Punjab University Journal of Zoology

34(1): 17-20 (2019)
http://dx.doi.org/10.17582/journal.pujz/2019.34.1.17.20

OPEN ACCESS

Research Article

Prevalence of Chewing Lice (Phthiraptera: Insecta) from Common Quail *Coturnix coturnix* (Aves: Galliformes: Phasianidae) from Jamshoro and Hyderabad, Sindh Pakistan

Farheen Shaikh*, Saima Naz, Nadir Ali Birmani

Department of Zoology, University of Sindh, Jamshoro-76080, Sindh, Pakistan.

Article History
Received: May 05, 2017
Revised: December 18, 2018
Accepted: December 18, 2018
Published: January 23, 2019

Authors' Contributions
FS conducted the experiments and wrote the manuscript. SN enhanced the idea of the project, guided during the whole project and proofread the manuscript. NAB collected the data and helped in lab work.

Keywords
Population density, Amblycera, Birds, Parasites, Hyderabad

Abstract | Host-parasite interaction depends on the environmental and ecological conditions that cause different biological and pathological problems. Chewing lice have a high capability to develop host specificity. In present study the chewing lice (Phthiraptera: Insecta) were examined for their population and rate of infestation on Common quail *Coturnix coturnix* (Aves: Galliformes: Phasianidae) from Jamshoro and Hyderabad Districts, Sindh, Pakistan. The study was conducted during 2013-2014. Twenty-six Common Quails were observed in four localities including two urban and two rural areas of Jamshoro and Hyderabad Districts. The selected birds were tagged with identity rings and 5-8 hosts in each locality were examined. Infestation of chewing lice on each bird was checked periodically in each month. Moreover, permanent microscopic slides of ectoparasites were prepared. During the study, three species of chewing lice were reported from Common Quail. Their population density on host body was recorded in each month. The prevalence of chewing lice species of *Coturnix coturnix* was recorded as 44.47% *Cuclotogaster cinereus* (Nitzsh, 1866) belongs to family Philopteridae 32.64% *Menacanthus abdominalis* (Piaget, 1880) and 22.87% *Menacanthus cornutus* belongs to family Menoponidae. The results revealed high infestation found in birds of rural localities. The present study will help to understand host-parasite interaction in study area.

To cite this article: Shaikh, F., Naz, S. and Birmani, N.A., 2019. Prevalence of chewing lice (phthiraptera: insecta) from common quail *coturnix coturnix* (aves: galliformes: phasianidae) from jamshoro and hyderabad, sindh pakistan. *Punjab Univ. J. Zool.*, **34(1)**: 17-20. http://dx.doi.org/10.17582/journal.pujz/2019.34.1.17.20

Introduction

Chewing Lice (Order Phthiraptera Hackel, 1896) are obligatory parasitic insects of warm blooded animals. They show a remarkable level of host specificity, with transmission largely occurring opportunistically when hosts of the same species are in close contact with each other. There are four recognized suborders: Anoplura, Amblycera, Ischnocera and Rhynchophthirina (Clay, 1970 and Lakshminarayana, 1979).

There are four species of chewing lice which parasitize the different breeds of *C.coturnix* and cause infestation throughout the world (Price *et al.*, 2003, Naz and Rizvi, 2011). These species belong to family Menoponidae (suborder Amblycera) and family Philopteridae (suborder Ischnocera), found in less to moderate rate of infestation on galliform birds worldwide. The species of *Coturnix coturnix* are *Amyrsidea* fulvomaculata (Denny, 1842), *Cuclotogaster cinereus* (Nitzsch, 1866), *Menacanthus cornutus* (Burmeiter, 1838), and *Menacanthus abdominalis* (Piaget, 1880) throughout the world.

Host- parasite Interaction depends on the environmental and ecological conditions, that cause different biological and pathological problems (Ash, 1960; Marshal, 1981). Chewing lice have a high capability to develop host specificity with their hosts. They develop similar genotype

***Corresponding author: Farheen Shaikh**
fshaikh700@yahoo.com

with their host genotype in same environmental conditions along with their phenotypes (Price and Graham, 1997; Saxena *et al.,* 2004). Galliform birds cover a major part of our poultry industry, including fowls, patridges and quails (Batairs), peacocks and Guinea fowls (Robert, 1992; Grimmett *et al.,* 2012). Quail are economically important birds and are affected by different ectoparasites especially under traditional and unhygienic conditions of raring. Temperature variations and humidity play important role in prevailing the rate of infestation among these important accommodates (Mccrea *et al.,* 2005; Sychra *et al.,* 2008). The rate of infestation may also increase by geographical change, as it is observed higher infestation in rural areas and lower in urban areas (Sychra *et al.,* 2008; Audi and Asmau, 2014).

