

## The Parasitic Infection in the common moorhen *Gallinula chloropus* Linnaeus, 1758 (Rallidae) from Basrah Governorate, Southern Iraq.

Hanan A. Z. Al – Mansury [id<sup>1</sup>](#), Heba A. H. Kadim [id<sup>2</sup>](#), Majid A. A. Bannai [id<sup>1</sup>](#), Zahraa K. Shakir [id<sup>1</sup>](#)

<sup>1</sup>Department of Marine vertebrate, Marine Science Centre, University of Basrah, Iraq.

<sup>2</sup> Department of Basic Medical Science, College of Dentistry, Misan University, Iraq.

\*Corresponding Author E-mail: [henan.salbok@uobasrah.edu.iq](mailto:henan.salbok@uobasrah.edu.iq)

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### Abstract

In the present study, we studied parasitic infestations of waterhen or swamp chicken (*Gallinula chloropus*). The samples were gathered during the period from January to December 2024, in different sites at Hammar Marsh Basrah Province. The findings revealed that 72.1% of the birds were infected with one or more parasite species, including *Raillietina* sp. and *Hymenolepis* sp.); cestodes (tapeworms) and nematodes, including *Capillaria* sp., *Ascaridia dissimilis*, and *Congydonema ingluricola*. A seasonal pattern was shown for infection rates, with the highest prevalence during the cooler months. In particular, the infection rates in winter and spring were 42.85% and 32.15%, respectively. Mixed infections predominated (50% infection) with double infections occurring in 33.3%. Of the parasites detected, the nematode genus *Capillaria* was found to have the highest infection rate of 28.8%, followed by *Raillietina* spp. at 23.0%. These findings indicate the high parasitic load in the common moorhen. Basrah area population, especially in winter times. The results also highlight the high proportion of polyparasitism in the wetland birds, indicating potential ecological and abiotic factors that may be influencing the transmission dynamics of parasites in these birds.

**Keywords:** Common moorhen (*Gallinula chloropus*), parasitic infections.

### Introduction:

Allouse, 1961, pointed out that this family belongs to eight species that are widely spread in central and southern Iraq due to their ability to withstand various conditions, including temperatures. The types of this family prefer lakes and water marshes, in which the reed and papyrus plant is spread, and often prefers protected water in forests and plants and adapts its types to the environments referred to significantly. (Cramp, 1980; Ritter and Savidge, 1999)



Some sources have indicated that some species have been domesticated and bred in freshwater habitats in the Arabian Peninsula (Jennings, 1999). Previous studies have shown that local and wild birds play a major role in spreading the area of infections in parasites over wide geographical areas, as a result of the migration of these birds and their exposure to different conditions, which leads to multiple infections in terms of quantity and type (Al-Khalidi, 1996; Mohsen, 2008). The process of raising poultry is affected by many and different variables such as environmental conditions, poor management, feed quality, and others. Parasitic diseases are one of the most important dilemmas in raising commercial and non-commercial poultry. Among these diseases, internal parasites have shown a major challenge to raising poultry for several years (Permin and Hansen, 1998).

Poultry, like other animals, are exposed to many parasitic infections that cause many pathological effects such as low weight and egg production and death in severe cases (Al-Hubaiti, 1976; Awad, 1993). Internal parasites in birds have been studied in different parts of the world (Ibrahim *et al.*, 1995; Magwisha *et al.*, 2007). The present study deals with the parasitic fauna of the moorhen in the south region of Iraq. The study aimed to investigate parasitic infections in the common moorhen (*Gallinula chloropus*) in Basrah Province, Iraq, by determining the prevalence and identifying the specific parasite species, including *Raillietina* sp., *Hymenolepis* sp., *Capillaria* sp., *Ascaridia dissimilis*, and *Congylyonema inghlicola*. Seasonal variations in infection rates were analyzed, highlighting higher prevalence during colder months, with mixed infections being predominant.

