Biomedical Letters ISSN 2410-955X DOI: https://doi.org/10.47262/BL/11.2.2025425

Research article
2025 | Volume 11 | Issue 2 | Pages 62-68

ARTICLEINFO

Received
April 25, 2025
Revised
June 23, 2025
Accepted
July 27, 2025

***Corresponding Author**
Khawar Ali Shahzad

E-mail
khawar7bar@yahoo.com

Keywords
Japanese quails
Ascaridia galli
Eimeria species
Blood parasites
Economic loss

How to Cite
Saeed A, Rehman ZU, Mushtaq A, Fatima A, Rafiq M, Lashari MH, Shahzad KA. Prevalence of some enteric and blood parasitic infections in Japanese quails (*Coturnix coturnix japonica*) and their potential zoonotic risk. Biomedical Letters 2025; 11(2): 62-68.

SCAN ME

Open Access

Prevalence of enteric and blood parasitic infections in Japanese quails (*Coturnix coturnix japonica*) and their potential zoonotic risk

Aiman Saeed[1], Zia Ur Rehman[2], Ayesha Mushtaq[1], Areeba Fatima[1], Muhammad Rafiq[1], Mushtaq Hussain Lashari[1], Khawar Ali Shahzad[1*]

[1]Department of Zoology, The Islamia University of Bahawalpur, Bahawalpur 63100, Pakistan
[2]Department of Physiology, The Islamia University of Bahawalpur, Bahawalpur 63100, Pakistan

Abstract

Japanese quail farming is gaining recognition as a sustainable substitute for chicken production because of its high productivity, dietary benefits, and capacity to satisfy protein needs. However, quails are vulnerable to a number of parasitic, bacterial, fungal, and viral illnesses, such as coccidiosis and Ascarididae infestations, which can have a serious negative effect on their well-being and production. The purpose of this study is to present firsthand information regarding the frequency of blood and intestinal parasites in Japanese quails in the Bahawalpur district. 30 Japanese quails were collected from different fields in order to examine parasites. While intestinal samples were subjected to microscopic examination for enteric parasites and gross pathology, blood samples were obtained after slaughter for smear analysis. With 14 quails infected, the overall parasitemia rate was 46.66%. The pathological examination of Japanese quails revealed intestinal abnormalities, including hemorrhagic material, mucus accumulation, and gas distension. Eimeria species and roundworms (*Ascaridia galli*) were found to be a mixed infection (36.66%) and *Aegyptianella* spp. (10%) as a single blood protozoan infection, Eimeria species were recognized under a microscope, while roundworms were found by intestinal scraping. Due to co-breeding, environmental exposure, and inadequate management techniques, this study found that Japanese quails had a significant prevalence of blood and gastrointestinal parasites, which resulted in financial losses in quail husbandry. Furthermore, zoonotic dangers underscore the necessity of improved disease control strategies, and additional study is necessary to evaluate the severity of parasitemia and its related health effects.

This work is licensed under the Creative Commons Attribution Non-Commercial 4.0 International License.

Introduction

Farming of domesticated birds is a vital part of the agricultural system all around the world [1]. Enhancing the poultry sector through a brief generation interval is a viable method to alleviate Pakistan's animal protein shortfall. [2]. Domestic chicken breeding has for decades dominated the poultry market, but the Japanese quail (*Coturnix coturnix japonica*) of the Galliformes family has begun to gain recognition [3]. Quail production is a sector of the contemporary poultry business [4]. Due to increasing consumer appetite for special diets and eggs, brown-colored Japanese quails have become the focus of successful commercial breeding, establishing quail farming as a potential alternative for the production of chicken [5, 6]. The Quail is a compact-sized bird [7] compared to other chicken species, they have a brief life span, swift maturation pace, robust ability to reproduce, a substantial production rate, and speedier incubation, and their flesh is abundant in protein, vital fatty acids, and minerals [8, 9]. They are able to fill a substantial gap in protein demands, seeking ways to boost production and sustainability [10]. Despite the widely held misconception that Japanese quails are innately immune to primary poultry diseases, they are highly vulnerable to most of them, and outbreaks may arise in intensive quail farming or in harsh conditions [11]. They can suffer from an array of viral, bacterial, and fungal infections, as well as parasite ailments [12]. There are zoonotic parasite infections in quail that can spread to humans [13].