Materials and Methods

Hyderabad is the 2nd largest city of province Sindh Pakistan. It is located at the east bank of River Indus. Its temperature and humidity is remaining high. It has warm winter season. This high temperature and humidity is favorable medium for the development of chewing lice population on host body (Figure 1). A total of 26 specimens Quails *Coturninx coturnix* have been searched for chewing lice species between December 2013 to October 2014 from different regions of Hyderabad, including Jamshoro, Latifabad, Hyderabad city and Kotri Sindh, Pakistan. During present study two localities were selected two urban (Hyderabad city and Latifabad) and two rural areas (Jamshoro and Kotri) for their population density. Birds were captured from their natural environment and brought into the laboratory. Each bird was kept in white paper sheet sprinkled with Permathrin powder and carefully searched chewing lice species on neck, belly and abdominal feathers. All lice specimens are collected and preserved in 70% ethylic alcohol. The infested birds were tagged with identity rings as locality wise A, B, C and D (Table 1 and 2) to check their lice after interval of 10 days. All birds, their diet and their feather condition were checked out carefully for their infestation. Observation occurred month wise except May and November in order to allow the eggs to hatch and grow the population of lice. The experiments were conducted in both summer and winter seasons. The winter collection was carried out during December 2013 to April 2014 and the summer collection was carried out during June 2014 to October 2014 in order to check the effects of climatic conditions.

Results and Discussion

During the present study, three species of chewing lice *Cuclotogaster cinereus* (Nitzsh, 1866) *Menacanthus abdominalis* (Piaget, 1880) and *Menacanthus cornutus* (Schommer, 1913) have been found on Common quail *C. coturnix* from four different localities of Jamshoro and Hyderabad (Table 1 and 2). It was observed by surveying from different regions of Jamshoro and Hyderabad, that the normal louse population appears to have very little effect on the healthy birds as they spend much time in preening. Thus the healthy bird without any doubt able to keep the parasite number in checked. A sick or injured bird is often found particularly heavy infestation which is probably due to inability of the weekend bird to remove the excess parasites. It seems unlike that parasite increase alone will weaken the bird very much (Clayton *et al.,* 1992, Naz *et al.,* 2010 and Singh and Mauraya, 2010).

The correlation analysis of lice population density and environmental variables indicate that the minimum day temperature, maximum body temperature and humidity were significantly correlated with population size (Table 2). Presently, the population rate and prevalence of three chewing lice species infesting Common quail have been calculated with the highest prevalence of prevalence of *Cuclotogaster cinereus* (Nitzsch, 1866) is 44.47% and minimum prevalence of *Menacanthus cornutus* (Schommer, 1913) is 22.87% only. The population density of other chewing lice species of Common quail is given (Table 1 and 3; Figure 4 A-D), in which seasonal effect and variation in temperature also showed the change in abundance of chewing lice population. The overall population density of chewing lice on Common Quail has been shown in figure 3. It was observed by surveying from different regions of Jamshoro and Hyderabad, that the normal louse population appears to have very little effect on the healthy birds as they spend much time in Preening. Thus the healthy bird without any doubt able to keep the parasite number in checked. A sick or injured bird is often found particularly heavy infestation which is probably due to inability of the weekend bird to remove the excess parasites. It seems unlike that parasite increase alone will weaken the bird very much (Naz *et al.,* 2010 and Singh and Maurya, 2010).

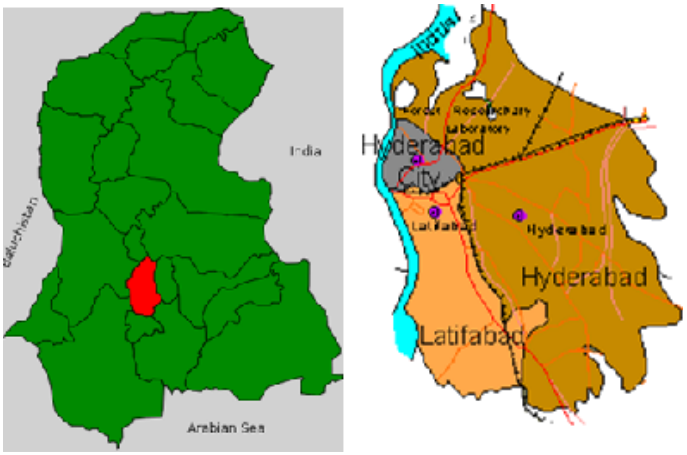

Figure 1: The Study area Hyderabad.