The study also aimed to investigate the ecological and environmental determinants of parasite transmission, and act as a baseline for future wetland ecosystem conservation and avian health work. There are few reports in Iraq on bird parasites and prior investigations had a restricted number of species under consideration mostly involving chickens (Al-Hubaiti and Al-Habib, 1979) and some pigeon's species (Al-Janabi *et al.*, 1980; Sawada and Mohammad, 1989). The majority of these reports have also been carried out on different bird species without focusing on a particular taxonomic group (Mohammad, 2002; Mahmoud and Mohammad; 1989; Mahmoud *et al.*, 2000). The study of Mahmoud and Mohammad (1989) are the only who recorded the parasites in Rallidae family in Iraq.

## Materials and Methods

### Description of the collection area:

The Hammar Marshes, situated south of the Euphrates River, receive their primary water inflow from this river and extend westward toward Nasiriyah, reaching the eastern boundary of the Shatt al-Arab and the southern limits of Basra. These marshes typically span approximately 2,800 km<sup>2</sup> (1,100 mi<sup>2</sup>) as permanent wetlands and lakes; however, during periods of flooding, their expanse can increase to around 4,500 km<sup>2</sup> (1,700 mi<sup>2</sup>). Additionally, seasonal overflow from the central marshes, which are supplied by the Tigris River, can further contribute to their water levels. In addition, seasonal excess can effectively contribute to increasing the water level.

Lake Hammar represents that it represents the largest body of water within the water marshes, which cover rather large areas that often exceed 250 km and depths of up to 3 meters, which makes it a safe place for many water revivals in the region to provide food habitats in it, the topography of the region often changes during the dry season or the summer, which is characterized by a dry climate, which leads to the emergence of temporary water islands that are sometimes exploited for agricultural activities in the region.

### Sample Collection and Parasitological Examination

Study samples were collected from multiple locations in the Marsh al-Hammar areas in southern Iraq in Basra Governorate during January to December 2024 on a monthly basis. During the collection operations, which consisted in swampy areas and ponds, 30 samples of the common moorhen (*Gallinula chloropus*) was obtained and then transferred to the laboratories of the Marine Fraternity Department at the Marine Science Center for study. During which the birds were examined for ectoparasites according to the established protocols. The isolated samples were placed in a potassium hydroxide (KOH) solution at a concentration of 10% for clearing and the samples were kept in a 70% ethanol solution for future studies. For microscopic identification, they were mounted on slides using Canada balsam and examined under a light microscope following the methodology of Dik *et al.* (2015).

Blood samples were obtained either directly from the brachial vein or, in some cases, from the heart. The smears of these samples were air-dried, fixed with absolute methanol and stained with 1:10 diluted Giemsa's stain for hematological study. Necropsy were done to examine the internal parasites, especially in body cavity and gastrointestinal tract. The intestines were stored in 70% ethanol before being taken to the laboratory for subsequent tests. Trematodes and cestodes were stained with acetocarmine, cleared in xylene, and mounted in Canada balsam for taxonomic identification, while nematodes were cleared in lactophenol and examined. Parasites were categorized and identified according to Palma and Jensen (2005), Adam (2004) and Dik *et al.* (2011). Data were statistically analyzed using the Chi-square test, and significance was accepted at  $P < 0.05$  according to Al-Rawi (1984).

### Results

The study revealed that an examination of 30 fecal swabs of *G. chloropus* in Basrah Governorate were found infected with worms caused by different species. The overall infection rate was 72.1% and, in all samples, three nematode species were found and in some, two tapeworm species were present. *Capillaria* was the predominant nematodes, with an infection rate of 46.5% (Table 2). In the case of tapeworms, the variability was highest for *Raillietina* (it infected 66.6% of infected birds) different genera being included in this group (Table 3). The seasonal variation showed that the infection rate of winter was higher than other three seasons ( $P < 0.05$ ), followed by spring. Although the spring rate was lower than in winter, it was still higher compared to summer ( $P < 0.05$ ). Overall, the summer infection rates were relatively similar and there was no statistical difference (Table 4). The infection pattern indicates that mixed infections were the most common (50% affected birds) followed by double (33.3%) and single infections (16.6%) as presented in Table 5. Statistical analysis showed that mixed infections occurred more often than any single and double infections ( $P < 0.05$ , Table 5). The prevalence of mixed infection was the dominating group in a common moorhen and indicated that, seasonality has influenced the parasitic prevalence.