Coccidiosis is a parasitic gastrointestinal illness brought on by intracellular protozoa belonging to the genus Eimeria and subphylum Apicomplexa [14]. In many bird species, it is one of the most significant and prevalent protozoal diseases [15]. Clinical signs of coccidiosis include weight loss, increasing feed conversion rates, fluid-filled stool that can be greenish or red [4] with noteworthy death rates in certain more extreme cases [16]. When these pathogenic organisms infect quail, they can cause serious intestinal mucosal lesions that result in intestinal congestion [17]. Three Eimeria species (*E. tsunodai, E. uzura, and E. bateri*) are responsible for spreading this illness [4]. Coccidiosis is seen as a hindrance in intensive farming for the husbandry of chicken for both meat and laying fowls, as well as in extensive farming systems, leading to considerable decline in health and production efficiency [18]. Ascarididae parasites produce enteritis, another common ailment in birds that can be fatal based on the bird's age, physical condition, and nutritional state [19]. Young birds are particularly vulnerable to this mortality because they are more prone to illness than adults [20]. Both wild and domesticated birds can become infected with Ascarididae. This parasite, which primarily targets the proventriculus and small intestine of several species, can significantly impair the performance of birds [21], The most severe infestation is caused by *Ascaridia galli* specie of nematodes [22]. Besides intestinal parasites, blood parasites are also likely to be common in poultry [23]. Clinical manifestations of avian hemoparasite infection include emaciation, anorexia, depression, anemia, decreased productivity, and elevated mortality rates [24]. Among the often-documented hemoparasites of birds are nematode microfilariae, *Plasmodium* sp., *Leucocytozoon, Hepatozoon* sp., *Aegyptionnella* sp., and *hemoproteus* sp.[25].

Due to their innate nature, quails are more impervious to illness than other domesticated birds [26]. However, variables including stocking density, a lack of sanitary environment, and mismanagement can contribute to overbearing environmental contamination [27]. Preventing and controlling infections in quail is a critical topic that requires special care. Prior studies have revealed a lack of knowledge regarding the diseases and oversight of quail farming in Pakistan. There aren't many readily available resources that help clarify the main intricacies of quail husbandry, diseases, and productivity. This research consequently provides first-hand knowledge on the enteric and blood parasites in Japanese quails found in the Bahawalpur District, Pakistan.

Materials and Methods

Study area

The research was carried out in Physiology lab, Baghdad-ul-Jadeed campus, the Islamia University of Bahawalpur, which is situated in Bahawalpur, Punjab, Pakistan, between January and May of 2023. Having six Tehsils, Bahawalpur is the largest district in Punjab in terms of geographic area [28].

Sample collection

A total of thirty Japanese quails (*Coturnix coturnix japonica*) were gathered from various fields within the district of Bahawalpur. Before being dissected, they

were temporarily housed in a bird's cage. Blood was immediately collected from the quail's neck region after they were slaughtered and transferred to EDTA tubes.

Blood smear preparation and examination

A micropipette was used to place a tiny drop of blood on the slide's side, and a second slide was angled at a 45-degree angle. A thin, homogeneous blood smear was formed as it swiftly spread along the spreader. After staining the blood smear slides with Field's solutions A and B and fixing them with methanol, they were allowed to air dry once more. The smears were examined using a light microscope manufactured by the Labomed company.

Postmortem analysis

The intestinal system, which included both cecal pouches and extended from the duodenum to the rectum, was cut open with scissors. All macroscopic pathological lesions found after a thorough examination of the gastrointestinal tract were noted.

Examination for parasites

Following each quail's postmortem, the intestinal scrape and feces were collected in different petri dishes.