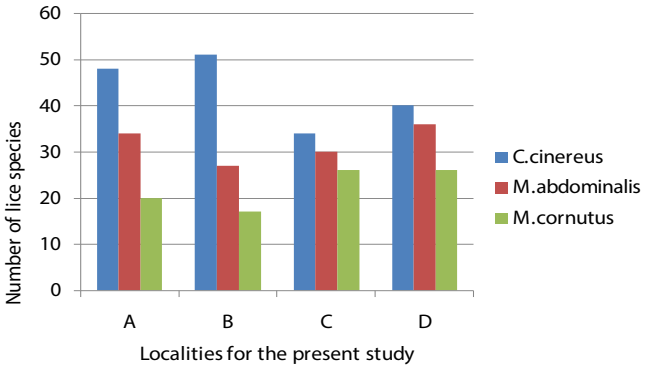

Figure 2: The total number of individual species in each locality (A-D).

It is concluded that the temperature and humidity are very important factors and play a significant role in increasing the population of lice on the host body. During the summer season the population of lice increases and also the humidity which causes rapid rate of population probably because birds keep them warm by sitting close contact with each other during which transmission of the lice occurs from one host to another. It was also observed that nymph increased due to more hatching of eggs in summer (Ash, 1960; Sayeed *et al.*, 2005).

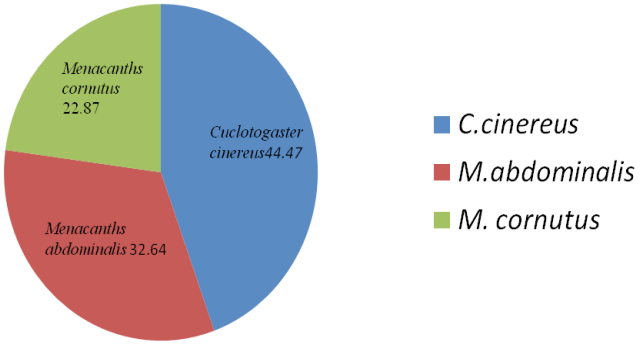

Figure 3: Prevalence of chewing lice on Common Quail during the present study.

Table 1: The Chewing lice of Common Quail, *C. coturnix* collected during present work from four localities of Hyderabad and Jamshoro, with population density and abundance.

Locality	Total number of birds examined	*C. cinereus*	*M. abdominalis*	*M. cornutus*	Total lice in each locality	Population Density
A-Jamshoro	7	48	34	20	102	14.57
B-Hyderabad	6	51	27	17	95	15.83
C-Latifabad	7	34	30	26	90	12.85
D- Kotri	6	40	36	26	102	17.00
Total birds and lice species	26	173	127	89	389	14.96
Overall Prevalence of chewing lice species		44.47	32.64	22.87	99.98	
Population abundance of all chewing lice species		6.65	4.88	3.42	14.96	

Table 2: Month –wise data on Population and Prevalence (%) of chewing lice of Common Quail, *C. coturnix* during Summer Season from June, 2013 to October, 2014(27-39°C) and Winter Season from December, 2013 to April, 2014 (17-28°C).

Locality of Lice Species	Number of lice in each month					Total no. of lice in Summer	Prevalence in Summer	Number of lice in each month					Total no. of lice in Winter	Prevalence in Winter
A *Cuclotogaste rcinereus*	3	4	5	4	3	19	39.58	3	3	2	4	3	15	35.71
Menacanths abdominalis	4	3	2	4	3	16	33.34	2	4	3	2	3	14	33.33
Menacanths cornutus	2	3	3	3	2	13	27.08	3	3	2	2	3	13	30.95
B *Cuclotogaster Cinereus*	4	5	6	4	3	22	43.13	3	6	4	4	8	25	51.02
Menacanthus abdominalis	2	4	4	4	3	17	33.33	4	3	2	3	3	15	30.61
Menacanthus cornutus	2	2	3	2	3	12	23.52	2	2	1	2	2	09	18.36
C *Cuclotogaster Cinereus*	5	6	7	6	4	28	53.84	5	6	5	4	3	23	53.48
Menacanthus abdominalis	2	3	4	2	3	14	26.92	3	3	2	2	3	13	30.23
Menacanthus cornutus	2	1	4	2	1	10	19.23	2	1	2	1	1	07	16.27
D *Cuclotogaster Cinereus*	5	6	5	4	3	23	41.07	2	6	3	2	4	17	36.95
Menacanthus abdominalis	5	4	4	2	4	19	33.92	3	4	3	4	3	17	36.95
Menacanthus cornutus	4	3	3	2	2	14	25.01	2	2	3	2	3	12	26.08

Table 3: Seasonal Mean of Population Density with Standard Error (Mean± S.E) and Standard Deviation of all chewing lice species of Common Quail, *C. coturnix* during present study in all four regions of Hyderabad and Jamshoro.

