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Investigation on ectoparasites of duck in upper Assam

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Abstract

A survey was conducted in seven districts of upper Assam for a period of one year from June, 2016 to May, 2017 to study the prevalence of ectoparasites of domestic ducks in upper Assam. A total of 675 ducks, comprising of 595 live ducks procured from the study areas and 80 dead ducks brought for post mortem examination to the District Diagnostic Laboratory and Head Quarters of Veterinary Officers in upper Assam, were thoroughly screened for the presence of ectoparasites on their body surfaces. Morphological study of mounted ectoparasite specimens were identified as per the keys and descriptions provided by Sen and Fletcher (1962), Soulsby (1982) and Hernandez (2015). Out of total 675 numbers of ducks examined, 467 ducks were found positive for different ectoparasites showing the overall prevalence of 69.19 per cent. Ducks from Gaurisagar of Sibsagar district Lahowal of Dibrugarh district showed highest (92.86%) and lowest (58.82%) prevalence for ectoparasites. Five different lice and two different types of mites were recovered from different body parts of duck, of which infestation with *Lipeurus caponis* (13.33%) was highest followed by *Menopon gallinae* (12.74%), *Menacanthus stramineus* (10.67%), *Columbicola columbae* (8.44%), different feather mites viz. *Dubinia melopsittaci*, *Megninia ginglymura* and *Bdellorhynchus* sp. (5.19%), *Goniodes* sp. (3.70%) and larva of Trombiculid mite (0.89%), respectively. The three feather mites, larva of the Trombiculid mite and *Columbicola columbae* were first time reported in ducks from Assam.

Keywords: ectoparasites, prevalence, domestic duck, upper Assam

Introduction

Ducks are waterfowls closely related to geese and swans. They belong to the order Anseriformes, family Anatidae and found on all the continents except Antarctica. Duck rearing is a productive livestock in the globe because of its egg, meat, feather and fattened livers (van der Meulen and den Dikken, Agrodoc 33, wageningen, 2004, 1-80). They have faster growth rate, efficient feed converters and have better meat quality. In Assam ducks fulfill a great proportion of animal protein like any other developing countries of the world in the form of meat and eggs. They are aquatic in nature and can thrive best in areas where there is plenty of water. As per the Livestock census 2012, duck population in Assam is 7.31 million. Duck farming is traditionally very popular in Assam because of the religious point of views, social structure, abundance of surface water, marshy and water logged areas throughout the state, which provides a congenial environment. Moreover, ducks are reared by all sections of the society irrespective of their caste or religion for both egg and meat as it can overcome all sorts of religious taboos. It is heartening to note that ducks not only sustain the earning of a family but also contribute immensely to the household food security in Assam. But still the duck industry could not meet the increasing demands of consumers in respect of eggs and meat in the state. One of the major factors responsible for this is the various parasitic infections which cause heavy economic loss to the farmers due to poor growth rate, poor feed conversion rate, reduced egg and meat production leading to death (Soulsby, 1982) [15]. All free-ranged birds are in constant contact with soil, water and vegetation, which serves as an important source for transmission of parasites. Moreover, duck feed on various aquatic organisms like snails, fishes, earthworms, water cyclops etc which act as an intermediate host and gets infected with parasitic disease. Migration of exotic duck to Assam in different seasons may also carry some of the parasites which are unknown and may spread to local ducks. Although informations are available about the prevalence of parasitic fauna along with its epidemiological picture and pathological significance in different livestock of Assam, such informations on duck are scanty, except a few investigatory study in parasites of Brahmini duck (Gogoi *et al.*, 1982) [4],

cestodes of duck (Barua *et al.*, 1987) [11] and parasites of duck in Assam (Roy, 2005) [11]. Therefore, considering all factors which are the major obstacles in raising healthy economically viable flock of ducks, the present investigation was undertaken with the following objective to study the prevalence of ectoparasites of duck in upper Assam.

