1979). The Ciliated Protozoa. Third Edition. University of Guelph Canada. Library of Congress Control Number: 2008923552. DOI: 10.1007/978-1-4020-8239-9.

[24] Shwani, A. A. (2010). Two New Species of *Trichodina* Ehrenberg, 1830 (Ciliophora: Trichodinidae) from *Silurus triostigus* in Iraq. *European Journal of Scientific Research*. pp.598-604. http://www.eurojournals.com/ejsr.htm

[25] ÖZER, A. and KIRCA, D. Y. (2013). Parasite fauna of Golden Grey Mullet *Liza aurata* (Risso, 1810) collected from Lower Kızılırmak Delta in Samsun, Turkey. *Helminthologia*, 50(4): 269 – 280, 2013. DOI 10.2478/s11687-013-0140-4

[26] Salih, N. E.; Ali, N. M. and Abdul-Ameer, K. N. (1988). Helminthic fauna of three species of carp raised in ponds in Iraq. *Journal Biol. Sci. Res.*, 19(2): 369-386.

[27] Mhaisen, F. T.; Balasem, A. N.; Al-Khateeb, G. H. and Asmar, K.R. (2003b). Recording of five monogenetic trematodes for the first time from fishes of Iraq. Bull. *Iraq Nat. Hist. Mus*., 10(1): 31-38.

[28] Ali, N. M.; Mhaisen, F. T.; Abul-Eis, E. S. and Kadim, L. S. (1988b). First occurrence of the monogenetic trematode Gyrodactylus kherulensis Ergens, 1974 in Iraq on the gills of the common carp *Cyprinus carpio*. *Journal Biol. Sci. Rec.*, 19(3): 959-664.

[29] Li, M.; Ponce-Gordo, F.; Norman-Grim, J.; Wang, C. and Nilsen, F. (2014). New insights into the molecular phylogeny of Balantidium (Ciliophora, Vetibuliferida) based on the analysis of new sequences of species from fish hosts. *Parasitol Res.* 113:4327–4333. DOI 10.1007 /s0043 6-014-4195-z.

[30] Nasraddin, M. O. and Abdullah, Sh. M. A. (2013). Some Ecological Aspects of Monogenean Infections on Some Fishes from Lesser Zab River, Near Koysinjaq City, Kurdistan Region, Iraq. Thesis of the Degree of Master of Science in Biology/Parasitology.

[31] Prasad, A.; Yadav, S. and Limbu, J. H. (2018). Identification of Ecto-parasites in silver carp (*Hypophthalmichthys molitrix*) and common carp (*Cyprinus carpio*) at fishery development Center Bhairahawa, Rupandehi, Nepal. *International Journal of Fisheries and Aquatic Studies* 6(5): 116-120.

[32] Al-Saadi, A. J. (2014). Isolation and identification of *Trichodina strelkovi* Chan, 1961 for the first time in Iraq from gills of the mugilid fish Liza Abu. *Journal of Karbala University*. (12)2.

[33] Ali, N. M.; Mhaisen, F. T.; Abul-Eis, E. S. and Kadim, L. S. (1988). First occurrence of the monogenetic trematode *Gyrodactylus kherulensis* Ergens, 1974 in Iraq on the gills of the common carp *Cyprinus carpio*. *Journal Biol. Sci. Res.*, 19(3): 659-664.

[34] Vilizzi, L.; Tarkan, A. S. and Ekmekçi, F. G. (2015). "Parasites of the common carp *Cyprinus carpio* L., 1758 (Teleostei: Cyprinidae) from water bodies of Turkey: *Turkish Journal of Zoology*: 39(4). https://doi.org/10.3906/zoo-1401-42.

[35] Obaid, H. M.; Hussein, N. F.; Obed, T. M. and Boundenga, L. (2021). Common Carp (*Cyprinus carpio*) parasites diversity and prevalence in Erbil aquacultures: gills, skin and intestinal infections. *Iranian Journal of Veterinary Science and Technology*. 13(1). DOI:10.22067/ijvst.2021.64304.0.

Internet References

- (https://sof.news/iraq/kirkuk/)

مسح ودراسة الطفيليات التي تصيب سمك الكارب الشائع في مزارع الاسماك في داقوق في محافظة كركوك في العراق

الملخص

اسماك الكارب تتواجد في مزارع الاسماك بشكل اساسي، وهي منتشرة أيضًا في مجاري الانهر والروافد في العراق. أن الطفيليات يمكن أن تضعف أسماك الكارب أو تلعب دورًا مهمًا في زوالها أو تقييد نموها ، مما يتسبب في خسائر مالية لتربية الأحياء المائية. تم جمع 70 من اسماك الكارب الشائع من مزرعة أسماك داقوق الواقعة جنوب شرق مدينة كركوك من شهر اذار الى نهاية شهر تموز . في هذه الدراسة كانت نسبة اصابة اسماك الكارب بالطفيليات 60% (42\70) ، تم تسجيل تسعة أنواع من الطفيليات ، منهم ستة انواع من الابتدائيات من صنف الهدبيات وهم

Chilodonella cyprinid (40%), *Ichthyophthirius multifiliis* (10%), *Tetrahymena pyriformis* (14%), *Balantidium polyvacuolum* (11%), *Trichodina acuta* (6%) and *Trichodina nobilis* (8.5%).

وثلاثة انواع من المخرمات الاحادية

Dactylogyrus extensus (6%), *Dactylogyrus minutus* (7%), and *Gyrodactylus kherulensis* (3%).

تعد إصابات الأنسجة و الأعضاء الداخلية ، واصابة الخياشيم ، وتلف العين، من اضرار الطفيليات بالاسماك. الهدف من هذه الدراسة هو المسح والتحري عن الطفيليات التي تصيب أسماك الكارب الشائع في مزارع اسماك داقوق في محافظة كركوك في العراق.

الكلمات الدالة: الكارب الاعتيادي، محافظة كركوك في العراق، المخرمات احادية المنشا، الهدبيات.