Preventive Veterinary Medicine 117 (2014) 305–312

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

Short communication

A survey of gastro-intestinal parasitic infection in domestic and wild birds in Chittagong and Greater Sylhet, Bangladesh

Md. Ahasanul Hoque[a,*], Mohammad Mahmudul Hassan[a], Enamul Haque[a], Amir Hossan Shaikat[a], Shahneaz Ali Khan[a], Abdul Alim[a], Lee Francis Skerratt[d], Ariful Islam[b], Hein Min Tun[e], Ravi Dissanayake[g], Tapan Kumar Day[f], Nitish Chandra Debnath[c], Mat Yamage[c]

[a] Chittagong Veterinary and Animal Sciences University, Chittagong, Bangladesh
[b] EcoHealth Alliance, New York, USA
[c] Food and Agricultural Organization of the United Nations, Dhaka, Bangladesh
[d] School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University, Townsville, Australia
[e] School of Biological Sciences, University of Hong Kong, Hong Kong
[f] Department of Forestry, Bangladesh
[g] Food and Agricultural Organization of the United Nations, Regional Support Unit for SAARC, Nepal

ARTICLE INFO

Article history:
Received 12 December 2013
Received in revised form 22 July 2014
Accepted 23 July 2014

Keywords:
Gastrointestinal parasites
Domestic and wild birds
Bangladesh
Survey

ABSTRACT

A survey of gastrointestinal parasitic infection as determined by faecal examination was conducted among domestic and wild birds in Bangladesh. Birds were sampled from households, wet markets and wetlands in Chittagong and Greater Sylhet districts during April 2012 to February 2013. Mist nets were used to catch resident wild and migratory birds. The overall prevalence of parasitic infection ranged among locations from 25 to 55% in indigenous domestic ducks (live bird samples = 304), 20% in resident wild birds (environmental faecal samples = 40) and 40% in migratory birds (live bird samples = 35). The prevalence of parasitic infection was significantly higher in indigenous domestic ducks collected during summer (39%) than winter (22%) ($p = 0.04$). In domestic indigenous ducks and Muscovy ducks, both single and multiple types of parasitic infections were found. However, other domestic birds and wild birds often had a single type of parasitic infection. *Ascaridia* spp. with an average egg load of 50–900, was commonly detected in faecal samples of domestic and wild birds in this study. Other identified parasites were *Capillaria* spp. and *Heterakis* spp. both in domestic and wild birds. Improvement of biosecurity measures for household duck farms through educating and motivating household farmers could help mitigate the effects of parasitic infection on production.

1. Introduction

Poultry rearing is part of an integrated farming system for rural communities in Bangladesh. Like neighbouring countries, predominantly the indigenous domestic duck (*Anas platyrhynchos*), exotic ducks such as Khaki Campbell (*A. platyrhynchos*), Jinding (*A. platyrhynchos*) and Muscovy (*Cairina moschata*) and less commonly domestic geese

* Corresponding author at: Faculty of Veterinary Medicine, Chittagong Veterinary and Animal Sciences University, Zakir Hossain Road, Khulshi, Chittagong 4225, Bangladesh. Tel.: +880 31 659093x105; fax: +880 31 659620.
E-mail addresses: ahasanul2010@yahoo.com, md.hoque@my.jcu.edu.au (M.A. Hoque).

http://dx.doi.org/10.1016/j.prevetmed.2014.07.012
0167-5877/

(Khanum et al., 2005; BBS, 2006) are reared by rural communities. The total duck population is 38.1 million (mostly rural), the third largest population in the world (Dolberg, 2008). Rural duck farming for eggs and meat (Bhuiyan et al., 2005; Pingel, 2011) reduces poverty in resource-poor smallholder rural families and is managed by women and children (Pym et al., 2002).

Helminth infections are thought to be an important challenge to the production potential of duck and geese rearing programmes in Bangladesh by reducing egg and meat production (Buckland and Guy, 2002; Farzana et al., 2008).

Millions of migratory birds consisting of 244 species visit at the Hoar of Hakaluki (Moulvibazar district) and Tanguar (Sunamganj district), the largest wetlands in Bangladesh, during winter (October to March) of each year and intermingle with resident aquatic wild birds (Anon., 2008). Therefore, this survey for common gastrointestinal parasites targeted resident wild and migratory birds at these wetlands and domestic ducks and geese in surrounding areas. Wild resident birds and migratory anseriformes harbour many gastrointestinal parasites (Price, 1980; Foucher and Munster, 2009), which could pose threats to domestic poultry and human health (Hatch, 1996). Although helminth parasites are well studied in North American, European and Asian species, comparatively little or nothing is known about the helminths of anseriformes in Bangladesh and in this region.

