

Prevalence of External and Internal Parasites and their Effects on Body Performance to Local Chickens in Erbil City

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Abstract

The parasites are known to infect local chickens and are one of the genuine issues leading to economic loss in breeding farms and rural regions that grow chickens yearly. This study aims to know the prevalence of external and internal parasites and their effects on body performance in local chickens in Erbil city.

The research was carried out on 500 different species of local chickens to investigate the existence of external and internal parasites and their prevalence in the Erbil city region of Kurdistan/Iraq from October 2022 to January 2023.

Overall findings showed that 280 out of 500 hens evaluated (56%) had external parasite infestations; out of that, 95 % (475/500) were infested with lice, and 5% (25/500) of it with the larval stage of soft tick. However, of the 500 hens that were tested, 13% (65/500) had internal parasite infections, including cestode which made up 65% (45/65), and nematodes, which made up 31% (20/65).

This study revealed that 56% of local chickens were infested with external parasites, the majority of which were lice (95%). Internal parasites were found to be more prevalent in 65% of cestode species, nematode species had a lower frequency of 31% in Erbil city.

Keywords: External & Internal parasite, Lice, Tick, Cestode, Ascaris, local chicken



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Introduction

Local chicken has been reared for thousands of years by human beings after being domesticated and used as a food source (1). Local chicken plays an important role in providing a natural and organic source of food to humans, most local chicken owners in Iraq especially in the Kurdistan region exactly in villages far from cities have the same reasons for starting up their flocks by getting products like meat and especially eggs due to having good taste and nutritional value or local chicken rearing participate in small business and normal human social behaviors (2).

Several ectoparasites, such as ticks, lice, mites, and endoparasites, such as protozoa, cestodes, nematodes, and trematodes, can be carried by chickens (3). External parasites target poultry by feathers, chewing on the skin, or swallowing blood; it is challenging to avoid interaction with small herds' external environment (4).

Ticks and mites, in particular, are some ectoparasites that serve as carriers of several helminth parasites, including fowl pox, Newcastle disease, and possibly chlamydia (5, 6). These parasites can also pose a clinical problem by spreading some infectious diseases.

Chickens are particularly susceptible to infection by a multiplicity of intestinal helminths, leading to significant commercial losses during intervention with healthy development in the late growth system, primarily chickens, rendering adult chickens vulnerable to secondary infections, actually reducing the production of chickens (9). Egg production, weight increase, and carcass deterioration will all be reduced as a result of the physical harm these insects and worms do (10). In large-scale poultry, parasitic worms are common, while severe infections in highly managed stocks affect death-causing birds' biological activities hence good antiparasitic application is very important seasonally for eradication of such diseases and economic loss (10,11).

The prevalence of internal and external parasites varied from country to country. In Morocco, 89% (12), the prevalence of the external parasite rate (18) was 88% in Ethiopia. However, in Iran, the prevalence of internal parasites was 33% nematodes, and 22% tapeworms (34). In Jordan, 50% of domestic chickens were infected with internal and external parasites (35). There are few studies performed in Iraq. In the Sulaimanai region, a study was done by (7) the prevalence of external parasites was 81%

which was infested with lice, 62% was infested with the larval stage of the soft tick, and 89% was infected with internal parasites. (14) reported that the among 82 local chickens 27% external parasites, 52% was infected with internal parasites in Salah Al-Deen Province. While in Duhok province, another study was done by (15). The prevalence of external & internal parasites was 9% and 44%, respectively. The objective of the present study is to determine the prevalence of external and internal parasites in local chickens and their effects on body performance in Erbil City.

Material and Methods

Ethical approval

This study was performed after gaining ethical approval from the committee of Erbil Polytechnic University ethical committees, for applying all criteria for handling all biological samples and not harming chickens during the examination.

Study area

A total of 500 local chickens were inspected from different locations in Erbil city center and villages of Erbil municipality and Shaqlawa district, Iraq, from October 2022 to January 2023. After knowing their symptoms, the samples were taken from the infected area in the chicken's body. The

infested area was recorded to know the type and size of the presence of the external parasites. The infected chicken with internal parasites was recognized by their clinical symptoms and taken to the lab for further diagnosis.

