J. Agric. Food. Tech., 9(1)1-6, 2019

ISSN 2090 – 424X
Journal of Agriculture and Food Technology
www.textroad.com

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Prevalence of Infection with Ectoparasites among Chickens of Albaha Region-Kingdom of Saudi Arabia

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ABSTRACT

The Ectoparasites negatively affect the productive potential of chickens because they compete for feed and cause discomfort and stress to them. The current study was aimed to determine the spread of ectoparasites in the chicken farms of Baljurshi province affiliated with Albaha city and also the evaluation of prevalence and risk factors of chicken ectoparasites. A total of 125 chickens from Baljurshi region were examined to investigate for the infection of ectoparasites. The prevalence of ectoparasite was found to be 25.6%. There was a significant difference between the ectoparasites infestation and age of chickens (100% in adult chicken); type of farms, use of medicine and maintain level of hygiene ($P \leq 0.001$); number of chickens in each farm ($P < 0.05$). However, the sex and breed of chickens were found to have no significant impact on ectoparasites infestation. The present study has shown the infestation of chicken mainly by three types of ectoparasites (Lice, fleas and mites). Four species of chicken lice such as *Menacanthus sramineus*, *Menopon gallinae*, *Gonoides gigas* and *Goniocotes gallinae* were found. Whereas one species of flea, *Echidnophaga gallinacean* and one species of mite; *Dermanyssus gallina* was also found. Periodic Examination of chickens at farms is recommended for early detection and treatment.

KEYWORDS: Chicken, External parasites, flea, lice, mite, spread

INTRODUCTION

Birds are present almost in all towns and metropolitan places of the world. They exist alongside with the individuals as means of foodstuff, hobby and for research. Like all other animals, chickens are also infected by diverse diseases and ectoparasitic infestation is one of them. The ectoparasites which infect chickens include lice, mites, fleas and ticks. A number of diseases can infect birds but parasitic infections are the most common ones. Ectoparasites of poultry occupy different places such as on skin/or enter inside the skin. They also live in air sacs and several reside beneath the feathers. The ectoparasites are responsible for irritation; interfere with the feed utilization; therefore cause anemia, emaciation and ultimately hamper the production [1]. Aldryhim found that the hen's body infested with lice had less egg production than non-infested ones[2] .

Nevertheless, the lice species vary according to the place they live in the host body and these preferences have specified the common names to various species. These consist of four amblyceran species—Menacanthus cornutus, M. stramineus, M. Pallidulus and Menopon gallinae and eight ischnoceran species Cuclotogasterheterographus, Goniocotes gallinae, Goniodes dissimilis, Goniodes gigas, Lagopoecussinensis, Lipeuruscaponis, L. tropicalis, and Oxylipeurusdentatus. Most of these are cosmopolitan and virtually very much flexible to get adapted to different geographic locations and climatic conditions [3].

Many studies have been carried out on bird's ectoparsites. In Ethiopia, many studies have shown the prevalence of different species of ectoparasites (lice,mites and fleas)in birds [4, 5, 6].

Bala et al, have indicated high prevalence of ectoparasites (100%) among chickens of Sokoto town, Nigeria[7]. The studies of Mukaratirwa and Khumalo have shown the infestation of free-range chickens by several species of lice in South Africa[8]. Another study in California has shown ectoparasite infestations of birds [9].

Few taxonomic or the biological studies of chewing lice are available in the Middle East. Likewise, [10, 11, 12] have reported some of the chewing lice of wild and domestic birds of Egypt. However, very few reports are available on the chewing lice of domesticated fowl in the Kingdom of Saudi Arabia [13, 14, 15], but no report has been found till now on the chewing lice of wild birds.

On the other hand, in the Kingdom of Saudi Arabia, at present 19 chewing louse species and 2 subspecies have been reported [13, 14, 15, 16, 17]. Nasser et al, reported 12 species of chewing louse from the Indian Peafowl present in Saudi Arabia[18].

The present study was aimed at the followings:

1-To determine the prevalence of ectoparasites in hens.

2-To identify the species of louce, mite and flea in hens.

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3-To determine the factors that increase the infestation of ectoparasites in hens.