Materials and Methods

A survey was undertaken for a period of one year from June, 2016 to May, 2017 to study the prevalence of ectoparasites of domestic ducks in upper Assam. During the study period regular visits were made to some selected areas of Golaghat, Jorhat, Sibsagar, Dibrugarh, Tinsukia, Dhemaji and Lakhimpur districts of Assam for collection of ectoparasites.

Collection and preservation

A total of 675 numbers of duck comprising 80 dead ducks brought for post mortem examination to the District Diagnostic Laboratory and Head Quarters of Veterinary Officers in upper Assam and 595 live ducks procured from the study areas were thoroughly screened for the presence of ectoparasites on their body surfaces. Lice were collected from the feathers of various parts of the body of ducks with the help of fine brush and fine forceps (Peterson, 1959) [9] and placed in glass vials containing hot water to kill them with their legs extended. The killed lice thus obtained from different ducks were subsequently preserved separately in properly labeled vials containing 70% alcohol with few drops of 5% glycerine for further study. Feather mites were collected by snipping off portions of the feather vane with attached mites and placing them in a vial of 70% alcohol. Mites were removed by scraping skin, scabs and lesions with a scalpel (Ritchie *et al.*, 1994) [10]. Lice and mites found on different body location were recorded properly.

Identification

The preserved specimens of the lice were processed in 2% Potassium Hydroxide by gentle boiling following by repeated washing in tap water. Dehydration and clearing were done in ascending grades of alcohol (30%, 50%, 70%, 80%, 90% and absolute) 15 minutes each and momentarily in xylene permanent mounts were prepared using DPX as per the method described by Cable (1963) [2]. Morphological study of mounted specimens was carried out under a Stereoscopic binocular microscope and a compound microscope for their

identification as per the keys and descriptions provided by Sen and Fletcher (1962) [13], Soulsby (1982) [15] and Hernandes (2015) [5].

Results and Discussion

A total 675 numbers of ducks were examined, out of which 467 ducks were found positive for different ectoparasites. The overall prevalence of ectoparasites was 69.19 per cent (Table 1 and Fig.1). Five different lice and two different types of mites were recovered from different body parts of duck and were identified as *Menacanthus stramineus*, *Menopon gallinae*, *Goniodes* sp. *Columbicola columbae*, *Lipeurus caponis*, larva of Trombiculid mite (Chigger mite) and different feather mites (*Dubinia melopsittaci*, *Megninia ginglymura* and *Bdellorhynchus* sp.) (Fig. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16). These four mites and *Columbicola columbae* were first time reported from this part of the country in duck. The genus/species wise percentages of prevalence are given in Table 2 and Fig 2.

The present findings are in agreement with Sen and Fletcher (1962) [13], Soulsby (1962) and Hernandes (2015) [5]. However almost similar findings were encountered by several other workers: Sexana *et al.* (2004) [12] recorded *Menopon gallinae*, *Goniocotes gallinae*, *Lipeurus lawrensis tropicalis*, *Lipeurus caponis*, *Menacanthus cornutus*, *Goniodes dissimilis* and *Lipeurus heterographus* from 510 fowls in Rampur district; Roy (2005) [11] recorded *Menacanthus stramineus*, *Menopon gallinae*, *Cuclotogaster heterographus*, *Goniodes* sp. and *Lipeurus caponis* from ducks in Assam; Lakshmanan *et al.* (2007) [6] recorded *Menacanthus stramineus*, *Menopon gallinae*, *Columbicola columbae* and *Goniocotes bidentatus* from birds in Wayanad; Kerala; Musa *et al.* (2012) [8] reported *Lipeurus squalidus*, *Goniocotes hologaster*, *Menopon leucoanthum* and *Menacanthus stramineus* from ducks in Dhaka city; Vettaya and Kaewbiyudth (2014) reported *M. gallinae* and *Megninia* spp from Nakhonpathom province and Shemshadi *et al.* (2017) [14] recorded *M. stramineus* and *Lipeurus squalidus* from Iran. Contrary to our findings, Cencek *et al.* (2002) [3] reported *D. gallinae* infection in ducks from Poland.