Examination via direct microscopy

To perform a direct microscopic analysis, a tiny amount of fecal material was placed on a glass slide using a toothpick, and it was then emulsified with a drop of regular saline. After that, a cover slip was applied to the smear before it was examined under the microscope.

Results

Pathological study

The examined Japanese quails' small intestine showed macroscopic changes during the necropsy as shown in **Fig. 1 (A and B)**. The mucous membranes were clogged, the intestinal loops had dilated as a result of gas collection, and the mucus content was yellowish mustard in color, possibly with blood streaks mixed in. There were occasions when the small intestine was filled with gas bubbles, an unpleasant-smelling brownish fluid and blood clots were found in the caecum, previously reported [29].

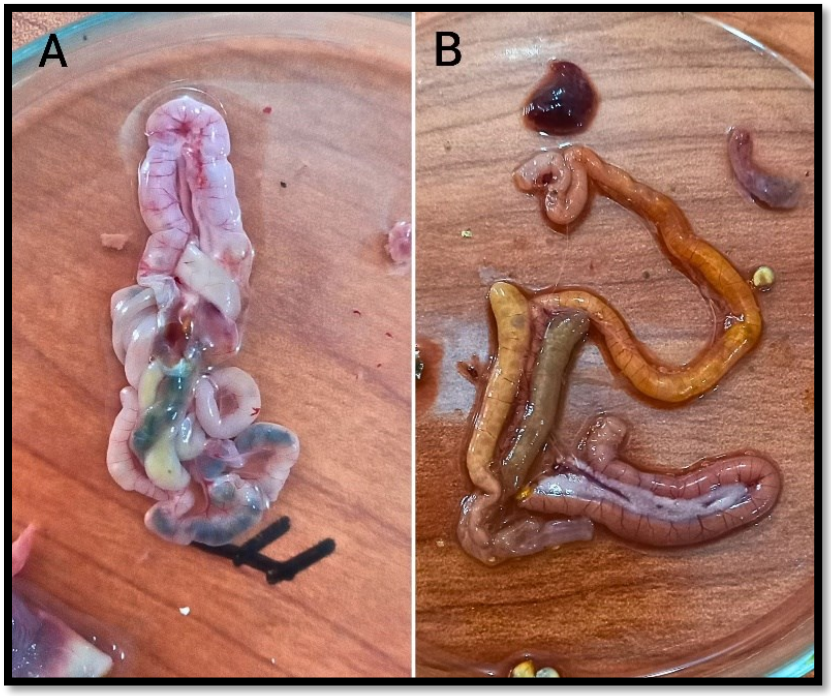

Fig.1: (A) A Japanese quail's intestine showing haemorrhage, (B) Reddish-brownish fluid with gas bubbles scattered throughout the quail's intestine

Helminths (Nematode)

Three Japanese quail samples were found to contain the worm *Ascaridia galli* after intestinal scraping as shown in **Fig. 2**. The parasites found were spherical, elongated, creamy white, and semitransparent. Three lips encircled the mouth, and the esophagus lacked a posterior bulb, as stated in a former study [30].

Intestinal protozoa

Microscopic analysis of fecal slides confirmed the presence of Eimeria oocysts, as shown in **Fig. 3 (A)**, with a frequency rate of 36.66% demonstrating a mixed infection of Eimeria species, in accordance with the results of [31-33] as shown in **Fig. 3 (B).**

Blood protozoa

We found an unusual structure, like stain of deep purple spheres inside erythrocytes of 3 Japanese quails shown in **Fig. 4 (A)**. After examining them thoroughly, these unusual stains were found to be parasites that belong to *Aegyptianella* spp., which were comparable to the outcomes of studies by Abdullah *et al.,* [34] and Hassan *et al.,* [32] as shown in **Fig 4(B1 and 2)** respectively.

