

**Recording ectoparasites and endoparasites from
an Indian vulture (*Gyps indicus*): A case report**



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Recording ectoparasites and endoparasites from an Indian vulture (*Gyps indicus*): A case report



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ABSTRACT

Birds play an important role in maintaining ecological balance although considered significant in transmitting zoonotic diseases. Ectoparasite and endoparasite of wild birds are of economic and public health importance. We have attempted to record the available ectoparasites and endoparasites from an Indian vulture (*Gyps indicus*) captured at Chittagong in Bangladesh. Careful physical examination resulted in collection of several ticks. Three dimensional (3D) microscopy were used to capture high quality images of the tick towards its identification. Further confirmation of the tick taxonomy was achieved with the help of online tick research site (www.tickspotters.org). Nymphal stage of Lone star tick (*Amblyomma americanum*) was confirmed during the study. For endoparasites, fecal sample was collected to identify eggs and larvae through direct smear method. Coproscopy revealed a number of Ascarid eggs and eggs of Strongyle group. The presence of parasitic eggs reflects the feeding habit of vulture as they are scavengers rather than predator. The findings contribute to increase our understanding about the parasitic diseases of Indian vulture, their zoonotic significance and public health importance as well as highlighted the need to control them towards conservation of this critically endangered species.

Keywords: Ectoparasite, Endoparasite, Indian vulture, Amblyomma, Ascarid

CHAPTER I

INTRODUCTION

Birds constitute an important element of virtually every ecosystem and wild birds are available throughout the world. Among wild birds vultures are the largest and highest flying raptors. These large birds do not hunt for food, but will very occasionally attack wounded and dying animals (Khan, 2013). Famous ornithologist and naturalist from India, Dr. Salim Ali once mentioned “Though a repulsive creature at close quarters, a vulture gliding effortlessly in the sky is the very embodiment of graceful motion.” A large number of wild birds are thought to be responsible for spread of emerging infectious diseases worldwide. While serving as a carrier, they are also vulnerable to suffer from various diseases. Wild birds are subject to a variety of health problems, which may affect their reproduction and thereby threaten conservation. Parasitic infestation is one of the most critical among these problems both for high occurrence and provoking serious infections and even death in a large proportion of the bird populations found in intensely parasitized regions (Reed et al., 2003); (Maretto-Gonçalves et al., 2009). The majority of ectoparasites in birds are associated with the skin and feathers while some species infect subcutaneous sites (mites, flies). A number of them spend part of their life on the host and some are only associated with a host for brief periods at a time (McLaughlin, 2001). External parasites generally bite and irritate birds but can also cause blood loss and transmit diseases. Mites, lice, and ticks are all external parasites. Ectoparasites found on birds are usually characterized by common morphological patterns like segmented bodies, jointed appendages and chitinous exoskeleton.

Ticks are obligate ectoparasites of different birds. They have been considered to transmit parasitic, viral and bacterial diseases in birds. In addition, they cause heavy morbidity by sucking blood and causing irritation to the birds which adversely affects the economical production of birds. The tick was considered a nuisance as it does not transmit the etiological agent of Lyme disease, but more recent studies have shown that this species can transmit various other pathogens to humans and other animals, such as those that cause rickettsiosis, ehrlichiosis, theileriosis and tularemia.

Endoparasites found in prey birds include roundworms (nematodes), protozoans, spiny-headed worms (acanthocephala), flukes (digenetic trematodes), tapeworms (cestodes), and tongue worms (pentastomida). Nematodes are considered to be the most pathogenic endoparasites, and may have a considerable economic impact on birds.

The identification of endoparasites and ectoparasite is essential to identify the most commonly prevalent species that infect the wild birds like vulture with a view to development of effective control measures. With the above scenario, the present study was aimed at identifying several endo- and ectoparasite that was collected from an Indian vulture captured unexpectedly.

CHAPTER II

MATERIALS AND METHODS

2.1 Case history

An Indian vulture (*Gyps indicus*) was found in jungle of Chittagong region in emaciated condition. The captured vulture was admitted to the local veterinary hospital for treatment when further physical and clinical examination was performed. Fecal sample was collected for coproscopy and ectoparasite was collected manually from the vulture (**Fig 01**).