Larva of Trombiculid mite (Chigger mite) and different feather mites [*Dubinia melopsittaci* (male), *Megninia ginglymura* (female) and *Bdellorhynchus* sp. male] and *Columbicola columbae* might be the first report from this part of country in duck.

Table 1: Prevalence of ectoparasite in different localities

District	Localities	No. of ducks examined for ectoparasite	No. of ducks positive for ectoparasite	Percentage of infection
Golaghat	Chinatolly	37	22	59.46
	Hanhchora	44	29	65.91
	Dergaon	60	45	75.00
	Jamuguri	53	38	71.70
Jorhat	Atilagaon	44	29	65.91
	Na Ali	45	31	68.89
	Baghchung	38	23	60.53
	Titabor	28	22	78.57
Sibsagar	Joysagar	55	41	74.55
	Gaurisagar	28	26	92.86
	Amguri	31	22	70.97
	Demow	42	30	71.43
Dibrugarh	Lahowal	34	20	58.82
	Tengakhath	43	27	62.79
Tinsukia	Kakopathar	39	23	58.97
Dhemaji	Dhemaji	26	19	73.08
Lakhimpur	Bihpuria	28	20	71.43
Total		675	467	69.19

**P value = .288^{NS}

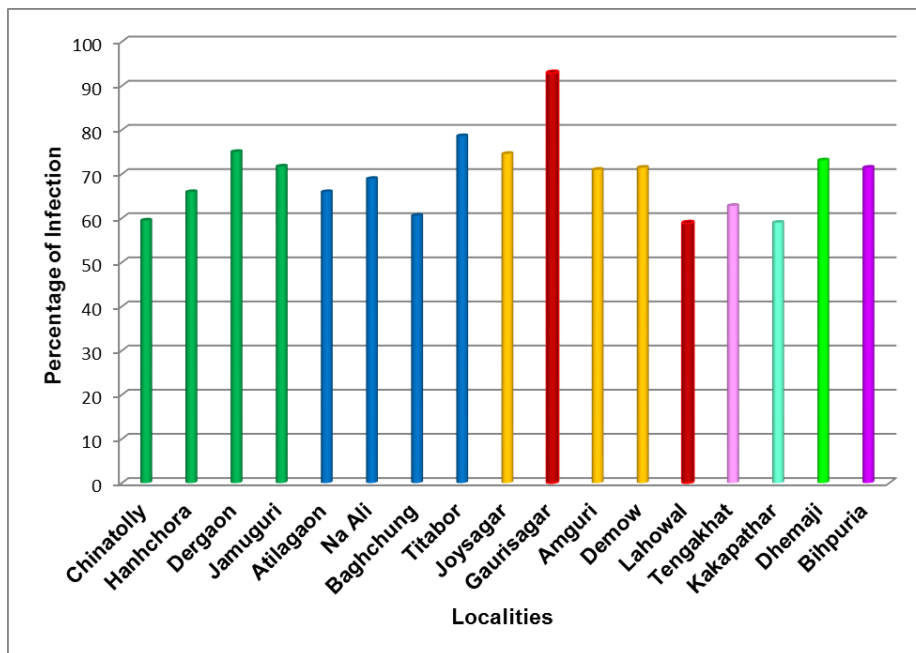


Fig 1: Prevalence of ectoparasite in different localities

Table 4.2: Prevalence of Ectoparasites In Ducks

Sl. No.	Species	No. of ducks found positive	Percentage of infestation	95% Confidence Level				
1	<i>Menacanthus stramineus</i>	72	10.67	8.56 -13.22				
2	<i>Menopon gallinae</i>	86	12.74	10.43-15.47				
3	<i>Goniodes</i> sp.	25	3.70	2.52 -5.41				
4	<i>Columbicola columbae</i>	57	8.44	6.57-10.78				
5	<i>Lipeurus caponis</i>	90	13.33	10.98-16.11				
6	Larva of Trombiculid mite (Chigger mite)	6	0.89	0.41-1.93				
7	Feather mites a. <i>Dubininia melopsittaci</i> b. <i>Megninia ginglymura</i> c. <i>Bdellorhynchus</i> sp.	35	5.19	3.75-7.13				
	8				Infested with more than one species.	96	14.22	11.79 -17.06
	Total				467	69.19	-	