MATERIAL AND METHODS

2.1. Study Area:

This research has been carried out from February 2018 to March 2018 in order to determine the prevalence and associated risk factors of poultry ectoparasite in Baljurshi province of Albaha city, south west Saudi Arabia. It is located at 19° 51′ 34″ N, 41° 33′ 26″ E.

2.2. Study Population:

In current investigation 125 chickens were selected from 6 farms of Baljurash, Albaha town. All parameters such as age, sex and breed were considered for the study.

2.3. Study Methodology:

The sample collection was done randomly from different parts such as vent, head, neck, leg, back, comb and wings with the help of hand lenses and by naked eyes. The head was examined first and followed by the neck, body sides, back, ventral part of the abdomen; wings, vent area and legs. In order to pick up the ectoparasites viz; lice and fleas, the hairs and feathers were partitioned and also the base of the feathers were smoothly brushed using a delicate brush to protect the experimental chickens from injuries. Moreover, some of them were directly picked up by hands and non-toothed thumb forceps. Mites were picked up by scraping the skin surface with scalpel blade.

Normally in due course of examination, bird's legs were tied by taking assistance of an assistant. Individual feathers were manually deflected to observe the presence of ectoparasites. The samples were collected in the clean bottles filled with 70% (v/v) alcohol. Each sample bottle was labeled by specific serial number for easy identification. The physiological and morphological features like sex, breed and age of each chicken were recorded in separate sheet. The numbers of parasites collected were counted and their predilection sites on the body of the chicken and probable risk factor were recorded. The samples were then examined under the light microscope. The identification of ectoparasites was done on the basis of their morphological features by utilizing entomological keys and with the consultation of authentic books for instance; [1, 19, 20, 21].

2.4. Data Managements and Statistical Analysis:

Data were coded and entered in to Microsoft Excel spread sheet and analyzed using Statistical Software for Social Sciences (SPSS) version 22 and $p<0.05$ was considered as statistically significant. Also the data was analyzed by using the Chi-square $(x)2$ test to determine the association present among the different variables. One Way Anova test was used to compare the means.

RESULTS

In the present study, a total of 125 chickens from six farms were examined; 25.6% of the chickens were found to be infested with ectoparasites. The results, as shown in Table 1, indicated the prevalence of ectoparasite in the selected chickens was as follows: lice (87.5%), fleas (59.38%) and mite (3.13%). In present study, four species of chicken lice were found which are: *Menacanthus sramineus*, *Menopon gallinae*, *Gonoides gigas*; whereas one species of flea *Echidnophaga gallinacean* and one species of mite *Dermanyssus gallina* was also found.

3.1. Prevalence of ectoparasite infection in chicken according to their characters:

There was a significant difference between the age of chicken and ectoparasite infection ($P<0.05$); While, there was no significant difference between the sex or breed of examined chickens and ectoparasite infection ($P>0.05$). (Table 2).

3.2. Prevalence of ectoparasite infection in chicken according to farm characters:

The results pertaining to the farm characters that the various farms significantly affected ectoparasite infestation ($P\leq0.001$). There was significant correlation between prevalence of ectoparasite and number of chickens in each farm, use of medicine and level of hygiene were found to have a high significant on ectoparasite infections ($P\leq0.001$) (Table 3).

The results recorded in Table 4 indicated that was no significant differences in the ectoparasite concerning chicken characters -related factors ($P>0.05$) while their farm characters factors got high significantly different ($P\leq0.05$).

Table 1: The overall prevalence of ectoparasite

Ectoparasite	Species	No. positive	Prevalence(%)
Lice	*Menacanthus sramineus* *Menopon gallinae* *Gonoides gigas* *Goniocotes gallinae*	28	87.50
Fleas	*Echidnophaga gallinacean*	19	59.38
Mite	*Dermanyssus gallinae*	1	3.13

Table 2: Prevalence of ectoparasite infection in chicken according to their characters

Chicken characters		No. of infested chicken	% of infestation	X^2	P-value
Age	Young	0	0	7.23	0.003
	Adult	32	100		
Sex	Male	14	43.75	2.73	0.077
	Female	18	56.25		
Breed	Local	10	31.25	2.50	0.084
	Exotic	22	68.75		

Table 3: Prevalence of ectoparasite infection in chicken according to farm characters

