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Occurrence of gastro-intestinal parasites in wild avifauna: A study in Kota region

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Abstract

Wild birds are susceptible to infection with gastrointestinal parasites are known to affect avian populations, influencing the health and ecology of wild birds. This study aimed to assess the prevalence of gastrointestinal parasites in species around Kota between June 2021 to September 2021. Total 40 Fecal samples were collected from Indian Peafowl and Red vented bulbul. Helminth's identification was conducted using macroscopic and microscopic techniques (Direct method Centrifugal sedimentation technique and Floatation technique allowing for a comprehensive analysis of the avian gastrointestinal parasite. Overall, 15% (6/40) of the investigated samples, helminths positive. Most endoparasites were *Capillaria* Spp. (10%), *Ascaridia* Spp. (5%). Among 20 sample of Indian Peafowl 4 (20%) nematodes revealed similarly Red Vented Bulbul 2 (10%). None of the Avifauna were diagnosed with more than one endoparasite. Overall, this study shows a low occurrence of endoparasites among Avifauna in Kota region. The results of this study contribute to further insight into the distribution and potential risk factors associated with endoparasitic infections, as well as the zoonotic potential these parasites may present.

Keywords: Wild avifauna, gastrointestinal, helminths, peafowl, red vented bulbul, endoparasite, prevalence

Introduction

Birds are a group of vertebrates found in almost every region of the world. Birds are among the easiest animals to identify due to their wide spatial distribution and the diurnal behavior of most species. (SICK, 1985) [12]. Wild birds face many health problems that can affect their survival and reproduction. Parasitic diseases are one of the most important of these problems, not only because of their incidence, but also because of the ability to interfere, causing serious illness and death to the majority of birds found in highly endemic areas. (REED *et al.*, 2003; MARIETTO *et al.*, 2009) [10, 5]. The most common wild birds parasites are protozoa, nematodes, tapeworms and flukes. Nematodes are considered the most common parasites and can have a financial impact on the poultry industry. The occurrence of these parasitic diseases is common in free range birds and in the wild but is also rare in domestic avifauna. (Taylor *et al.*, 2010) [14]. These diseases can spread horizontally among birds through ingestion of larvae, or through indirect circulation requiring an host such as a mollusk or insect. Nematodes include tracheal nematodes, pharyngeal nematodes, tetramer nematodes, roundworm nematodes, and capillary nematodes. (Taylor *et al.*, 2010) [14]. Endoparasites can directly affect the host's survival and reproduction by causing pathological effects such as tissue damage, blood loss, congenital deformities, spontaneous abortion, and, in rare cases, death, as well as indirectly affecting the host's physical condition by lowering the host's resistance. Zoonoses are harmful to human health, and wild animals play an important role in the spread of parasite zoonotic illnesses. The epidemiology of zoonoses with wild animals as a reservoir has been determined by several human-related activities and ecological variables. Human population growth, migration, deforestation, and the loss of wildlife habitat are among these reasons. Found wild animals are sources of infections, reservoirs, and amplifiers of several new parasitic illnesses as well as well-known zoonoses of public health concern. (Thompson *et al.*, 2009; Carmena and Cardona, 2014) [15, 1].

Although gastrointestinal parasites are often found in wild birds, the spread of parasites among avifauna in zoological settings is little known. However, these creatures are becoming extinct

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because of a variety of factors, including a lack of knowledge about illnesses such as bacterial, viral, fungal, and parasitic infections. Even mortality has been observed in these animals while they are maintained in captivity (Rao and Acharjyo, 1984) [11]. Endoparasitism symptoms are Anorexia, changes in vocalisation, ruffled plumage, breathing difficulties, emaciation, bloody diarrhoea, and inability to live are all symptoms of endoparasitism. As a result, screening for endoparasites is critical for determining the health of the birds. Furthermore, gastrointestinal parasites can cause thickening of the intestinal mucosa with several petechial hemorrhage on the surface, nodular typhlitis, enteritis resulting in diarrhoea, wasting, unthrifty, marked emaciation, and intestinal obstruction in severe infection resulting in death. There are no effective management methods for controlling parasite infections in wild birds. The adaptability of these hosts guarantees that parasites are extensively dispersed in local environments and that those of migratory species are dispersed across much larger geographic regions, the transmission of parasites from migrating birds to local populations is a potential. (Kocan *et al.* 1979) [14]. In addition to developing and implementing effective management methods, identifying infectious diseases is important for understanding the types of diseases that affect wild birds. The aim of this study is to investigate the frequency of gastrointestinal parasite.

Material and Methods

The research carried out From June 2021 to September 2021 at Laboratory of Department of wildlife Science, University of Kota, Kota, Rajasthan, India. Faecal samples were collected from old habitat of Indian Peafowl it is surrounding of Instrumentation limited (IL) township from this location samples of Red vented bulbul were also collected. Freshly voided samples collected and placed in polythene bags using a spatula. For the coprological examination, samples were collected directly in polybags and preserved in a collection vial containing 10% formalin. The samples were labelled with the date of collection, species, sex, and location. They were brought to the laboratory to avoid egg hatching placed unfavorable conditions. The faecal sample was macroscopically examined to note distinguishing characteristics such as consistency, colour, the presence of mucus, blood, helminths parasites, segments, and their stages. Qualitative methods such as direct method, centrifugal sedimentation technique, and floatation technique were used for the detection of parasitic eggs/ova.