Collection of samples

External parasites were examined by naked eyes and magnifier and then were removed with comb, scissor, scalpel, and forceps from the entire body including the wing, head, foot, leg, wattle, comb, vent, and eyes, and placed in a tube containing 10% KOH. Each chicken's suspected internal parasites were performed anatomical postmortem examination starting from the trachea, bronchi, and GIT, including the seed, esophagus, proventriculus, gizzard, and small and large intestines, which were opened longitudinally to detect internal parasites. All visible worms were collected with forceps, carefully cleaned, sorted into different categories, and preserved in 10% formalin (15, 16).

Microscopical examination

This procedure was used during a visual examination. The parasite was examined under a dissecting microscope to see the details of the parasite. A light microscope was used to research the type of parasite and

make slides to test isolated samples for examined parasites (17).

Statistical analysis

All collected data were entered into a computer by using the Excel program. All statistics were analyzed using Graph pad Prism (Version 8) and a significant P-value of less than ($P \leq 0.05$) with 95 % confidence intervals.

Results

In the current study, ectoparasites were found in 56% (280/500) of domestic

chickens raised in a free-range environment, and mixed infestations involving more than two ectoparasite species were also found. The majority of prevalence was from around Erbil city, 64% (180/280) then, followed by 25% (70/280) from the city center, and the lower rate was found in Shaqlawa at 11% (30/280) respectively (Table 1). All isolated ectoparasites were from the wing, tail, and neck (Table 1).

Table 1: Prevalence of external parasites according to city location samples among local chickens in Erbil city.

No. of Examined	No. of non infested	No. of Infested	Location of Parasites	Total
100 (City center)	30 (13%)	70 (25%)	Wing, tail, neck	100
350 (Around city)	170 (77%)	180 (64%)	Wing, neck, tail	350
50 (Shaqlawa)	20 (10%)	30 (11%)	Tail, wing, neck	50
Total	220 (44%)	280 (56%)		500

P= 0.52 NS.

Local poultry are typically infected with lice (Figure 1) and soft ticks (Figure 2), which irritate them and cause them to grow poorly and lay fewer eggs. There were no mite organisms found in the scratching of different regions of the hens' bodies or feathers.

Table 2: Prevalence of external parasites lice (*Menacanthus stramineus* *Cuculotogaster heterographus*, and Soft Tick (*Argas persicus*) in domestic chickens in Erbil city.

External Parasites	No. of Infested	Infestation rate %	Total
Lice			
(<i>Menacanthus stramineus</i>)	325	65%	475
(<i>Cuculotogaster heterographus</i>)	150	30%	
Soft Tick (<i>Argas persicus</i>)	25	5%	25
Total	500	100%	500