Farm characters		No. of infested chicken	% of infestation	X^2	P-value
Farm No.	Farm1	19	37.6	75.29	0.000
	Farm2	0	0		
	Farm3	8	100		
	Farm4	0	0		
	Farm5	5	50		
	Farm6	0	0		
No. of chickens in each farm	1 -20	13	40.6	41.29	0.000
	21-40	19	59.4		
	Upper 60	0	0		
Use of medicine	Yes	0	0	46.59	0.000
	No	32	100		
Level of hygiene	Low	32	100	68.99	0.000
	High	0	0		

Table 4: Comparison means of infestation according to risk factors (F - test)

Category	Variation sources	Sum of Squares	Df	Mean square	F	Sig.
Chicken characters	Between Groups	.102	1	.102	1.641	.203
	Within Groups	7.637	123	.062		
	Total	7.739	124			
farm characters	Between Groups	9.017	1	9.017	64.034	.000
	Within Groups	17.321	123	.141		
	Total	26.338	124			

df = degree of freedom F = f- value Sig.= significance

DISCUSSION

In current study, 125 chickens were examined. The results have shown 32 infected hens and 92 non-infected with ectoparasites. The results indicated higher infestation by lice, then fleas and lastly mites (87.5%lice, 59.38% fleas and 3.13% mites) ectoparasites. No infestation by ticks have been recorded. Our results are similar the studies of [4, 5, 6]. The reasons of high infestation by lice may be due to the fact that it complete its life cycle in their host skin and feathers[22]and are unaffected by the external environmental factors .Also lice had continuous food supply in the form of blood and scales and had modifications in the chicken bodies which help them to stay long time in their host e.g. loss of wings , dorso –ventral invagination and it had 3 pairs of clinging legs and solid cuticle[23, 24]

The infestation percentage of adult hens was 100%, while no infection has been found among the young hens. These results are in agreement with many other studies reported in the literature which also have recorded significance differences between the infestation of adult and young hens by ectoparasites [5, 6]. Kaufman et al., cited incomplete wings growth as the reasons of absence of infestation by some species of lice in young hens[25]. Also the lice need warm temperature to be viable and active [26].Whereas, Kebede et al., suggested the reason that the long time of exposure of adult hens to endemic factors compared to young ones[6]. On the other hand, these results aren't in agreement with the results of Mirzaei et al, where they had found high infestation of young hens than adult ones[27].

Additionally, it has also been observed in the present study that there is high infestation by ectoparasites in females compared to male hens, but no significant difference was obtained due to sex. These results are consistent with the study of Mekuria et al, [4]. However, there are reported studies which showed significant differences in infestation due to sex. In this study, infestation of local hens by ectoparasites was less than exotic hens (31.25 for local and 68.75 for exotic hens), but there weren't significant differences between the two types of hens. These results were different with the results obtained by [28, 5, 6].Their studies reported high infestation of local hens than exotic ones due to the breeding system (local hens usually have more freedom in the farm and so more exposed to endemic factors). The present study is in agreement with the studies of [29, 30], which suggested that the hens may prevent themselves from lice infection by sunning, anting ,dusting and use of peak. In summary , the present study has shown significant differences due to farm characters and ectoparasites infestation .Our results are similar with the results of Mekuria et al, [4] which indicated high link between infestation of hens by ectoparasites with the number of hens in farm, using drugs to treat infested hens and to maintain good hygiene.

CONCLUSION

Conclusively, Lice, fleas and mites represent the common ectoparasites of Baljurashi chicken farm houses. In the present study, the infestation with lice was higher than the other ectoparasites. The infestation was mainly by following species: *Menacanthus sramineus, Menopon gallinae, Gonoides gigas,Goniocotes gallinae, Echidnophaga gallinacean* and *Dermanyssus gallina* .The infection among adult chickens was very high, while there was no infection among young ones. Other factors which are related to hen's structural characters were found to be unaffected.

Farm characters affect the infestation rate, exactly the level of care and hygiene of the farm. Also, periodic inspection of chickens, early detection and treatment were found to decrease the infestation. Also, it was observed that the chickens which were found in sunny place had low infection.

Lastly farm house owners should be aware of the importance of periodic diagnosis of their hens by veterinarian to detect early infestation, especially in case of poor appetite and lack of activity of the hens.

Acknowledgment

The authors would like to thank Dr. Touseef amna for her assistance during the review of the paper.

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