**Table 1.** The intestinal parasitic worms in the common moorhen (*G. chloropus*) in Basrah Governorate.

	Number examined	Number infected	mean intensity %
common moorhen	30	25	83.3

**Table 2.** The prevalence and number of nematode infections in the common moorhen (*G. chloropus*) in Basrah Governorate.

Nematodes worms	No. of positive samples in common moorhen	mean intensity %
<i>Capillaria</i> sp.	14	46.5
<i>Ascaridia dissimilis</i>	10	33.3
<i>Congylnema inghuricola</i>	6	20.9
Total	30	
LSD	7.3	4.5

**Table 3.** Prevalence and number of tapeworm infections in the common moorhen (*G. chloropus*) in Basrah Governorate.

Tapeworms	No. of positive samples in common moorhen	mean intensity %
<i>Railletina</i> sp.	20	66.6
<i>Hymenolepis</i> sp.	10	33.3
Total	30	99.9
LSD	6.9	3.2

**Table 4.** The percentage of infection with parasitic worms in common moorhen examined according to the seasons.

Season	No. infected No. samples in common moorhen	Infection rate %
Winter	12	42.85%
Spring	9	32.14%
Summer	7	25%
Total	28	

**Table 5.** Pattern of common parasitic infection with parasitic worms in common moorhen In the Basrah governorate.

Pattern of infection	Number infected No. samples in common moorhen	mean intensity %
Single Infection	5	16.5%
Double Infection	10	33.3%
Mixed Infection	15	50%
Total	30	
LSD	9.1	5.6

**Discussion:**

The common moorhen (*Gallinula chloropus*) has been found to be infested with different species of parasitic worms and the prevalence rate was 83.3%. These observations are in sharp contrast to the results observed by Kashid *et al.* (2002), who found an overall infection rate of 15.15% in poultry and Abd El-Fattah (1996) who obtained an infection rate of 38.6 % for domestic and wild birds. But the findings are almost similar to Al-Alusi *et al.* (1994) in Mosul, who observed an infection rate of 82.0 with internal parasites in turkeys.

Jensen and Pandey (1989) also reported a 100% infection in their study on poultry in Zimbabwe. These discrepancies may correspond different host species, ecologic conditions and parasite population in the studied regions.

Most of the parasitic worms that were detected in this study were nematodes, three species being diagnosed in common moorhen. Muhairwa *et al.* (2007) observed that nematode infestations occurred more frequently in waterfowl than in wild and domestic birds, which is consistent with the present analysis. This is likely due to the feeding habit of birds and ubiquitous presence of intermediate hosts in superficial sediment strata. These sediments are also susceptible to infestation by vector insects acting as intermediate hosts for different nematode species; this also, was earlier alluded to in (Wagner and Ruedy, 1981); (Ashenafi and Eshetu, 2004). Also, the free-range feeding that depends on a variety of feed sources contributes to nematode infection as wild and domestic birds consume insects that act as parasite vectors in agreement with Al-Alusi *et al.* (1994).

The genus *Capillaria* is one of the most prevalent helminths, which was referred to in the current study, which was at a rate of 28.8% in the common moorhen, where the results of the current infection are higher than many previous studies, the most prominent of which is the study carried out by Abdullah (1988), in the northwestern Basra region, where the study showed that most of the infections were infected with the penny of the species. Out of 100 birds, 14 were infected with the same type of parasite, which was considered to be the lowest rate of infection from the results of the current study. The researcher Reissjg *et al.* (2001) in his study that he completed on birds that one of the causes of the high rates of infection observed in his study was due to mutual infection with other bird species to aspects related to breeding operations through the lack of a healthy system and the overlap of infections between wild birds and domestic ones.

Studies have shown that species belonging to the genus *Capillaria* have multiple disease effects on birds, despite lower incidence rates, as noted by al-Jabri (2006). Infected birds, such as partridges and pheasants, have been observed to experience clear signs of wasting and weakness, despite the availability of adequate food sources. Pathological examinations revealed that parasites penetrate the intestinal walls in the areas of infection, leading to intestinal ulcers. In severe cases, the infection caused a complete blockage of the gastrointestinal tract, worsening the health status of these birds.