The overall prevalence of gastrointestinal parasites varies according to species. The prevalence of gastrointestinal parasites ranged from 10 to 50% in domestic ducks and geese in Tanzania (Muhairwa et al., 2007), ~75% in pigeons in Brazil (Marques el al., 2007), ~34% in captive wild birds in India (Patel et al., 2000), with common parasites being *Ascaridia* spp., *Heterakis* spp., *Capillaria* spp. and *Eimeria* spp. (Cordon et al., 2009; Adejinmi and Oke, 2011). Seasonal variability in prevalence of gastrointestinal parasites was documented in different bird species (Yousuf et al., 2009).

Pigeons were also considered in this survey as they are an important source of human food in Bangladesh (Sari et al., 2008). The total pigeon population in Bangladesh is 10.5 million (BBS, 2006). Parasitic infections may retard growth, lower egg production and increase susceptibility to other infections (Dranzoa et al., 1999). In addition to wetlands and surrounding areas live bird wet markets were targeted as they are the place for trading live birds that come from different parts of the country and hence facilitate transmission of pathogens among naïve poultry and humans (Muzaffar et al., 2006).

The prevalence and distribution of gastrointestinal parasites have been documented in domestic ducks in households (Muhairwa et al., 2007; Hoque et al., 2011), but limited studies have occurred for domestic ducks, geese and pigeons at live bird markets, and wild resident and migratory birds in Bangladesh. The present survey was therefore conducted to estimate the prevalence, distribution and infection load of gastrointestinal parasites in domestic birds (within households and live bird markets) and document parasites of wild resident and migratory birds at the domestic bird and human interface.

2. Methods

2.1. Study sites and sampling

A cross-sectional survey of parasitic infection, as a spin-off from the main study of avian influenza surveillance in Bangladesh funded by Food and Agriculture Organization of the United Nations, was conducted on domestic and wild birds at birds (wild-domestic)–human interface in purposively selected study sites in Bangladesh. Faecal samples of different birds were sampled from households, live bird markets and major wetlands under Chittagong and Greater Sylhet districts in Bangladesh during April 2012–February 2013 (Table 1 and Fig. 1).

Household indigenous domestic ducks were sampled randomly from surrounding areas of Chittagong metro city such as Mirasarai and Anowara during May–June 2012 and Halla village of Borolakh Upazila of Moulvibazar district (Greater Sylhet) (HVBM) in December 2012.

Four live bird markets (Folliatoli, Jhautola, Pahartali and Riazuddin) of Chittagong metro city and one of the Sylhet metro city were included in the survey. Species conveniently sampled from these markets during April–December 2012 (one to five times) were domestic indigenous duck (predominant species), domestic Muscovy duck, goose and pigeon. According to owners of retailer shops (vendors), these birds were from rural areas of Chittagong district as well as north and northeast districts of the country such as Pabna, Mymensingh, Kushtia and Sirajganj, Sunamganj and Sylhet. Thus, our sampling may represent a wider part of the country.

Fresh environmental faecal samples of resident wild birds such as cormorant and egret were also sampled from the ground of roosting trees of HVBM in February 2013. These birds roosted separately in different trees and roost size of each species was around 20,000 + birds according to our counting with naked eyes. These birds had close connection with migratory birds roosted on Hakaluki Hoar of Moulvibazar district in Bangladesh. Hakaluki Hoar is one of the biggest wetlands in this country where millions of migratory birds in different species visit every winter (October–March).

Resident and migratory wild birds were sampled from the major wetlands of Bangladesh such as Hakaluki and Tanguar Hoar during December 2012–February 2013. Mist nets were used to catch wild birds for our main avian influenza study under the ethics and eco-permission approval number given by the Department of Forestry, Bangladesh (22.01.0000.101.23.2012.1439).

2.2. Collection and transportation of field samples and epidemiological data

Individual or pooled fresh faecal samples of birds were collected aseptically in sterile plastic containers having 10% formalin with unique identification numbers. Fresh environmental faecal samples of resident birds (Cormorant and egret) were collected using a clean plastic sheet on the ground of roosting trees and given unique identification number of each sample. Samples were submitted on ice to the laboratory of Chittagong Veterinary and Animal