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Original Research

Prevalence of Parasitic Infestation of Poultry Presented at Guder Mamo Mezemir Campus Veterinary Teaching Clinic, Guder, Oromia Regional State, Ethiopia

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Abstract

Poultry suffers from many diseases of various etiologies resulting in morbidity as well as mortality in birds. Poultry plays a crucial role in the livelihoods of rural households in Ethiopia, contributing to income generation and food security. This cross-sectional study, conducted from September 2023 to March 2024 at the Ambo University Guder Mamo Mezemir Campus Veterinary Teaching Clinic in Guder town, Oromia Regional State, Ethiopia, aimed to determine the prevalence and risk factors of parasitic infestations in poultry. A total of 1123 local and exotic breed poultry were randomly selected and examined for ectoparasites, revealing a 63.0% overall prevalence. Fleas (41.1%) and lice (21.9%) were the most prevalent ectoparasites. Local breeds exhibited higher infestation rates (38.1%) compared to exotic breeds (24.9%), and females (53.2%) were more affected than males (9.7%). Adult poultry was more prevalent (53.9%) than young poultry (9.0%). Ectoparasite infestations were more common in rural areas (47.2%) than in urban areas (15.7%). The statistical analysis indicated significant associations with age and origin but not with breed, sex, or management system. These findings underscore the need for improved management practices and targeted ectoparasite control measures to enhance poultry health and productivity in the study area.

Keywords: Ectoparasite, Guder Poultry, Prevalence, Veterinary Clinic.

Introduction

In Ethiopia, 99% of chickens are raised using a conventional backyard management system (Dessie, 2003) with inadequate housing, nutrition, and medical care (Belihu *et al*., 2010). External parasites of poultry are very common in the tropical environment of the world since the climatic conditions create a conducive environment for the development of the parasites. Poor standards of poultry husbandry are also contributing factors to the abundance of parasites (Tamiru *et al*., 2014). In most rural areas, the high prevalence of parasite infestations in backyard chickens poses a great challenge in the poultry industry since the majority of external parasites are associated with poor hygiene of chicken houses, and a lack of appropriate parasite control measures (Mungube *et al*., 2008).

Despite their devastating effects, ectoparasites receive little attention in almost all production systems. Hence, studies for determining the magnitudes of such parasites and identifying their types are fundamental to devise appropriate control methods (Amede *et al*., 2011). Earlier no studies were conducted on poultry ectoparasites in and around Guder town, Oromia Regional State, Ethiopia, where chickens are a source of income generation and food. Thus, the current study was undertaken to determine the prevalence of major parasitic infestations in poultry at the Guder Mamo Mezemir Campus Veterinary Teaching Clinic, Guder town, Oromia Regional State, Ethiopia.

Materials and Methods

Study Area

A cross-sectional study was conducted from September 2023 to March 2024 in the Ambo University Guder Mamo Mezemir Campus Veterinary Teaching Clinic at Guder town, Oromia Regional State, Ethiopia. It is located 12 km from the zonal capital, Ambo town, and 119 km from Finfine Oromia capital city. According to the district livestock agency office, it has 336310 heads of cattle, 53492 sheep, 32492 goats, 376596 chickens, 2665 horses, 6445 mules, and 27772 donkeys (TKWAO, 2023).

Design Implemented

Poultry coming to the veterinary clinic for various purposes were selected randomly and examined for the presence of ectoparasites. Before examination, each poultry selected was categorized based on its sex, age, origin, management, and species. Local domestic and exotic breeds of poultry were the study animals. The age of the poultry was also determined by observing the color of the shank and the growth of the spur and was categorized for ease of data management as young (less than 12 weeks of age) and adult (greater than 12 weeks of age) (Tamiru *et al*., 2014).

Sample Collection

Ectoparasites, including lice and fleas, were collected by hand from their attachment sites and put in a universal bottle containing 70% methanol (Soulsby, 1982). Samples were then transported to the Ambo University Guder Mamo Mezemir Campus Veterinary teaching clinic laboratory for further identification of the parasites.

Poultry Examined

A total of 1123 poultry were examined to study the distribution of various species of ectoparasites. A greater number of poultry were sampled because of their predominance in the area. The poultry originated from Guder town surroundings, including from nearby rural and urban areas. The poultry were examined for the presence of ectoparasites. The whole body parts of the poultry were examined for the presence of ectoparasites.

Data Analysis

All the collected data was entered and stored in the database in a Microsoft Excel spreadsheet (MS-2007) program. The data were coded appropriately and analyzed by the SPSS statistical software package (SPSS version 26.0 for Windows). Frequency was used to calculate the prevalence. The P-value was considered statistically significant as $p<0.05$, whereas $p>0.05$ was considered non-significant. Odds ratio and chi-square tests were used to quantify the association among the different risk factors, like age groups, sexes, breeds,

origin, and management, considered in the study with the presence of ectoparasite infestation.