Fig. 2: *Ascaridia galli* and its remnants taken out of the gut

Discussion

Japanese quails are exposed to more infectious stages because of their free-ranging lifestyle in the environment, and the possibility of parasite cross-transmission through co-breeding with other poultry species, they were found to have a high prevalence of gastrointestinal parasitism in this study. This outcome is consistent with research conducted in Tanzania [35] which found that helminth infections were 100% prevalent in the free-range system regardless of the age or sex of the birds. We found that Ascaridia and Eimeria species were present in both single and mixed infections. These findings support the researcher's findings that Japanese quails frequently harbor worms and protozoa [36]. According to [37], large roundworms (*Ascaridia galli*) cause serious harm, particularly in young birds, by reducing nutrient uptake, causing developmental delays and lower output. In critical infestations, intestinal blockage can occur, potentially leading to death. Several factors, including the bird's age, the maturity of parasite eggs, and the host's nutrition, are thought to influence worm growth in the gut. Quails' wild nature makes them more disease resilient than poultry [26], yet, high stocking density, poor cleanliness, and management shortcomings can result when mature oocysts significantly contaminate the environment as a result, coccidiosis poses a serious financial risk to the commercial quail industry [27]. The quails under examination tested positive for oocysts at a 36.66% frequency rate (**Table 1**). Previous reports of coccidiosis from Coturnix species have shown varying prevalence rates, with a close rate of 36.36% documented by [34], with a greater rate of 64.54% recorded by [38], 30% from farmed quail was noticed by [32], and 24% stated by [39].

The small intestine appeared bloated with gas, and necrotic mucosa could be seen through the intestinal walls. Hemorrhages were also found on the intestinal wall. In rare cases, the small intestine contained a darkish fluid with a bad odor and interspersed bubbles of gas. Similar outcomes were noted, as previously documented by [40]. The jejunum, ileum and cecum of certain quails were filled with brown mucus that resembled coffee grounds similar to the findings of [29]. [4] reported that *Eimeria* spp. induced parasitemia in quails has been identified as manifested by diarrhea and cecal distention brought on by gas buildup. Similar results have been observed in intestinal coccidiosis cases in Japanese quail by [41]. According to [31], the most frequent pathological lesion in Japanese quails infected with mixed *Eimeria* spp. is cecal enlargement without the presence of red exudate in the lumen, which is consistent with our current data. The variety in oocyst shapes could indicate the existence of multiple Eimeria species in the quails studied. The oocysts of *Eimeria tsunodai*