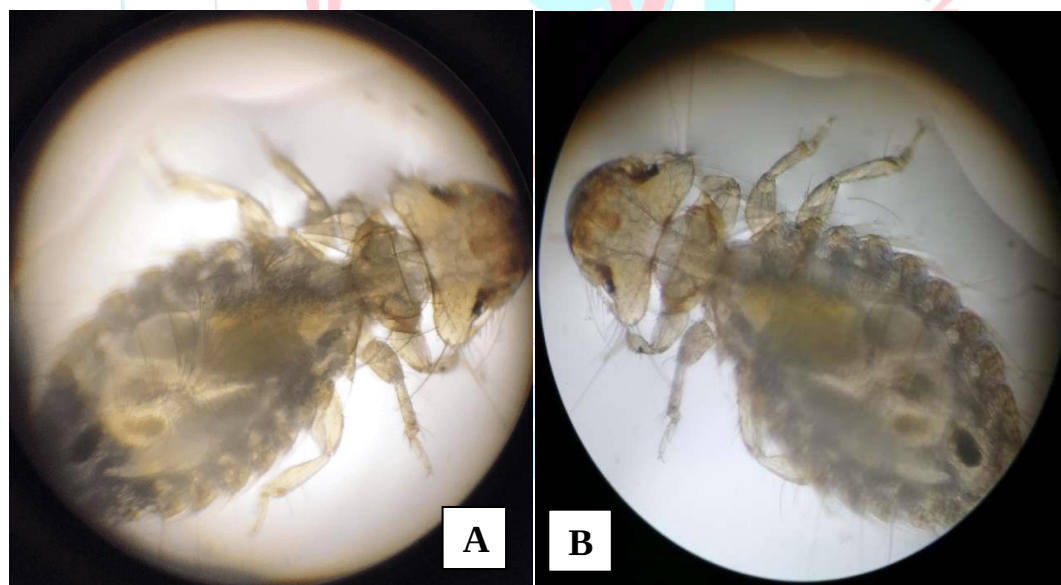


Figure 1: Lice species: - A. *Menacanthus stramineus*, B. *Cuculotogaster heterographus* (10X).



Figure 2: The larval stage of the external parasite (soft tick) *Argas persicus* (10X).

According to our findings, 13 % of 65/500 local chickens examined by postmortem inspection harbored gastrointestinal parasites, including multiple species of helminths, as seen in (Table 3). The prevalence rate of the majority of worms was (76%), (15%), (and 7%) respectively.

Two forms of helminths were classified based on morphological characteristics of parasites, which included four nematode and five cestode genera, and all of the chickens tested had mixed infections (Table 3).

Table 3: Common internal parasites isolated among local chickens in Erbil city.

Helminthes species	No. of positive	Percentage %
<i>Raillietina echinobothrida</i>	45	69%
<i>Ascaridia galli</i>	20	31%
Total	65	100%

Raillietina echinobothrida was the most common cestode species in the current sample, accounting for 69 % (45/65) of the total (Fig. 4); other helminths species documented belonged to nematode *Ascaridia galli* (31%) (20/65) (Fig. 3).



Figure 3: *Ascaridia galli* during postmortem examination.

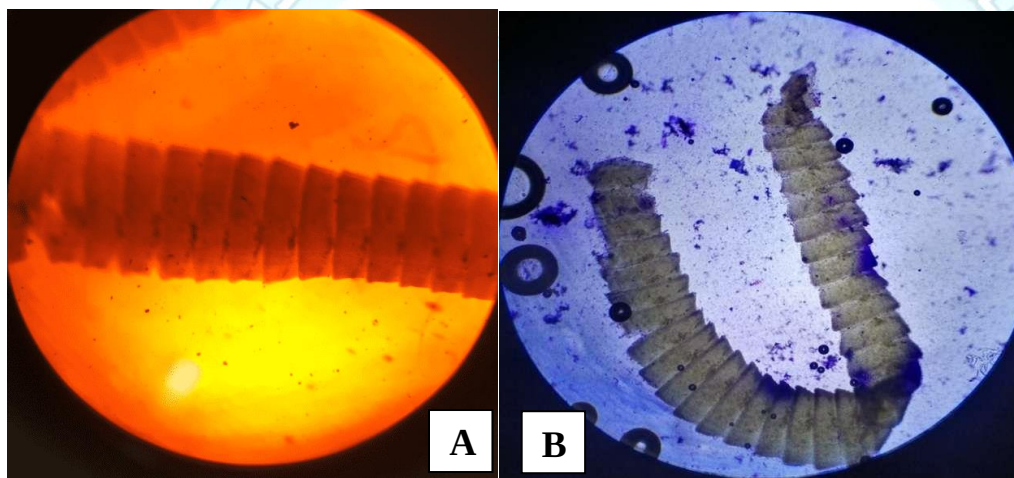


Figure 4: Intestinal tape worms under microscope (*Raillietina echinobothrida*) (10X).

Discussion

Overall, ectoparasites were present in 56% (280/500) of domestic hens, and mixed infestations involving more than two ectoparasite species were also found. The city center of Erbil had the highest frequency, at 64% (180/280), followed by 25% (70/280) from there, and Shaqlawa had the lowest prevalence, at 11% (30/280),

respectively. The wing, tail, and neck were where all isolated ectoparasites came from. In Sulaimanai city (7) recorded 81% of local chicken was infected with lice, 62% soft tick, and 89% was infected with internal parasites. In south Iraq exactly at Salah Al-Deen city, 27% of chickens harbored different species of external parasites, and 52% were infected with different types of internal parasites (14). While in Duhok City,

the prevalence of external & internal parasites was 9% and 44% (15).