Locality	Population Density Summer (Mean± S.E)	Standard Error	Population Density Winter (Mean± S.E)	Standard Error
A	7.28 (17.01± 2.35)	4.08	7.01 (16.3± 3.81)	6.60
B	8.66 (17.33± 4.45)	7.71	7.16 (14.3± 3.06)	5.31
C	6.85 (16.01± 1.40)	2.44	6.01 (14.01± 0.46)	0.81
D	9.33 (18.66± 2.12)	3.68	7.66 (15.33± 1.35)	2.35

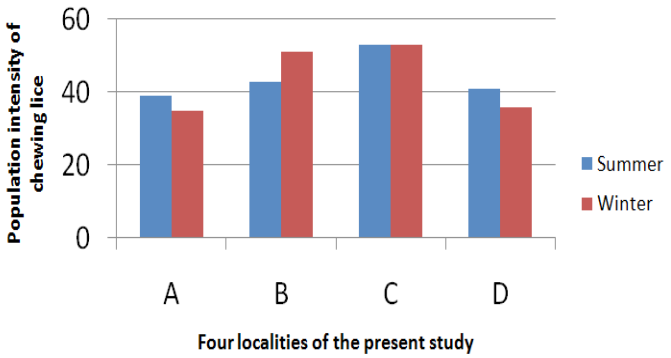

Figure 4: Comparison of population of chewing lice in winter and summer seasons on Common Quail, *C. coturnix* during 2013-2014.

References

Ash, J.S., 1960. A study of mallophaga of bird with particular reference to their ecology. *Ibis.,* **102**: 93-110. https://doi.org/10.1111/j.1474-919X.1960.tb05095.x

Audi, A.H. and Asmau, A.M., 2014. Prevalence of bird louse, *Menacanthus cornutus* (Phthiraptera: Amblycera) in four selected poultry farms in Kano State, Nigeria; *BaJo PAS,* **7**(1): 142-146.

Clay, T., 1970. The Amblycera (Phthiraptera: Insecta); *Bull. Br. Mus. (Nat. Hist.) Entomol.*, **25** (3): 75-98, *Pls.* 1-5.

Lakshminarayana, K.V., 1979. A synoptic list of Mallophaga*sens. lat.* (Phthiraptera: Insecta) from India and adjacent countries together with host and regional indices. *Rec. Zool. Surv. India,* **75**: 39 – 201.

Marshall, A.G., 1981. *The ecology of ectoparasitic insects.* Academic Press, London. pp. 459.

Mccrea, B., Jaffrey, J.S., Ernst, R.A. and Gerry, A. C., 2005. *Common lice and mites of poultry: Identification and treatment.* Publication no. 8162, Division of Agriculture and Natural Resources, University of California. https://doi.org/10.3733/ucanr.8162

Naz, S., Rizvi S.A. and Sychra O., 2010. The high rate of infestation of the chewing lice (Phthiraptera) in rock pigeons (*Columba livia*) in Pakistan; *Trop. Zool. Italy,* **23**: 21 - 28.

Naz, S., Rizvi, S.A. and Akhter, M.A., 2011. Records of chewing lice (Phthiraptera) on different birds of Phasianidae (Galliformes) from Sindh, Pakistan. *Pak. J. Entomol.,* **26** (2): 153-156.

Price, M.A. and Graham, O.H., 1997. Chewing and sucking lice as parasites of mammals and birds. *Technical Bulletin No.*1849, Usda, Agric. Res. Serv.

Price, R.D., Hellenthal, R.A., Palma, R.L., Johnson, K. P. and Clayton, D.H., 2003. The chewing lice: World checklist and biological overview. Champaign, IL, USA: Illinois Natural History Survey Special Publication.

Roberts, T.J., 1991. *The Birds of Pakistan*. Vol. I. Non-Passeriformes. Oxford University Press. Karachi. Pp. 598.

Saxena, A.K., Kumar, S., Gusta, N., Singh, S.K., 2004. Prevalence of phthirapteran ectoparasitic insects on domestic hens of Rampur (U.P.). *J. Parasitic Dis.,* **28**, 57–60.

Sayeed, K., Rizvi, S.A. and Naz, S., 2005. Seasonal effects on the population of chicken lice (Mallophaga: Insecta). *Int. J. Biol. Biotechnol.;* **2**(4): 921 - 924.

Singh, S.K. and Mauraya, N., 2010. Population dynamics of two phthirapteran ectoparasites of pigeon, *Columba livia.* Gmelin. *Indian J. Sci. Res.,* **1**(1): 63-65.

Sychra, O., Harmat, P. and Literak, I., 2008. Chewing lice (Phthiraptera) on chickens (*Gallus gallus*) from small backyard flocks in the eastern part of Cech Republic; *Vet. Parasitol.;* **152:** 344-348. https://doi.org/10.1016/j.vetpar.2008.01.001