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INCIDENCE OF CHEWING LICE (PHTHIRAPTERA: INSECTA) FROM DOMESTIC FOWL *GALLUS GALLUS* (PHASIANIDAE: GALLIFORMES: AVES) FROM JAMSHORO AND HYDERABAD, DISTRICTS, SINDH PAKISTAN

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ABSTRACT

The chewing lice (Phthiraptera: Insecta) were examined for their population and rate of infestation from Domestic fowl Gallus gallus Linnaeus (Phasianidae: Galliformes: Aves) from Jamshoro and Hyderabad Districts, Sindh, Pakistan during the year 2013-2014. 40 domestic fowls and were observed in four localities of Jamshoro and Hyderabad Districts, including two urban and two rural areas. During the survey, six species of chewing lice were reported from domestic fowl. Their population density on host body was recorded in each month. The data were taken from four localities by random collection method. The prevalence of chewing lice species of Gallus gallus was recorded as 22.43% of Menacanthus pallidulus, 19.16% of Lipeurus tropicalis, 19.12% of Menacanthus stramineus, 16.30% of Menopon gallinae, 12.19% of Goniode dissimilis and of 10.76% of Goniocotes gallinae and Coturnix coturnix with 44.47% of Cuclotogaster cinereus, 32.64% of Menacanthus abdominalis and 22.87% of Menacanthus cornutus.

1. 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 three recognized suborders: Amblycera, Ischnocera and Rhynchophthirina (CLAY 1970, LAKSHMI NARAYANA 1979, MOLLER, Et Al. 2005). There are twelve species of chewing lice of *Gallus gallus* parasitize the different breeds and cause infestation throughout the world (PRICE et al. 2003, NAZ & RIZVI 2012). These species belong to family Menoponidae (suborder Amblycera) and family Philopteridae (suborder Ischnocera), found in less to moderate rate of infestation on galliforme birds worldwide. The species of Gallus gallus are *Culclotogaster hetrographus* (Nitzsch 1866), *Goniocotes gallinae* (De Geer 1778), *Gnoiodes dissimilis* Denny 1842, *Goniodes gigas* (Taschenberg 1879), *Logopoecus sinesis* (Sugimoto, 1930), *Lipeurus caponis* (Linneaus, 1758), *Lipeurus tropicalis* Peters 1931, *Menacanthus cornutus* (Schömmer 1913), *Menacanthus pallidulus* (Neumann 1912), *Menacanthus stramineus* (Nitzsch 1818), *Menopon gallinae* (LINNAEUS 1758), and *Oxylipeurus dentatus* (Sugimoto 1934) throughout the world. Parasitism is an association between host and parasites in which parasite is always harmful. 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 with their host genotype in same environmental conditions along with their phenotypes (Price and Graham, 1997; Saxena, et.al., 2007). Galliform birds cover a major part of our poultry industry, including Fowls,

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Patridges and Quails (Batairs), Peacocks and Guinea fowls (Robert, 1992; xxx). These are economically important birds and are affected by different ectoparasites specially under traditional and unhygienic conditions of raring. Temperature variations and humidity play important role in prevailing the rate of infestation among these important accomodities (Mccrea, et.al., 2005; Sychra, 2005; Sychra, et.al., 2008; Ilyes, et.al., 2013).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, 2008; Audi and Asmau, 2014). This work deals with the contribution to the prevalence, population density and seasonal affects of chewing lice in particular to Domestic fowls in Jamshoro and Hyderabad regions.

2. MATERIAL AND METHODS

During the present study the collection of different species of chewing lice from four localities of Jamshoro and Hyderabad two urban (Hyderabad and Latifabad) and two rural areas (Jamshoro and Kotri) were selected, off the 40 birds of Domestic fowl *Gallus gallus.* The biological material was collected based on the population of chewing lice on bird's body, host data, locality and climatic factors like temperature and humidity. The lice were identified and mounted permanently and confirmed by the experts.

One group of galliforme birds *Gallus gallus* was observed contained both the genders and adult birds. The group of birds was tagged with numbered plastic rings in their legs, named as locality A, B and C and D all adult birds (Tab. 1&2). All the birds, their diet and their feather condition were checked out carefully for their infestation, after the period of each 10 days in every month except May and November in order to allow the eggs to hatch and grow the population of lice.

The average number of lice on each bird of all the localities was conducted during 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.

3. RESULTS AND DISCUSSION

During the present study, six species of chewing lice have been found on Domestic fowl Gallus gallus and three species of chewing lice have been found from four different localities of Jamshoro and Hyderabad, Districts (Tab.1& 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, GALLOWAY & PALMA 2008, NAZ et al. 2010, SINGH & MAURAYA 2010).It is concluded that the temperature is also very important factor and play a significantly role in increasing the population of lice on the host body. During the winter season the population of lice is 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. (SAYEED et. al. 2005). 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 (Tab. 2).

Presently, the population rate and prevalence of four chewing lice species infesting House sparrows have been calculated with the highest prevalence of Brueelia. Sp. is 69.1% and minimum prevalence of Myrsidea quadrifasciata which is 62.7% only. Only two specimens of Philopterus fringillae were collected from one bird only, and the data could not be collected so far for the prevalence. The prevalence of other duck chewing lice species is given (Tab. 3 and 4; fig. 1A-D), in which seasonal effect and variation in temperature also showed the change in abundance of chewing lice population. The overall prevalence of chewing lice on Common Duck has been shown in fig. 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; Galloway and Palma, 2008; Naz, et. al., 2010; Singh and Maurya, 2010).

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)

4. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interests regarding the publication of this article.