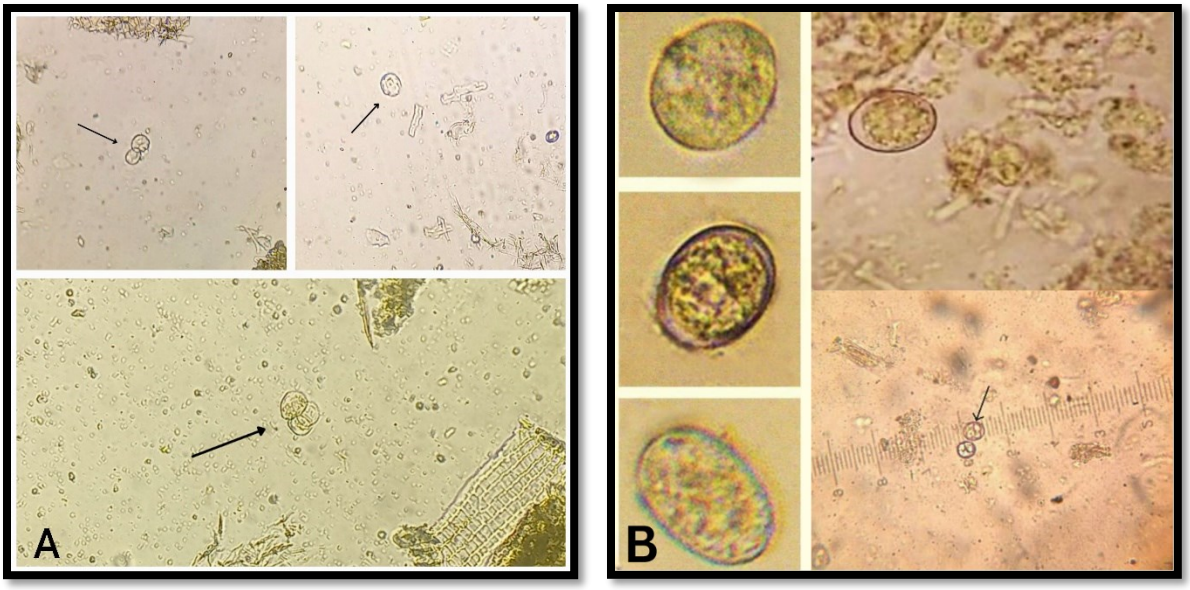

Fig. 3: (A) Oocysts of Eimeria discovered in a Japanese quail fecal sample, (B) Various Eimeria oocysts discovered in previous investigations

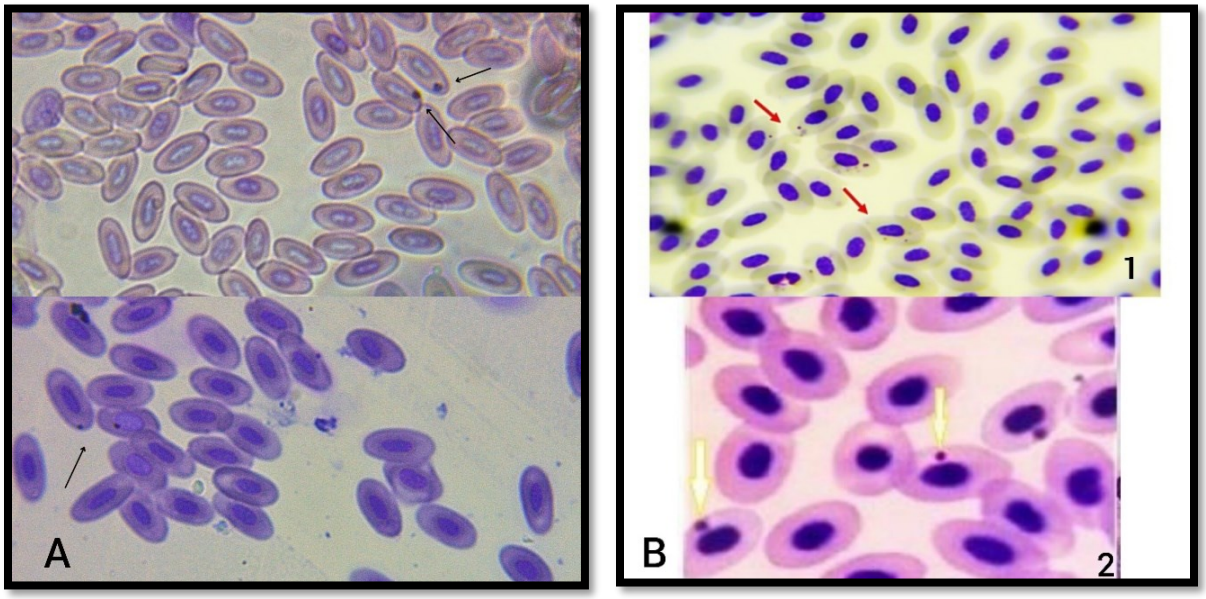

Fig. 4: (A) Deep purple spheres found inside erythrocytes of Japanese quails, (B1) Results by Abdullah *et al* (B2) Results by Hassan *et al*.

and *Eimeria bateri* are characterized as subspherical, elliptical, or ovoidal, but *Eimeria uzura* has both elliptical and ovoidal morphologies [42]. According to [43] the parasites can be spread by vectors or through interaction with other livestock in the sampling establishment. Concerning to *Aegyptenella* spp., with frequency rate 10%, various prevalence rate has been reported previously from *Coturnix* spp., 7.7% stated by [44] who recorded in Nineveh governorate, Iraq. 7% from farmed quail was reported by [32]. Temperature, humidity, and vector dispersion all affect the incidence of blood parasites in birds. While host age, sex, immunity, and behavior influence parasitemia levels, reduced vector counts during the dry season enable asymptomatic carriers to maintain infections. Hemoparasite susceptibility may also be influenced by feeding patterns and physiological alterations [34].