Results

In the present study, 1123 poultry of local and exotic breeds were examined, and 708 (63.0%) of them were found to be infested with different external parasites. Accordingly, two major groups of poultry ectoparasites identified were fleas and lice, with prevalence rates of 462 (41.1%) and 246 (21.9%), respectively, which were statistically significant (Table 1). Fleas were mostly encountered from the eye, comb, and wattle (Figure 1) whereas lice were encountered from the skin, feather, wing, thigh, and breast area.

Figure 1: Echidnophagea gallinacean (stick tight flea) affected by present poultry during study

Source: (Captured by Tesfaye, R)

Table 1: Overall prevalence of ectoparasite encountered in poultry Guder Veterinary Teaching Clinic

External parasite	Number of positive	Prevalence (%)	p-value
Flea	462	41.1	0.000
Lice	246	21.9	
Total	**708**	**63.0**	

The prevalence of ectoparasite infestation was higher in local breeds 428 (38.1%) than in exotic breeds 280 (24.9%). The prevalence of ectoparasite infestation was relatively higher in female poultry 598 (53.2%) compared to male poultry 110 (9.7%). The various risk factors, including breed, sex, age, origin, and management system of the poultry, were identified. However, the infestation has a statistically significant association with risk factors like age and origin and has no statistically significant association with risk factors like breed, sex, or management system (Table 2).

Table 2: Overall prevalence of ectoparasites in poultry in the Guder Veterinary Teaching Clinic

Risk factor	*Category*	*No of examined*	*No of positive*	*Prevalence (%)*	χ^2	*p-value*
Breed	*Local*	*570*	*428*	*38.1*	*2.676*	*0.102*
	Exotic	*553*	*280*	*24.9*		
Sex	*Male*	*200*	*110*	*9.7*	*0.119*	*0.102*
	Female	*923*	*598*	*53.2*		
Age	*Adult*	*802*	*606*	*53.9*	*19.855*	*0.000*
	Young	*321*	*102*	*9.0*		
Origin	*Urban*	*399*	*177*	*15.7*	*12.784*	*0.000*
	Rural	*724*	*531*	*47.2*		

Management	*Extensive*	*660*	*584*	*52.0*	*0.518*	*0.472*
	Semi-intensive	*463*	*124*	*11.0*		
Total		*1123*	*708*	*63.0*		

Regarding the species of ectoparasites of poultry in the present study, four species were identified. *Echidnophaga gallinacean* was the most prevalent ectoparasite, with a prevalence of 462 (41.1%), and *Menopon gallinae* 27 (2.4%)) was the least prevalent. *Menacanthus stramineus* 164 (14.6%) was the second most prevalent species infesting poultry, and the third species identified was *Cuclotogaster hetrographus* 55 (4.8%) (Table 3).

Table 3: Prevalence of genes and species of ectoparasites encountered in the current study area

Ectoparasite group	**Order**	**Species**	**Attachment sites**	**Frequency**	**Prevalence (%)**	**p-value**
Flea	*Sinophtera* (flea)	*Echidnophagea gallinacean*	Head, eyes, Comb, wattles	462	41.1	0.000
Lice	*Phthinaptera* (lice)	*Menacanthus stramineus*	All over the body	164	14.6	
		Cuclotogaster hetrographus	feathers along the head and neck	55	4.8	
		Menopon gallinae	Breast, thigh	27	2.4	
Total				**708**	**63.0**	

Discussion

In the present study, lice and fleas were common ectoparasites infesting poultry, with an overall prevalence of 63.0%. The observed overall prevalence of 63.0% of ectoparasite infestation in the current study was similar to results of 60.15% (Amenu, 2022) from Guduru district and of 59.4% (Furgasa, 2021) from Bishoftu town. The relatively higher prevalence in the present study could be attributed to the sampling methodology where poultry coming to the veterinary clinic that might be susceptible to ectoparasite infestations were sampled. However, it was relatively lower than the prevalence rate reported by Tessema (2019) in Mareka Woreda of Dawuro Zone, SNNPR, Ethiopia, and 67.95% in and around Ambo town by Tamiru *et al*. and co-investigators (2014), 86.67% from Bangladesh by Shanta and others (2006), 91.5% from Central Ethiopia by Belihu and co-workers (2010), 65.6% from Ebinat district in north-west Ethiopia by Maru and others (2023), respectively.

The difference between the current and previous prevalence rates could be due to control measures, sample size, management, and methods of disease control and prevention practiced in the study area, which exposes the chickens to poor hygiene, thus enabling them to contract a wide range of harmful ectoparasites (Mekuria and Gezahegn, 2010).

