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

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Abstract

This study investigated parasitic infections in waterhen or swamp chicken the common moorhen (*Gallinula chloropus*). Samples were collected from various locations at Hammar marsh Basrah Province between January and December 2024. The findings revealed that 72.1% of the birds were infected with one or more parasite species, including *Raillietina* sp. and *Hymenolepis* sp. (tapeworms), as well as nematodes such as *Capillaria* sp., Ascaridia dissimilis, and Congylonema ingluricola. Seasonal variation in infection rates was observed, with the highest prevalence recorded during the colder months. Specifically, infection rates reached 42.85% in winter and 32.15% in spring. Mixed infections were predominant, occurring in 50% of the infected birds, while double infections were observed in 33.3%. Among the identified parasites, the nematode genus *Capillaria* exhibited the highest infection rate at 28.8%, followed by *Raillietina* spp. at 23.0%. These results highlight the significant parasitic burden in the common moorhen population in the Basrah region, particularly during colder seasons. The findings also emphasize the prevalence of mixed infections, suggesting possible ecological and environmental factors influencing parasite transmission dynamics in this wetland-dwelling bird species.

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,

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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 *Congylonema ingluricola*. Seasonal variations in infection rates were analyzed, highlighting higher prevalence during colder months, with mixed infections being predominant.

The research also sought to explore ecological and environmental factors influencing parasite transmission and provide baseline data to support conservation efforts for wetland ecosystems and avian health. There is a scarcity of studies on bird parasites in Iraq, with previous research primarily focusing on a limited number of species, such as chickens (Al-Hubaity and Al-Habib, 1979) and certain pigeon species (Al-Janabi *et al*., 1980; Sawada and Mohammad, 1989). Most available studies have examined various bird groups without emphasizing a specific taxonomic group (Mohammad, 2002; Mahmoud and Mohammad, 1989; Mahmoud *et al*., 2000). Among these studies, the report by Mahmoud and Mohammad (1989) is the only one that has documented parasites in the 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 km² (1,100 mi²) as permanent wetlands and lakes; however, during periods of flooding, their expanse can increase to around 4,500 km² (1,700 mi²). 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 and 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*) were 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. These samples were air-dried, fixed using absolute methanol, and stained with Giemsa's stain at a dilution of 1:10 for hematological analysis. Postmortem examinations were performed to assess internal parasites, with a particular focus on the body cavity and gastrointestinal tract. The intestines were preserved in 70% ethanol before being transported to the laboratory for further analysis. For taxonomic identification, trematodes and cestodes were stained with acetocarmine, cleared using xylene, and mounted in Canada balsam, whereas nematodes were cleared and examined in lactophenol. The classification and identification of parasites followed the criteria established by Palma and Jensen (2005), Adam (2004), and Dik *et al.* (2011). Statistical analysis was conducted using the Chi-square test with a significance level set at $P < 0.05$, as described by Al-Rawi (1984).

Results

The study revealed that an examination of 30 fecal samples from the common moorhen (*G. chloropus*) in Basrah Governorate showed infections with various worm species. The total infection rate was 72.1%, with three nematode species identified across all samples and two species of tapeworms detected in some. Among the nematodes, the genus *Capillaria* had the highest infection rate, reaching 46.5% (Table 2). Regarding tapeworms, the genus *Raillietina* showed the highest infection rate, with 66.6% of infected birds (Table 3). Seasonal analysis indicated that winter had the highest infection rate compared to other seasons ($P < 0.05$), with spring ranking second. Although the spring rate was significantly lower than winter, it remained significantly higher than summer ($P < 0.05$). The infection rates in summer were relatively uniform and showed no significant variation (Table 4). The pattern of infection showed that mixed infections were most prevalent, with 50% of birds affected, followed by double infections at 33.3%, and single infections at 16.6% (Table 5). Statistical analysis confirmed that mixed infections were significantly more frequent than either single or double infections ($P < 0.05$, Table 5). These findings highlight the dominance of mixed infections in the common moorhen and underscore the influence of seasonal factors on 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 %
Capillaria sp.	14	46.5
Ascaridia dissimilis	10	33.3
Congylonema ingluricola	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 %
Railletina sp.	20	66.6
Hymenolepis 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 present study revealed that the common moorhen (*Gallinula chloropus*) is infected with various species of parasitic worms, with an overall infection rate of 83.3%. These findings differ significantly from the results reported by Kashid *et al.* (2002), who observed a total infection rate of 15.15% in poultry, and Abd El-Fattah (1996), who recorded an infection rate of 38.6% in domestic and wild birds. However, the results are comparable to those of Al-Alusi *et al.* (1994), who reported an infection rate of 82.0% with internal parasites in turkeys in Mosul. Similarly, Jensen and Pandey (1989) found a 100% infection rate in their study on poultry in Zimbabwe. These variations may reflect differences in host species, environmental conditions, and the diversity of parasite populations in different regions.