Total birds examined =675

Figures in parentheses indicates range

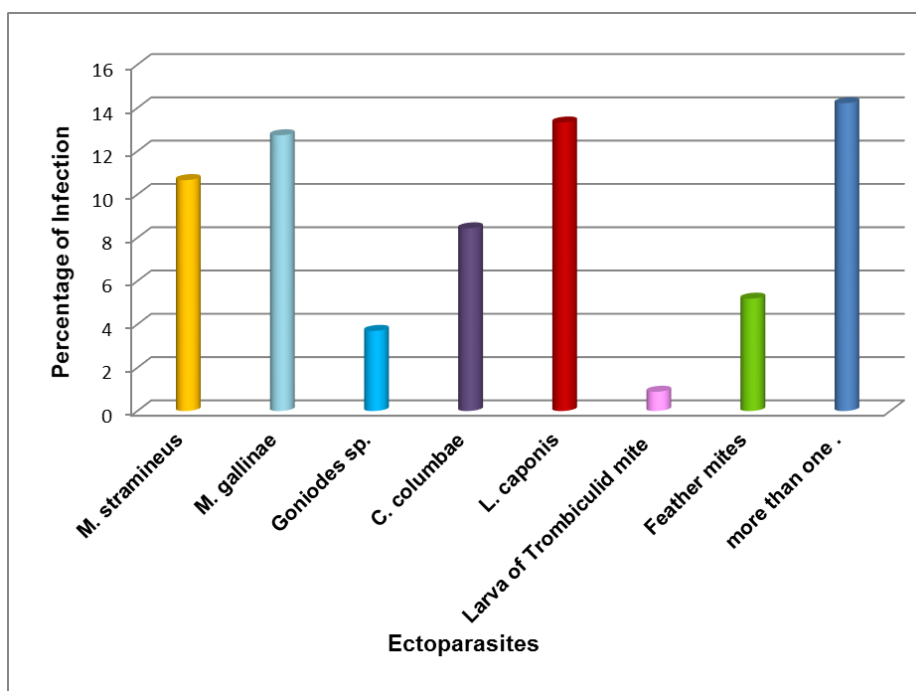


Fig 2: Prevalence of Ectoparasites in Ducks



Fig 3: Photomicrograph Showing *Menacanthus stramineus*, X100.

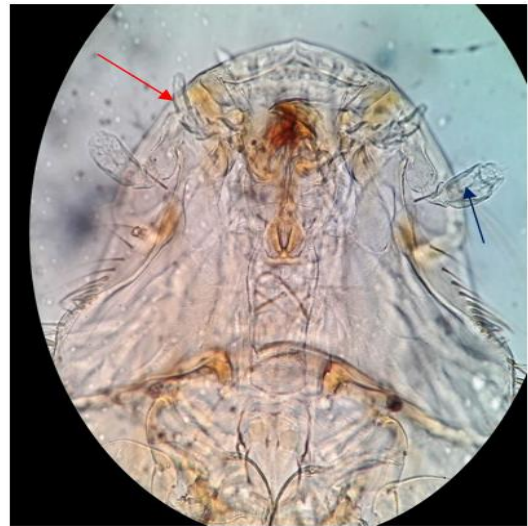


Fig 6: Photomicrograph Showing The Head OF *M. gallinae*, X400 (Red arrow: palps, Black arrow: antennae)

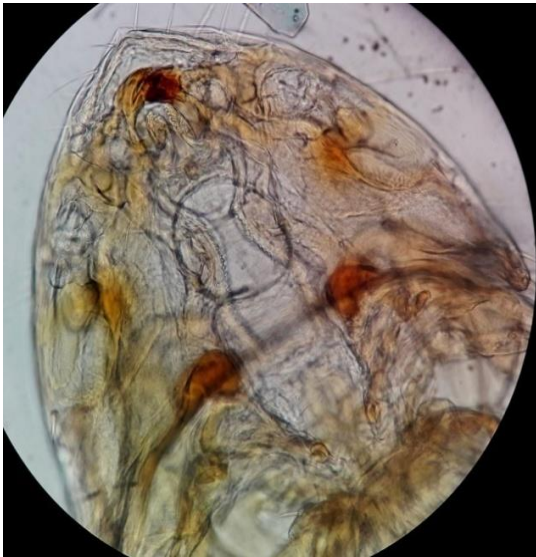


Fig 4: Photomicrograph Showing The Head OF *M. stramineus*, X400 (Red arrow: antennae, Black arrow: spine-like process)