Similar to our findings, a study by (33) reported that 100 percent of the chickens from free-range processing systems in Nigeria harbored ectoparasites, of the overall (90.77 %, 81.36 percent (48/59) were infected with various species of lice, and 62.72 percent (37/59) were infected with the larval stage of soft tick. (7) mentioned among (81 percent) of local chickens, 48/65 were infested with lice and (62 percent) 37/65 were infested with the soft tick. Also, (18) recorded that louse is the most common ectoparasites, infesting 88 percent of the chickens studied in Ethiopia, while (15) reported 9.1 % 11/120 of local chickens infested with ectoparasite, with 12.5 percent infested with lice and 6.8 percent infested with the soft tick in Duhok city.

The ectoparasites in general are the main source of chicken infestation like as biting lice, and ticks, which irritates hens and can lead to poor development and decreased egg production. They live their entire lives on chickens and are found on the breast, thighs, and skin surrounding the vent. They eat skin and feathers but can also consume blood (10, 19, 15, 40). When lice were present on the birds, they could be seen pecking

themselves and rolling on loose dirt or ashes for relief (18, 20, 15).

Because the chickens were raised in a free-range setting where they were exposed to a variety of ectoparasites, there may be a high prevalence of ectoparasites in this sample. (21) showed that poor hygiene in the farm/chicken house and a lack of parasite control measures were related to the occurrence of ectoparasites.

The results showed that birds kept in a free-range habitat had somewhat lower body weight and weight increase than those kept in an indoor-floor system. The connection between the feed transfer ratio (feed/gain) and gain, however, was the reverse (21).

Internal parasite infections disrupt the metabolism of the host, which reduces feed consumption, growth rate, height, and maturity age (22). All of those are common traits of chickens in rural areas. The hens employed in this study seemed steady, but they were in poor physical condition because combined cestode/nematode infections led to a significant weight loss of around 16%, showing that helminth infections had a direct influence on weight (23, 24, 9).

Based on the physical traits of the parasites- which belonged to four nematode species and five cestode genera-two types of

helminths were identified, and all of the hens tested showed mixed infection. Similar to our findings in Zambia, (25) reported a helminth prevalence of 95 percent, and (26) reported a helminth prevalence of 10 percent in Mosul/ Iraq. According to (7, 15), since domestic chickens eat often, they become more susceptible to infection.

In the isolated sample, *Heterakis gallinarum* made up 69 percent (45/65) of the total number of nematode species. A similar conclusion was made by (29) who found that *H. gallinarum* made up 93% of all nematode species in Malaysia. By releasing eggs into the atmosphere, *H. gallinarum* enhances the likelihood of *Histomonas meleagridis* transmission to vulnerable turkeys and other fowl (15). *Ascaridia galli* (31%) (20/65) was another helminth species found in samples, which has been noted in several investigations as the most pervasive and major helminth infection of poultry (7).

The local chickens with helminth infections include reduced feed consumption, slowed development, shorter heights, and earlier ages at maturity (4, 7). The hens employed in this study exhibited poor bodily condition while seeming steady. Weight loss of up to 16% was significantly induced by mixed cestode/nematode infections, proving that

helminth infections affected weight (28,30). The results showed that birds kept in a free-range habitat had somewhat lower body weight and weight increase than those kept in an indoor-floor system. The link between the feed transfer ratio (feed/gain) and gain was the reverse (9,30,31).

The high prevalence of helminthiasis reported is a reflection of the low degree of helminthic infection control practiced by native poultry keepers, which may have an impact on the health and growth rates of the birds. Caretakers of poultry should get training on how to stop and manage these outbreaks (4, 20, 32).

Conclusion

External parasites were identified in significant abundance in local poultry. Local chickens, on the other hand, have a low frequency of internal-external parasites. The bulk of external parasites were lice, with a soft tick accounting for a small percentage. Weight loss, poor feather quality, emaciation, lethargy, and loss of productivity were seen in local hens afflicted with parasites.