Conclusions

In this study, the incidence of parasites in Japanese quails was examined at different levels including endoparasites and hemoparasites. In impacted communities, the sustainability of livelihoods and food security may be impacted by financial losses resulting from parasitic disease. People can become infected with parasites if they eat the meat or eggs of infected quail that have been incorrectly cooked. Farm workers who handle diseased birds may get allergic responses or skin issues. However, more research is required to determine the extent of the current parasitemia and related hematological abnormalities.

Table 1: Frequency of parasitic infection in studied Japanese quail (*Coturnix coturnix japonica).*

Mixed Identified Parasites	No. of infected quails	Infection %
Intestinal parasite (mix infection)		
Helminths (Nematode) *Ascaridia galli*	3	10
Intestinal Protozoa *Eimeria spp.*	11	36.66
Blood protozoa (single infection) *Aegyptianella pullorum*	3	10
Total	**14**	**46.66**

Conflict of interest

The authors declare no conflict of interest.

References

[1] Tabler T. Characterizing and Evaluating Growth Performance and Poultry Production Efficiencies Using Conventional and Novel Monitoring Methods on Modern Broilers and Japanese Quail. 2023.

[2] Owen O, Dike U. Japanese quail (Coturnix coturnix japonica) husbandry: a means of increasing animal protein base in developing countries. 2013.

[3] Egbeyale L, Fatoki H, Adeyemi O. Effect of egg weight and oviposition time on hatchability and post hatch performance of Japanese quail (Coturnix coturnix japonica). Nigerian Journal of Animal Production. 2013;40:102-10.

[4] Teixeira M, Teixeira Filho W, Lopes C. Coccidiosis in Japanese quails (Coturnix japonica): characterization of a naturally occurring infection in a commercial rearing farm. Brazilian Journal of Poultry Science. 2004;6:129-34.

[5] Nasar A, Rahman A, Hoque N, Talukder AK, Das ZC. A survey of Japanese quail (Coturnix coturnix japonica) farming in selected areas of Bangladesh. Veterinary world. 2016;9:940.

[6] Berto BP, Luz HR, Flausino W, Teixeira-Filho WL, Ferreira I, Lopes CWG. Isosporoid coccidia (Apicomplexa: Eimeriidae) parasites of tanagers (Passeriformes: Thraupidae) from the Marambaia Island, Brazil. Pesquisa Veterinária Brasileira. 2011;31:798-805.

[7] Abd El-Ghany WA. A comprehensive review on the common emerging diseases in quails. Journal of World's Poultry Research. 2019:160-74.

[8] El-Katcha M, Soltan M, Sheaita S, Naggar E, Karima M, El-Shobokshy SA. Growth Performance, Blood Biochemical Changes, Carcass Traits and Nutrient Digestibility of Growing Japanese Quail Fed on Various Dietary Protein and Calcium Levels. Alexandria Journal of Veterinary Sciences. 2015;44.

[9] Gecgel U, Yilmaz I, Gurcan EK, Karasu S, Dulger GC. Comparison of fatty acid composition between female and male Japanese quail meats. Journal of Chemistry. 2015;2015:569746.

[10] Mohammed BR, Ejiofor C. The prospects and limitations of Japanese quail (Coturnix coturnix japonica) production in Nigeria-A review. International Journal of Multidisciplinary and Current Research. 2015;3:920-6.

[11] Minvielle F. The future of Japanese quail for research and production. World's Poultry Science Journal. 2004;60:500-7.

[12] Islam MT, Talukder AK, Rahman MA, Haider MG, Rahman ANMA. Incidence of diseases in Japanese quail (Coturnix coturnix japonica) with special reference to bacterial and viral diseases in some selected areas of Bangladesh. Asian-Australasian Journal of Bioscience and Biotechnology. 2016;1:410-8.