2.2 Examination of fecal sample

Several types of qualitative and quantitative techniques are available to analyse the fecal samples. The direct smear, floatation, sedimentation method and the McMaster technique are the most common methods to detect and quantify the number of eggs, ova or cyst in fecal samples. The direct smear method of fecal examination was performed and several smears were prepared for direct smear. Parasitic eggs were identified by morphological features.

2.3 Direct smear

This is the most common and easiest method to detect the presence of helminth eggs. Small amount of fresh fecal sample was taken in the glass slide. Few drops of physiological saline solution were put on the glass slide. A cover slip was placed on the transparent liquid and examined systematically under lower magnification of with the help of light microscope (**Fig 02**).

2.4 Tick collection

The dust-ruffling technique was used for ectoparasites collection while forceps was used to remove ticks from birds according to previously described methods (Freed et al., 2008)

2.5 Tick identification

The ticks were preserved with 70% formalin and viewed by a light microscope. Further measurement and morphological analyses was aided by a 3D microscopy (Entovision[®], USA) to observe the tick. In addition, a confirmation of tick species was achieved by sending pictures to the global resource of tick researchers named TickSpotters (www.tickspotters.org) who are voluntary contributor and help identifying ticks around the globe. TickSpotters is an organizational site who helps to identify tick after submit the photograph and relevant information.

2.6 Morphology of tick

Detailed morphological investigation revealed that the collected sample was Lone star tick (*Amblyomma americanum*) under ixodidae family. The recorded tick was at the nymphal stage of lone star tick. The length of nymph was recorded as 1.71mm, width 1.53mm and have six legs (**Fig 03**)

FIGURES



Fig 01: Indian vulture (*Gyps indicus*)

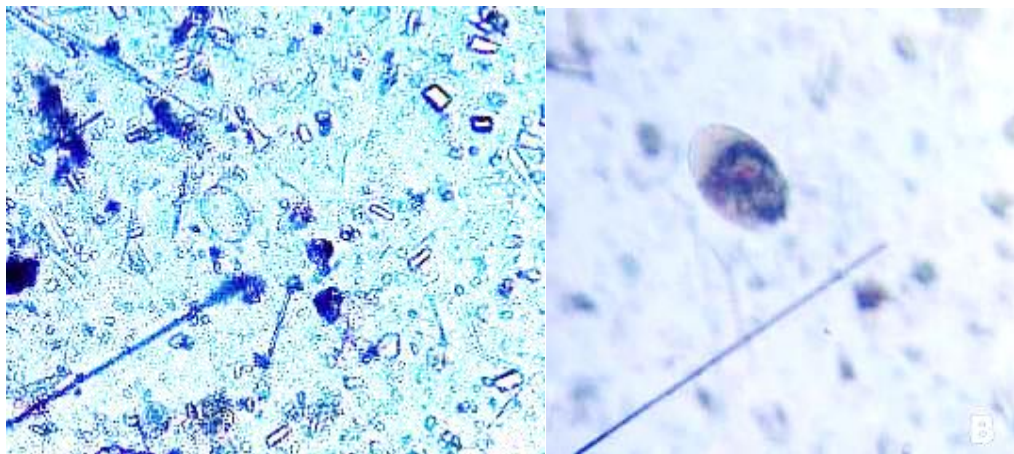


Fig 02: Parasitic eggs of Indian vulture (*Gyps indicus*);A) Ascarid type egg
B) Strongyle type egg