Results and Discussion

The faeces samples were macroscopically examined to identify distinguishing characteristics such as consistency and colour. Mucus, blood, and helminths parasites and their stages are all present. The faeces samples from confined birds ranged in colour from brown to green to white to black to orange to slit red to mixed colour. The faeces samples ranged in consistency from semisolid to watery, pasty, firm, and mucous combined. None of Adult worm was discovered in the faeces of birds and no blood was seen in the faeces of the samples. The faeces samples were primarily white, with a few greenish to brownish samples thrown in for good measure. Microscopically examined faeces 15% (6/40) were helminth positive at the experimental site. Patel *et al.* (2000) [18] found helminths in 20.75% of samples and protozoan infection in 17.92% of samples in certain wild birds at Ahmedabad's Kamla Nehru Zoo and Vadodara's Sayaji Baug Zoo. Otegbade and Morenikeji (2014) [17] At the Zoological Park in South-

West Nigeria, found an overall frequency of 21.9% in birds. Endoparasites were identified in 51.96% (Belgrade), 46.16% (Pali), and 16.66% (Bor) of the examined birds, according to Ilic *et al.* (2018) [2]. Overall positive of endoparasites fauna was 30.30%, according to K. Saranya *et al.* (2017) [3]. Similar parasite fauna was identified in the faeces of captive wild avian (n = 35) collected from University Research Farm, with an overall positive of 34.28 percent for endoparasitic fauna. Out 20 sample of Nematodes found in 6 (15%) None of the sample positive for Cestode. Among 20 sample of Indian Peafowl 4 (20%) nematodes revealed similarly Red Vented Bulbul 2 (10%), Souza *et al.* (2019) [13], the prevalence of endoparasite infections in the faecal samples studied was 70.58% (72/102). In 69.44% (50/72) of the samples, protozoa oocysts and cysts were found, whereas helminth eggs were found in 75.00% (54/72). According to Mehmood *et al.* (2019) [6], Out of 60 pigeon gastrointestinal tracts (GIT), 22 (36.67%) were positive for helminthic endoparasites. The Prevalence of *Capillaria* Spp. 4/40 (10%), *Ascaridia* sp., 2/40 (5%), was found respectively. Highest occurrence of *Capillaria* Spp. and least occurrence of *Ascaridia* Spp. Mehmood *et al.* (2019) [6], *Raillietina* sp. (25 percent; 15/60), *Ascaridia* sp. (5 percent; 3/60), and the hairworm *Capillaria* sp. (6.67 percent; 4/60) were found in 22 (36.67 percent) of the 60 pigeons' gastrointestinal tracts (GIT). *Coccidian* parasites (58.3%; 35/60), *Cryptosporidium* parasites (50%; 5/10), and *Trichomonas gallinae* (40%) (12/30). Prathipa (2015) [9] discovered in 12% of the samples, Cestode *Hymenolepis* sp. eggs were detected, *Capillaria* sp. eggs were found in 19% of the samples, and mixed infection of these was identified in 17% of the samples.

Conclusion

These data represent a significant advance in understanding the diversity and occurrence of endoparasites in wild Avifauna in Kota Region. The prevalence of parasites in this study may have important consequences for bird conservation and public health, as well as potential economic consequences, such as poultry production, which has an impact on bird conservation and public health. The study of parasitic infections in wild birds is essential not only for their health but also for their zoonotic potential. To acquire a thorough picture of parasitism in India, detailed research of parasites of wild birds should be carried out. Identification of parasites and diagnosis of parasitic illnesses utilizing molecular methods, as well as pathophysiology of various helminth species, are required. Based on the findings of this study, it can be inferred that gastrointestinal helminth parasites nematodes are more common than cestodes in wild birds in the Kota region the findings of this study show that frequent screening of faeces samples from Wild birds is necessary for estimating the parasite load of these birds in a qualitative and quantitative manner. In this approach, thorough parasitic infestation diagnosis will aid in reducing the negative consequences of these parasites in birds. In addition, stronger preventive and control techniques are required to limit environmental pollution.

Future scope

Future studies on gastrointestinal diseases in wild birds span a ll areas, including research, conservation, and public health. Some potential suggestions for future research include.

Ecological importance

Is important to understand how intestinal diseases affect the ecology of wild birds. Future studies may focus on the

ecological dynamics of these parasites, their effects on the host, and the interaction between different bird species antiparasitic. Host Parasite Relationship: Studying interactions between wild birds and intestinal parasites may supply insight into the arms race between hosts and parasites. Understanding protection mechanisms and the impact on different bird species can help inform conservation strategies.

Emerging Infectious Disease: Monitoring and examining emerging and potentially zoonotic gastrointestinal diseases in wild birds is important for public health. The fact that some diseases can be transmitted from birds to humans or animals proves the need for surveillance and prevention

One Health Approach: It is important to adopt a healthy lifestyle that considers the connection between human, animal, and environmental health. Understanding the connection between wild birds, animals and human health can help prevent disease outbreaks.

Conflict of Interest: Authors have declared that no competing interests exist.

Author contributions

Akash Bairwa: collection of data, contributed data and analysis tools, perform analysis, wrote the paper.

Akhilesh Pandey: Conceived and designed the analysis, contributed data and analysis tools, perform analysis

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