[13] Peterson M. Diseases and parasites of Texas quails. Texas quails: ecology and management Texas A&M University Press, College Station, USA. 2007:89-114.

[14] Pinheiro BC, Da Silva ABS, Cavalcante MMAdS, Mendonça ILd, Conde Júnior AM. ptidiose em frangos de produção. R cient eletr Med Vet. 2014:1-11.

[15] Al-Natour MQ, Suleiman MM, Abo-Shehada MN. Flock-level prevalence of Eimeria species among broiler chicks in northern Jordan. Preventive veterinary medicine. 2002;53:305-10.

[16] Yin G, Liu X, Zou J, Huang X, Suo X. Co-expression of reporter genes in the widespread pathogen Eimeria tenella using a double-cassette expression vector strategy. International journal for parasitology. 2011;41:813-6.

[17] Anbarasi P, Ponnudurai G, Senthilvel K, Puvarajan B, Arulmozhi A. A note on incidence of coccidiosis in Japanese quail (Coturnix coturnix japonica). 2016.
[18] Blake DP, Knox J, Dehaeck B, Huntington B, Rathinam T, Ravipati V, et al. Re-calculating the cost of coccidiosis in chickens. Veterinary research. 2020;51:1-14.
[19] Machado HHS, da Silva Lemos L, de Almeida LG, de Mattos Júnior DG. NOTA CIENTÍFICA: CICLO ERRÁTICO DE Ascaridia galli (SCHRANK, 1788) EM OVO DE GALINHA. Ciência Animal Brasileira/Brazilian Animal Science. 2007;8:147-9.
[20] Brito DRB, Fernandes RM, Fernandes MZdL, Ferreira MDdS, Rolim FR, Silva Filho MLd. Atividade anti-helmíntica dos extratos aquoso e etanólico do fruto da Morinda citrifolia sobre Ascaridia galli. Revista Brasileira de Parasitologia Veterinária. 2009;18:32-6.
[21] Rosa MS, Lima H, Campos G, Camargo MV, Aquino MS, Bittencourt TM. Enteroparasites of the families Eimeriidae and Ascarididae in Japanese quail (Coturnix japonica) in the metropolitan region of the Cuiabá river valley, state of Mato Grosso, Brazil. 2017.
[22] da Silva GS, Romera DM, Fonseca L, Meireles M. Helminthic parasites of chickens (Gallus domesticus) in different regions of São Paulo State, Brazil. Brazilian Journal of Poultry Science. 2016;18:163-8.
[23] Lawal J, Bello A, Balami S, Dauda J, Malgwi K, Ezema K, et al. Prevalence of haemoparasites in village chickens (Gallus gallus domesticus) slaughtered at poultry markets in Maiduguri, Northeastern Nigeria. Journal of Animal Science and Veterinary Medicine. 2016;1:39-45.
[24] Dunn JC, Goodman SJ, Benton TG, Hamer KC. Avian blood parasite infection during the non-breeding season: an overlooked issue in declining populations? BMC ecology. 2013;13:1-10.
[25] Olayemi OA, Jubril AJ, Adekola AA. Prevalence of Haemoparasites in Village Weaver (Ploceus cucullatus) in Ibadan, Nigeria. Journal of World's Poultry Research. 2014:89-93.
[26] Cheng KM, Bennett DC, Mills AD. The Japanese quail. The UFAW handbook on the care and management of laboratory and other research animals. 2010:655-73.
[27] Elmorsy MA, Das M, Senapati SK, Jena GR, Panda SK, Kundu AK, et al. Efficacy of immunization compared to an anticoccidial drug combination in the management of challenged coccidiosis in Japanese quail. Veterinary Parasitology. 2021;295:109451.
[28] Khalid S, Gilani AH. Distinctive cultural and geographical legacy of Bahawalpur. Pakistaniaat: A Journal of Pakistan Studies. 2010;2:1-17.