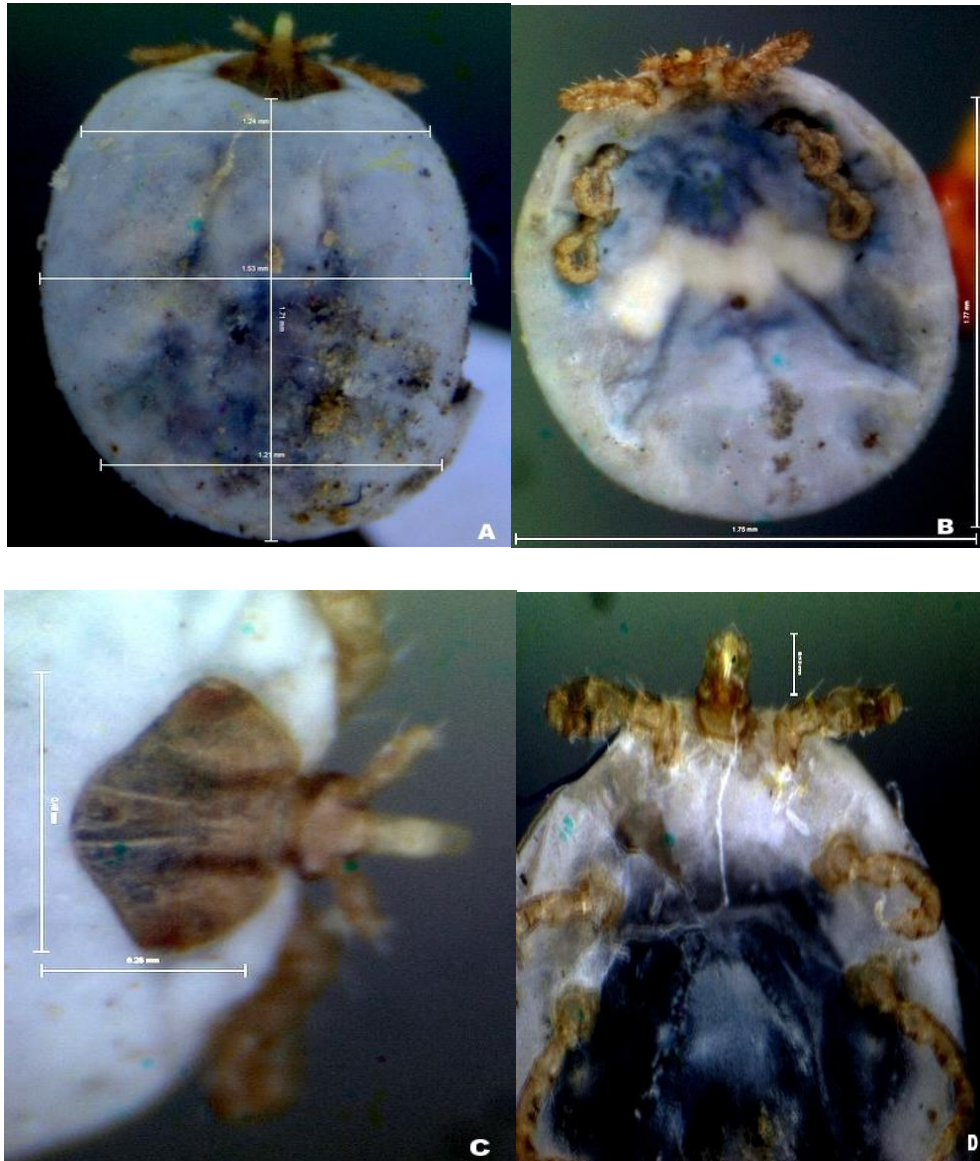


Fig 03: Morphology of Lone star tick (*Amblyomma americanum*);A) Dorsal view
B) Ventral view C) Mouthparts D) Legs