Local-breed poultry (38.1%) were more infested than exotic-breed poultry (24.9%) in the present study. This study was in agreement with the reports of Mekuria and Gezahegn (2010), Belihu *et al*. (2010), and Tamiru *et al*. (2014), who reported that local breeds (87.5%), (87.46%,) and (87.55%) were found to be more susceptible than exotic breeds in a study carried out in Wolaita Soddo, Bishoftu, and Ambo town, respectively. The reason of the local breed being more susceptible to external parasites might be that local chickens have been released and stay away from home. The community is more focused on exotic breeds than local ones, and there is poor hygiene and minimal

health care provision for local chickens. Thus, it becomes more vulnerable to ectoparasites than an exotic breed.

As compared to males (9.7%), females had a nearly greater parasite infestation rate in the current study (53.2%). A statistically significant difference did not exist, though ($p > 0.05$). Findings from Maru and co-workers (2023) and Amenu (2023) showed that female chickens had a higher rate of occurrence of ectoparasites (44.2%) compared to males (15.8%), which was in contrast to the prevalence rate of females (93.2%) and males (6.8%). One of the reasons could be the stationary state of hens during the incubation of their eggs, which makes them more susceptible to parasitic infestations. Not only this, bedding materials and premises used during the incubation period may host parasites and facilitate parasite infestation. In addition, it is also suggested that the odor that hens emit during incubation may attract parasites (Bala *et al*., 2011). Furthermore, cocks may introduce more parasites to the hens during mating since the male is forced upon the female for every mating.

The prevalence of ectoparasite infestation was found to be higher in adults (53.9%) than in young (9.0%). The present result agrees with the previous workers (Malann *et al*., 2016, Kebede *et al*., 2017, Lawal *et al*., 2017), who also reported that adults were more infested by ectoparasites compared with younger ones. This finding might be associated with the frequent contact of adult chickens with other species of animals, and they may be exposed longer to the infested environment and other sources of infestation. The current study results regarding the age of chicken were in disagreement with the findings of earlier investigators (Mulugeta *et al*., 2013, Tamiru *et al*., 2014, Rezaei *et al*., 2016), who reported that young chickens were more infested than adult birds.

Regarding the origin, a higher prevalence was observed in rural areas (47.2%) than in urban areas (15.7%). This result agrees with the previous report by Maru *et al*. (2023) on the prevalence of rural (71.45%) and urban (28.6%). The current study results regarding the age of chicken were in disagreement with the findings of Amenu, (2023), who reported 27.3% and (32.8%) infestation in rural and urban birds respectively. This may be due to sample size variation, and most of the poultry in rural areas is managed extensively. As a result, many harmful ectoparasites may be able to infect poultry in rural areas.

In this study, poultry kept under extensive management were found to be more susceptible to ectoparasites than those kept under a semi-intensive management system. The overall prevalence in semi-extensive management systems (52%) of poultry and semi-intensive management systems (11.0%) agreed with the findings of Wario and others (2018) and Maru and co-investigators (2023), who report higher prevalence in the backyard system than in the intensive system. According to Arends (2003), management may play a role in the type of ectoparasites that predominate in chicken houses. The extensive system provides a more sustainable environment for the parasites, and a lack of control measures towards these parasites was a possible factor contributing to the high prevalence of the parasites becoming vulnerable to ecto-parasitism (Mungube *et al*., 2008).

Conclusion and Recommendations

Poultry is a major source of egg production and contributes significant protein to diets worldwide. In addition to directly causing morbidity by sucking blood and irritating the birds, some ectoparasites of poultry, such as lice and fleas, are significant contributors to the spread of certain pathogens that cause significant financial losses to the poultry industry. This harms the economic production of poultry. However, in the present study, a high ectoparasite burden in poultry from the current study area, including fleas (41.1%) and lice (21.9%), was identified. Generally, in the present study, extensive poultry were affected by different infestations of ectoparasites due to the paucity of appropriate management. Therefore, based on the above conclusion, the following points were taken as recommendations:

- The community has to be made aware of how ectoparasites affect chicken production.
- Educating farmers and extension personnel about better housing, nutrition, disease prevention, and local chicken productivity is important.
- It is recommended that more research be done to assess the effects of ectoparasites on the health and productivity of hens, as well as the affordability of control measures.

Data Availability

The datasets generated during and/or analyzed during this study are available from the corresponding author on

reasonable request.

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Contribution by Authors

Wesenu Berhnau searching of articles, data extraction, and reviewing the manuscript and major supervision, and prepared all contents of the review..

Conflict of Interests

There is no conflict of interest.

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