Fig 7: Photomicrograph Showing *Goniodes* sp., X100.



Fig 5: Photomicrograph Showing *Monopon gallinae*, X100.



Fig 8: Photomicrograph Showing The Head of *Goniodes* sp., X200 (Red arrow: angular corners, Black arrow: large bristles)



Fig 9: Photomicrograph Showing *Columbicola columbae*, Male, X100



Fig 12: Photomicrograph Showing *Lipeurus caponis*, Female (Black arrow: angular projection), X400

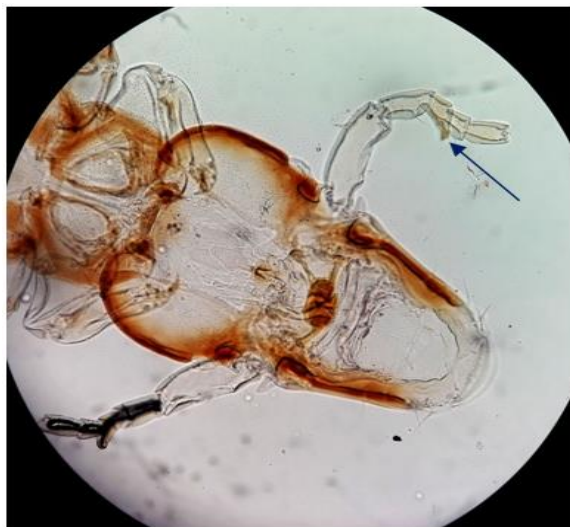


Fig 10: Photomicrograph Showing The Head of *Columbicola columbae*, MALE, X400 (Black arrow: distally expanded third segment)



Fig 13: Photomicrograph Showing Larva OF Trombiculid Mite, X400



Fig 11: Photomicrograph Showing *Lipeurus caponis*, MALE, X100



Fig 14: Photomicrograph SHOWING *Dubininia melopsittaci*, MALE (Red arrow: Epimerites I in V-configuration). X400



Fig 15: Photomicrograph Showing *Megninia ginglymura*, Female, X400



Fig 16: Photomicrograph Showing *Bdellorhynchus* sp., Male. X400

Summary and Conclusion

Examination of 675 numbers of ducks, 467 were found positive for different ectoparasites showing the overall prevalence of 69.19 per cent (Table 4.2). Chi square test revealed no significant difference in the prevalence of ectoparasites in different localities of upper Assam. (Chi sq = 18.63, df = 16, P value = .288) (Table. 1). Five different lice and two different types of mites were recovered from different body parts of duck viz. *Lipeurus caponis*, *Menopon gallinae*, *Menacanthus stramineus*, *Columbicola columbae*, different feather mites (*Dubininia melopsittaci*, *Megninia ginglymura* and *Bdellorhynchus* sp.), *Goniodes* sp. and larva of Trombiculid mite, respectively. The three feather mites, larva of the Trombiculid mite and *Columbicola columbae* were first time reported from Assam in duck.

The systematic study conducted in upper Assam led to a significant conclusion that ectoparasitic infestations in duck are highly enzootic. It can be convincingly remarked that conventional microscopy provide aid in routine diagnosis of different parasitic disease, but at the same time expertise with

well-equipped laboratory for a better diagnosis is also needed. Molecular identification of parasites also can be of great importance for different species identification. The relevant data obtained in this study formed a baseline for further research in diagnosis and control of ectoparasites in domestic duck. This study has also set a strong message on creating awareness among duck farm owners/ breeder about the different ectoparasites infesting ducks.

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