[29] Monte GL, Cavalcante DG, Oliveira JBS, Lima EF. Pathological Alterations in Carcasses and Viscera of Japanese Quail (Coturnix japonica Temminck & Schlegel, 1849) of Commercial Breeding. Acta Veterinaria Brasilica. 2015;9:205-11.
[30] Faizullah JS, Taj K, Ud Din Z, Akbar Khan M. Migratory Japanese Quail (Coturnix coturnix japonica) as a Host and Carrier for Coccidiosis and Ascaridiasis. Dates. 2021;1:1-10.
[31] Umar H, Lawal I, Okubanjo O, Wakawa A. Morphometric identification, gross and histopathological lesions of Eimeria species in Japanese quails (Coturnix coturnix japonica) in Zaria, Nigeria. Journal of veterinary medicine. 2014;2014:451945.
[32] Hassan AK, Naeem EV, Soliman MA. Investigation the prevalence of common parasitic infections in farmed quails in Upper Egypt. SVU-International Journal of Veterinary Sciences. 2020;3:38-50.
[33] Ahmed BAE, Nada MS, Anter RG. Prevelance and Morphological identification of Eimeria species in quails. Egyptian Veterinary Medical Society of Parasitology Journal (EVMSPJ). 2017;13:55-63.
[34] Abdullah SH, Amin SQ, Zorab HK, Mahmood HJ. An investigation of Endo-and Hemoparasitic Infection in Quails (Coturnix coturnix) Population of Sulaymaniyah Province/Iraq. Egyptian Journal of Veterinary Sciences. 2025:1-10.
[35] Magwisha H, Kassuku A, Kyvsgaard N, Permin A. A comparison of the prevalence and burdens of helminth infections in growers and adult free-range chickens. Tropical Animal Health and Production. 2002;34:205-14.
[36] D'souza NM, Rakesh GS, Das SS, Cattavarayane M, Christopher AFB. Incidence of gastrointestinal parasites in Japanese quails (Coturnix coturnix japonica) in a hot and humid tropical environment. Applied Veterinary Research. 2022;1:2022015-.
[37] Butcher GD, Miles RD. Intestinal parasites in backyard chicken flocks: University of Florida Cooperative Extension Service, Institute of Food and …; 1995.
[38] AL-Zarkoushi MMF, AL-Zubaidi MTS. Molecular Study of Eimeria species in Quail birds (Coturnix coturnix japonica) in Thi-Qar Province, Southern Iraq. Indian Journal of Forensic Medicine & Toxicology. 2022;16.
[39] Zahid M, Umer M, Ahmad N, Ullah Z, Mehmood M, Shaheen H, et al. Endoparasitic Fauna in quails population KP, Pakistan. International Journal of Fauna and Biological Studies. 2018;5:12-5.
[40] Chauhan H, Roy S. Poultry diseases and treatment. New Delhi, India: New Age International (P) Limited. 2008.
[41] Elmorsy M, Jena GR, Panda S, Kundo A, Kumar D, Mishra S, et al. Isolation, identification, and clinical impact of coccidiosis in Japanese quail farms in and around Bhubaneswar, Odisha, India. Journal of Entomology and Zoology Studies. 2020;8:302-7.
[42] Berto BP, Borba HR, Lima VM, Flausino W, Teixeira-Filho WL, Lopes CWG. Eimeria spp. from Japanese quails (Coturnix japonica): new characteristic features and diagnostic tools. Pesquisa Veterinária Brasileira. 2013;33:1441-7.
[43] Jubril A, Olushola G, Adekola A, Antia R. Haematological profile of naturally infected haemoparasite positive and negative Japanese Quails (Coturnix coturnix japonica). Sahel J Vet Sci. 2021;18:21-6.
[44] Mohammad RG. Diagnostic study on microfilariae and some blood protozoa in quail birds (Coturnix coturnix Japonica) in Nineveh Governorate. Basrah Journal of Veterinary Research. 2012;11:32-42.