References

1. Nnadi PA, George SO. A cross-sectional survey on parasites of chickens in selected villages in the subhumid zones

- of South-Eastern Nigeria. Journal of parasitology research. 2010 Jul 27;2010.
2. Bhowmik MK, Sasmal NK, Chakraborty AK. Effect of Raillietina cesticillus infection on the meat and egg production of fowl. Indian veterinary medical journal. 1982.
3. Luka SA, Ndams IS. Short communication report: Gastrointestinal parasites of domestic chicken Gallus-gallus domesticus linnaeus 1758 in Samaru, Zaria Nigeria. Science World Journal. 2007;2(1).
4. Alasadiy YD, Alhasnawi AN, Eabaid FA. The Prevalence of Parasitic Infection in Domestic Chicken: A Review. Medico Legal Update. 2020;20(1):864-9.
5. Hinkle NC, Corrigan RM. External parasites and poultry pests. Diseases of poultry. 2020 Jan 13;1135-56.
6. Tamiru F, Dagmawit A, Askale G, Solomon S, Morka D, Waktale T. Prevalence of ectoparasite infestation in chicken in and around Ambo Town, Ethiopia. J Vet Sci Technol. 2014 Jan 1;5(189):10-4172.
7. Abdullah SH. Ecto and Endo Parasites Prevalence in Domestic Chickens in Sulaimani Region. The Iraqi Journal of Veterinary Medicine. 2013 Dec 1;37(2):149-55.
8. Moyo S, Masika PJ, Moyo B. A diagnostic survey of external parasites of free-range chickens, in the rural areas of Eastern Cape, South Africa. Int. J. Agric. Sci. Vet. Med. 2015;3(2):1-9.
9. Borghare AT, Bagde VP, Jaulkar AD, Katre DD, Jumde PD, Maske DK, Bhangale GN. Incidence of Gastrointestinal parasitism of Captive Wild Pigeons at Nagpur. Veterinary World. 2009 Sep 1;2(9).
10. Mashishi MS. External parasites on chickens. Department of Agriculture; 2002.
11. Shifaw A, Feyera T, Walkden-Brown SW, Sharpe B, Elliott T, Ruhnke I. Global and regional prevalence of helminth infection in chickens over time: a systematic review and meta-analysis. Poultry Science. 2021 May 1;100(5):101082.
12. Hassouni T, Belghyti D. Distribution of gastrointestinal helminths in chicken farms in the Gharb region—Morocco. Parasitology research. 2006 Jul;99(2):181-3.
13. Solomon M, Elsabet G. Prevalence of external parasite of poultry in intensive and backyard chicken farm at Wolayta Soddo town, Southern Ethiopia. Veterinary World. 2010;3(12):533-8.