CHAPTER III

RESULTS AND DISCUSSION

The Indian vulture (*Gyps indicus*) is a critically endangered species according to IUCN red list since 2002 as the population is highly declined. As vultures are few in the world, their study also less in numbers. In my study, I have focused on ectoparasites and endoparasites of Indian vulture (*Gyps indicus*). This vulture was grabbed which was fallen down in emaciated condition. Ectoparasite (tick) and fecal sample was collected for endoparasite. In fecal sample Strongyle type eggs and Ascarid type eggs were found by direct smear method. Parasitic findings are most likely the result of the feeding habits of Indian vulture (*Gyps indicus*). Ascarid type *Toxocara* eggs are originated from stray dogs, cats and among wild feline and canine animals. *Toxocara canis* and *Toxocara cati* are the most commonest nematodes according to the examinations of fecal samples of dogs and cats (Beck, unpublished data). Strongyle type eggs are more frequent in sheep fecal sample (Kostelić et al., 2005). According to my study, it can be concluded that all the eggs of parasite are originated from animals where the vulture are fed. Larval, nymphal and adults all stages of ticks suck blood in vulture often from different host. Individuals remain attached to hosts for as long as two days (Mullen and Durden, 2009). Most ticks are ambush parasites found in litter and soil that attach to passing hosts. There are two types of ticks found in Avian. Those are soft ticks (Argasidae — *Argas* and *Ornithodoros*) and few hard ticks (Ixodidae — *Ixodes*) live in nests and burrows. Ticks transmit spirochetosis in birds and Lyme disease and acts as a vector for different anemia causing diseases. Some species of ticks produce toxin in their saliva that incite paralysis. In this study I have found nymphal stage of Lone star tick (*Amblyomma americanum*) from an Indian vulture (*Gyps indicus*). Wild turkey populations also are a common host and may contribute to tick expansion by providing additional hosts for immature stages (Kollars Jr et al., 2000). Lone star ticks are three-host ticks, feeding on different hosts during the larval, nymphal, and adult stages. The ticks have piercing-sucking mouthparts with chelicerae that pierce through the skin of the host. Attachment is facilitated by the tubular hypostome and a secreted cement- or latex-like compound that attaches ("glues") the tick to the host until feeding is complete (Adams et al., 2003). The nymph of

lone star tick which I have found was 1.71mm in length, 1.53mm in width and have 6 legs. Nymphs can survive up to 6 to 8 months without feeding on a host. Once a host is located they feed for 3 to 8 days, drop off the host and molt into the adult stage within a 5 to 6 week period (Troughton and Levin, 2007). As ticks are mobile, they breach their host range easily. The lone star tick is very aggressive and non-specific when seeking hosts (Goddard and Varela-Stokes, 2009) The lone star tick can be found on humans, domesticated animals (e.g. cattle, dogs, horses, goats), ground-dwelling birds (e.g., quail and wild turkeys), and small (e.g. squirrels, opossums, hares) and large (primarily white-tailed deer and coyotes) wild mammals (Kollars Jr et al., 2000). With the exception of wild turkeys, adult lone star ticks infrequently feed on birds (Kollars Jr et al., 2000). Lone star ticks do not transmit Lyme disease but they transmit some nesting germs.

Table 01: Disease transmitted by Lone star tick (*Amblyomma americanum*)

Tick	Diseases
Lone star tick (<i>Amblyomma americanum</i>)	STARI (Southern Tick-Associated Rash illness also known as masters disease) (Masters et al., 2008)
	Human Monocytic Ehrlichiosis (<i>Ehrlichia chaffeensis</i>) (Beall et al., 2012)
	Rickettsiosis (<i>Rickettsia parkeri</i>) (Cohen et al., 2009)
	Tularemia (<i>Francisella tularensis</i>) (Dantas-Torres et al., 2012)
	Theileriosis (<i>Theileria cervi</i>) (Waldrup et al., 1992)

CHAPTER IV

CONCLUSION

This study revealed that, hard ticks of the Genus *Amblyomma* under Ixodidae family are present in Indian vulture (*Gyps indicus*). The popularly known lone star tick (*Amblyomma americanum*) in Indian vulture has considered significant in disease transmission hindering their growth survivality. Observing the endoparasite indicated that Ascarid type eggs and Strongyle type eggs are present in Indian vulture. Wild birds may act as environmental indicator, that's why needs more attention especially on parasitic information for public health reasons. As the vulture is a critically endangered bird, more study and consciousness is required for their existence. This study will increase our understanding of parasitic infection of indian vulture with a view to their effective conservation.

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The Author

Biography

I am Chandan nath, from Chittagong. I completed my Secondary School Certificate (SSC) examination in 2009 with GPA 5.00 from S A Noor High School, Patiya, Chittagong and Higher Secondary Certificate (HSC) examination in 2011 with GPA 5.00 from Chittagong Govt. City College, Chittagong. Currently I have been doing my internship programme which is the compulsory of DVM programme under the Faculty of Veterinary Medicine, Chittagong Veterinary and Animal Sciences University. My favorite hobby is reading books. I feel much interest in exploring new techniques for contributing in development of veterinary field in Bangladesh.