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Table: 1. The Chewing lice of Domesticus fowl Gallus gallus domesticus, collected during the present work from four localities of Hyderabad and Jamshoro District, Pakistan.

Locality	Total number of birds examined	*Menacanthus pallidulus*	*Menacanthus stramineus*	*Menopon gallinae*	*Goniocotes gallinae*	*Goniode dissimilis*	*Lipeurus tropicalis*
A: Hyderabad	10	66	65	86	55	50	60
B: Latifabad	10	107	108	85	38	51	91
C: Jamshoro	10	102	123	148	63	49	147
D: Kotri	10	227	132	46	85	123	131
Total birds and lice specimens	40	502	428	365	241	274	429

Table: 2. Data on Population of chewing lice of Gallus gallus in each month from December, 2012 April, 2013 (Winter Data) and from June, 2013- October, 2013 (Summer Data).

Locality	Lice species	Dec. 2012	Jan. 2013	Feb. 2013	Mar. 2013	Apr. 2013	Jun. 2013	Jul. 2013	Aug. 2013	Sep. 2013	Oct. 2013	Total
Latifabad	*Menacanthus pallidulus*	7	6	7	6	6	10	21	18	14	12	107
	Menacanthus stramineus	8	6	7	9	10	13	16	14	13	12	108
	Menopon gallinae	7	6	7	8	7	9	8	12	11	10	85
	Goniocotes gallinae	2	3	2	4	3	4	6	3	5	6	38
	Goniode dissimilis	4	3	3	4	5	7	6	6	7	6	51
	Lipeurus tropicalis	9	8	7	8	7	10	12	11	10	09	91

Table: 3. Data on Population of chewing lice of Gallus gallus in each month from December, 2012- April, 2013 (Winter Data) and from June, 2013- October, 2013 (Summer Data).

Locality	Lice species	Dec. 2012	Jan. 2013	Feb. 2013	Mar. 2013	Apr. 2013	Jun. 2013	Jul. 2013	Aug. 2013	Sep. 2013	Oct. 2013	Total
Jamshoro	*Menacanthus pallidulus*	8	7	9	7	8	12	11	14	12	14	102
	Menacanthus stramineus	9	8	9	10	11	14	16	22	21	19	123
	Menopon gallinae	10	08	09	09	15	21	23	19	16	18	148
	Goniocotes gallinae	4	3	6	5	6	8	7	9	8	7	63
	Goniode dissimilis	3	2	4	4	4	7	6	5	8	6	49
	Lipeurus tropicalis	10	08	06	12	10	22	20	24	19	16	147

Table: 4. Data on Population of chewing lice of Gallus gallus in each month from December, 2012- April, 2013 (Winter Data) and from June, 2013- October, 2013 (Summer Data).

Locality	Lice species	Dec. 2012	Jan. 2013	Feb. 2013	Mar. 2013	Apr. 2013	Jun. 2013	Jul. 2013	Aug. 2013	Sep. 2013	Oct. 2013	Total
Kotri	*Menacanthus pallidulus*	15	14	18	20	22	24	20	30	33	31	227
	Menacanthus stramineus	7	5	6	8	15	18	20	18	17	18	132
	Menopon gallinae	4	3	3	4	5	4	6	6	5	6	46
	Goniocotes gallinae	7	6	8	7	9	12	10	9	8	9	85
	Goniode dissimilis	9	8	8	10	12	16	14	13	18	17	123
	Lipeurus tropicalis	10	09	07	11	15	16	15	14	18	16	131

Table: 5. Prevalence (%) of chewing lice species on Gallus gallus domesticus during the Winter Season (27-18oC) from December, 2012 to April, 2013

Locality	Menacanthus pallidulus	%	Menacanthus stramineus	%	Menopon gallinae	%	Goniocotes gallinae	%	Goniode dissimilis	%	Lipeurus tropicalis	%	Total Lice Birds-wise
A	31	19.6	24	15.1	38	24.0	18	11.3	22	13.9	25	15.8	158
B	32	17.8	40	22.3	35	19.5	14	7.82	19	10.6	39	21.7	179
C	39	17.4	47	20.9	51	22.7	24	10.7	17	7.5	46	20.5	224
D	89	31.2	41	14.3	19	6.6	37	12.9	47	16.4	52	18.2	285

Table: 6. Prevalence (%) of chewing lice species on Gallus gallus domesticus during the Summer Season (26-38oC) from June, 2013 to October, 2013.

Locality	Menacanthus pallidulus	%	Menacanthus stramineus	%	Menopon gallinae	%	Goniocotes gallinae	%	Goniode dissimilis	%	Lipeurus tropicalis	%	Total Lice Birds-wise
A	35	15.6	41	18.3	48	21.4	37	16.5	28	12.5	35	15.6	224
B	75	24.9	68	22.5	50	16.6	24	7.9	32	10.6	52	17.2	301
C	63	14.8	92	21.6	97	22.8	39	9.1	32	7.5	101	23.8	424
D	138	29.9	91	19.7	27	5.8	48	10.4	78	16.9	79	17.1	461

Table: 7 Population Density (Mean + S.E) and Mean Abundance of chewing lice in each locality in Winter Season and Summer Seasons.

Locality	(Mean + S.E)	Mean Abundance (Winter Season)	Mean + S.E)	Mean Abundance (Summer Season)
A	26.33±17.34	18.67	37.33±16.37	15.88
B	29.83±26.42	21.15	50.16±48.21	21.34
C	37.33±33.59	26.47	70.66±74.20	30.07
D	47.5±56.77	33.68	76.83±92.98	32.69