14. AL-jaumeili AH, Aljoburi AU. The Parasites That Infect The Females For Domestic Fowl (Gallus Gallus Domesticus) in The Villages of The City of Sharqat, Salah Al-Deen Province. Tikrit Journal for Agricultural Sciences. 2015;15(4).
15. Al-Saeed AT, AL-Badrani MA. Study of The Parasites of The Local Chickens (Gallus Gallus Domisticus) in Duhok Province, Kurdistan Region-Iraq. Science Journal of University of Zakho. 2014 Jun 30;2(1):18-23.
16. Al-Saffar TM, Al-Mawla ED. Some hematological changes in chickens infected with ectoparasites in Mosul. Iraqi Journal of Veterinary Sciences. 2008;22(2):95-100.
17. Phiri IK, Phiri AM, Ziela M, Chota A, Masuku M, Monrad J. Prevalence and distribution of gastrointestinal helminths and their effects on weight gain in free-range chickens in Central Zambia. Tropical Animal Health and Production. 2007 May;39(4):309-15.
18. Mekuria S, Gezahegn E. Prevalence of External parasite of poultry in intensive and backyard chicken farm at Wolayta Soddo town, Southern Ethiopia. Veterinary World. 2010 Dec 1;3(22).
19. Arends JJ. External parasites and poultry pest. Diseases of poultry. 1991;718-20.
20. Dube, S. C., P. Zindi, Joshua Mbanga and Cyril S. Dube. "A Study of Scavenging Poultry Gastrointestinal and Ecto-parasites in Rural Areas of Matebeleland Province, Zimbabwe." *International Journal of Poultry Science* 9 (2010): 911-915.
21. Mungube EO, Bauni SM, Tenhagen BA, Wamae LW, Nzioka SM, Muhammed L, Nginyi JM. Prevalence of parasites of the local scavenging chickens in a selected semi-arid zone of Eastern Kenya. Tropical Animal Health and Production. 2008 Feb;40(2):101-9.
22. Nnadi PA, George SO. A cross-sectional survey on parasites of chickens in selected villages in the subhumid zones of South-Eastern Nigeria. Journal of parasitology research. 2010 Jul 27;2010.
23. Soulsby EJ. Helminths. Arthropods and Protozoa of domesticated animals. 1982;291.
24. Ojok L. Diseases as important factor affecting increased poultry production in Uganda. Der Tropenlandwirt-Journal of Agriculture in the Tropics and Subtropics. 1993;94(1):37-44.
25. Tamiru F, Dagmawit A, Askale G, Solomon S, Morka D, Waktole T.

- Prevalence of ectoparasite infestation in chicken in and around Ambo Town, Ethiopia. *J Vet Sci Technol*. 2014 Jan 1;5(189):10-4172.
26. Shamaun AA. Surveillance of diseases in house reared chickens in Al-Hamdania, Mosul. *Iraqi Journal of Veterinary Sciences*. 2009;23(Suppl. 1).
 27. Atsanda NN, Jajere SM, Adamu NB, Lawal JR, Zango MK, Chindo MB. Prevalence of helminth parasites of helmeted guinea fowl (*Numida meleagris galeatus*) in Maiduguri, Northeastern Nigeria. *New York Science Journal*. 2015;8(3):93-7.
 28. Zada L, Rehman T, Niaz S, Zeb MA, Ruqia B, Salma KM, Khan A. Prevalence of *Ascaridia galli* in some poultry farms of district Mardan. *J. Adv. Parasitol*. 2015;2(4):75-9.
 29. Rahman AW, Salim H, Ghause MS. Helminthic Parasites of Scavenging Chickens (*Gallus domesticus*) from Villages in Penang Island, Malaysia. *Tropical Life Sciences Research*. 2009 Jul 1;20(1).
 30. Pam VA, Daniel LN, Brengshak S, Wai MS, Omalu CJ, Ashi RD. The survey of intestinal parasites of local and exotic chickens slaughtered at Yankari market, Jos, Plateau State. *Journal of Medical and Pharmaceutical Sciences*. 2006;2(3):27.
 31. Inuwa B, Musa IM, Konto M, Balami PU. Prevalence of Gastrointestinal Helminth Parasites of Local Chicken Slaughtered at Jalingo Market, Taraba State, Nigeria. *Nigerian Veterinary Journal*. 2021;42(2):161-70.
 32. Ajayi FO, Epundu NV. Assessment of helminth load in faecal samples of free range indigenous chicken in Port Harcourt metropolis. *Bull Anim Health Prod Afr*. 2014;62:207-12.
 33. Bala AY, Anka SA, Waziri A, Shehu H. Preliminary survey of ectoparasites infesting chickens (*Gallus domesticus*) in four areas of Sokoto Metropolis. *Nigerian Journal of Basic and Applied Sciences*. 2011;19(2).
 34. Zakian N, Nayebyzadeh H, Dezfoulan O, Ebrahimi-Samani A. Parasitic infections of local chickens from Lorestan Province, Iran. *Veterinary Research & Biological Products*. 2015 Dec 22;28(4):18-20.
 35. Al-Natour MQ, Suleiman MM, Abo-Shehada MN. Flock-level prevalence of *Eimeria* species among broiler chicks in northern Jordan. *Preventive veterinary medicine*. 2002 Apr 15;53(4):305-10.