Raillietina has been reported as the most common tapeworm genus described in birds which reflected its significance as a pathogenic helminth. Species of this genus have been identified as some of the most pathogenic tapeworms to produce symptoms such as; general weakness, diarrhea and low productivity in infected birds (Wadda 2000). From a pathogenic standpoint, these parasites cause the intestine wall penetration when feeding, which causes bleeding and local superinfection), that finally in the worst cases can develop into bloody diarrhea.

The associated inflammatory response can also induce wall thickening of the intestine; in advanced cases this may produce a complete bowel obstruction. In severe infection, especially *Raillietina echinobothrida*, tuberculosis-like nodules develop (Calneck *et al.*, 1991) demonstrating the severe pathological effects of these tapeworms on birds. The findings of the current study establish the importance and pathological implications of these parasites in causing intestinal perturbations which compromise the physiological and reproductive potential of infected birds.

### Conclusion:

The current study indicated that a high percentage of *G. chloropus* in Basrah was infested with different helminths infection nematodes and tapeworms is predominant species. There was a seasonal impact on parasite transmission since the highest rates of infection occurred in the cooler months. It has also been reported that half of the infected birds are suffering from mixed infection [Hall, 1998] which indicate a high possibility of exposure to more than one type of parasites at the same time, which could be due environmental influences (different sources for feeding) and variation in diet.

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## العدوى الطفيلية في المورين الشائع *Gallinula chloropus* Linnaeus 1758، من محافظة البصرة، جنوب العراق.

حنان عبد الزهرة المنصوري<sup>1id</sup>، هبة عبد الحسين كاظم<sup>2id</sup>، ماجد عبد العزيز بناي<sup>1id</sup>، زهراء كريم شاكر<sup>1id</sup>

<sup>1</sup>قسم الفقاريات البحرية، مركز علوم البحار، جامعة البصرة  
<sup>2</sup> قسم العلوم الطبية الأساسية، كلية طب الأسنان، جامعة ميسان

\*Corresponding Author E-mail: [henan.salbok@uobasrah.edu.iq](mailto:henan.salbok@uobasrah.edu.iq)

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### المستخلص

في هذه الدراسة، قمنا بدراسة الإصابات الطفيلية لدى دجاج الماء (*Gallinula chloropus*)، جُمعت العينات خلال الفترة من يناير إلى ديسمبر 2024، من مواقع مختلفة في أهوار حمار بمحافظة البصرة. وكشفت النتائج أن 72.1% من الطيور كانت مصابة بنوع واحد أو أكثر من الطفيليات، بما في ذلك *Raillietina* sp. و *Hymenolepis* sp؛ والديدان الشريطية والديدان الأسطوانية، بما في ذلك *Ascaridia* و *Capillaria* sp. و *Congylnema inghuricola* و *dissimilis*. وقد لوحظ نمط موسمي لمعدلات الإصابة، حيث كانت أعلى نسبة انتشار خلال الأشهر الباردة. وعلى وجه الخصوص، بلغت معدلات الإصابة في الشتاء والربيع 42.85% و 32.15% على التوالي. وسادت الإصابات المختلطة (50% من الحالات)، مع حدوث إصابات مزدوجة في 33.3% من الحالات. من بين الطفيليات التي تم رصدها، وُجد أن جنس الديدان الأسطوانية *Capillaria* هو الأكثر إصابةً بنسبة 28.8%، يليه جنس *Raillietina* بنسبة 23.0%. تشير هذه النتائج إلى ارتفاع الحمل الطفيلي لدى دجاجة الماء الشائعة خاصةً في منطقة البصرة، لا سيما خلال فصل الشتاء. كما تُبرز النتائج ارتفاع نسبة الإصابة بأكثر من طفيلي في طيور الأراضي الرطبة، مما يُشير إلى عوامل بيئية وغير حيوية محتملة قد تؤثر على ديناميكيات انتقال الطفيليات بين هذه الطيور.

**الكلمات المفتاحية:** دجاج الماء الشائع (*Gallinula chloropus*)، الإصابات الطفيلية.