The majority of parasitic worms identified in the current study were nematodes, with three species diagnosed in the common moorhen. Muhairwa *et al.* (2007) reported that nematode infections were more prevalent in waterfowl compared to wild and domestic birds, a finding that aligns with the results of the present study. This pattern can be attributed to the feeding behavior of these birds and the presence of intermediate hosts within shallow sediment layers. These sediments are often contaminated with vector insects that serve as intermediate hosts for various nematode species, a phenomenon also highlighted by (Wagner and Ruedy, 1981); (Ashenafi and Eshetu, 2004). Furthermore, the diverse diet of both wild and domestic birds, which includes insects acting as parasite vectors, plays a crucial role in the high prevalence of nematode infections, as previously noted by 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.

Studies have indicated that *Raillietina* is the most prevalent genus among tapeworms recorded in birds, confirming its importance as a pathogenic parasite. Wadda (2000) has shown that species of this genus are among the most harmful tapeworms, causing symptoms including general weakness, diarrhoea and low productivity in infected birds. The pathological mechanisms of these parasites are their ability to penetrate the intestinal walls, leading to

bleeding and local infections, which may develop into bloody diarrhea in severe cases. The resulting inflammatory response can also cause an increase in the thickness of the intestinal wall, which in some advanced cases can lead to complete blockage of the gastrointestinal tract. In cases of severe infection, especially with *Raillietina echinobothrida,* nodules similar to those associated with tuberculosis may form, as noted by Calneck *et al.* (1991), reflecting the profound pathological impact of these tapeworms on bird health. These results confirm the significant pathological role played by these parasites in inducing intestinal disorders that affect the physiological and reproductive performance of infected birds.

Conclusion:

The study showed that a large proportion of common moorhen (*G. chloropus*) in Basra are infected with helminths, with nematodes and tapeworms being the most prevalent. The highest rates of infection were found during the colder months, suggesting the influence of seasonal factors on parasite transmission. It has also been observed that half of the infected birds have mixed infections, reflecting the high likelihood of simultaneous infection with multiple types of parasites, which may be related to environmental factors and different feeding patterns.

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العدوى الطفيلية في المورين الشائع *Gallinula chloropus* Linnaeus1758، من محافظة البصرة، جنوب العراق.

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المستخلص

بحثت هذه الدراسة في الالتهابات الطفيلية في دجاج الماء أو مستنقعات الدجاج الشائع (*Gallinula chloropus*) تم جمع ثلاثين عينة من البراز من مواقع مختلفة في مستنقعات الحمار بمحافظة البصرة بين يناير/كانون الثاني وديسمبر/كانون الأول 2024. كشفت النتائج أن 72.1٪ من الطيور أصيبت بنوع واحد أو أكثر من الطفيليات، بما في ذلك *Raillietina* sp. و *Hymenolepis* sp. (الديدان الشريطية وكذلك الديدان الخيطية مثل *Capillaria* sp. و *Ascaridia dissimilis* و *Congylonema ingluricola*. ولوحظ تباين موسمي في معدلات العدوى، حيث سجل أعلى معدل انتشار خلال الأشهر الباردة على وجه التحديد، وصلت معدلات الإصابة إلى 42.85٪ في الشتاء و32.15٪ في الربيع. كانت العدوى المختلطة سائدة، حيث حدثت في 50٪ من الطيور المصابة، بينما لوحظت إصابات مزدوجة في 33.3٪. من بين الطفيليات المحددة، أظهر جنس الديدان الخيطية الشعيرات الدموية أعلى معدل إصابة بنسبة 28.8٪، يليه *Raillietina* spp. بنسبة 23.0٪ تسلط هذه النتائج الضوء على العبء الطفيلي الكبير في أعداد المورين الشائعة في منطقة البصرة، خاصة خلال المواسم الباردة. تؤكد النتائج أيضا على انتشار العدوى المختلطة، مما يشير إلى العوامل البيئية والبيئية المحتملة التي تؤثر على ديناميكيات انتقال الطفيليات في هذا النوع من الطيور التي تعيش في الأراضي الرطبة.

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