Gastrointestinal Parasites In Fecal Samples Of Sumatran Laughingthrush (Garrulax bicolor) From Bird Markets, Medan City, North Sumatra

Markus Mangantar Pardamean Sianturi, Adrian Hartanto, Adetia Arjuna Girsang

Abstract: Sumatran laughingthrush (Garrulax bicolor) is an endemic avian species from North Sumatra. The species is heavily exploited and traded in bird markets in Medan city following the threats to its health due to prolonged captivity and poor bird housing by the vendors and distributors. This preliminary investigation aims to identify the gastrointestinal (GI) parasites infecting the G. bicolor through coproscopical analysis and microscopical observation. Total of 120 fecal samples were collected and examined in a weekly-basis for two months from July to August 2019. The results revealed the presence of seven GI parasites namely one coccidia (Eimeria), two cestodes (Choanotaenia, Raillietina), and four nematodes (Ascarida, Amidostomum, Capillaria, Heterakis) in 68 positive samples (56.6 %). Raillietina spp. are designated as the most prevalent GI parasites to G. bicolor, followed by Amiodostomum (47.5 %), Eimeria (36.6 %), Choanotaenia (12.5 %), Capillaria (0.07 %), Heterakis (0.06 %), and Ascarida (0.03%). Severe infections are also obtained from Raillietina (75.0±22.6) with the relative density of 3.3/ind, followed with the remaining moderate infections by Ascarida (20.0±13.4), Eimeria (18.1±10.3), Choanotaenia (11.7±5.1), Heterakis (9.7±5.35), and Capillaria (6.1±3.6). Our results may then reflect the importance of sanitary management by the keepers to decrease the health risk posed by these parasites as well as to prevent a possible zoonotic infection from captive birds.

Index Terms: Bird market, Fecal, Garrulax bicolor, Gastrointestinal parasite, Medan city, Raillietina, Sumatran laughingthrush

1. INTRODUCTION
North Sumatra has long been a part as an important province in Indonesia which facilitate intense wildlife trade, especially in avifauna through bird market activities. Laughingthrushes or Garrulax spp. are exotic avifaunal species commonly kept and exploited from the wild, leading to over-catchment and trade in North Sumatra [1]. Both the native and non-native Garrulax species are commercially available in bird markets with fluctuative inputs based on demands and natural supply for certain species [2], [3]. Sumatran Laughingthrush (Garrulax bicolor) is a native and endangered songbird species from North Sumatra which is commonly traded in wildlife and bird markets to bird enthusiasts and keepers [4], [5]. Past studies have revealed a change of interest in which G. bicolor has been a substitute to the White-crested Laughingthrush (G. leucolophus) in market demands. Hence, the species is reported to becoming unstable in the level of trade with the risk of extinction in the future [6]. Infestation of parasites is an important issue in captive birds, especially to the high-density population with increasing risk of exposure of cross-infection and prolonged captivity to birds in cage [7]. Indication of poor management in bird markets, e.g sanitary and health care may pose a threat to the captive G. bicolor with the fatal issue of mortality [6].

The risk become greater with the possibility of finding zoonotic parasites which concern to the personal health of the bird keeper or even to the community health [8]. The present study was undertaken to investigate the presence of gastrointestinal parasites through fecal or coprological survey from G. bicolor sampled from representative bird markets in Medan city, North Sumatra. In addition, categorizations are given to reflect the importance of our finding to the highlighted parasite.

2. MATERIALS AND METHOD
2.1 Study Area
The bird markets are located in Jalan Bintang, known as the largest wildlife market in Medan city, North Sumatra, Indonesia. The area is characterized by the presence of numerous wildlife species being reared and raised in captivity for trade purposes, including the Sumatran Laughingthrush or Garrulax bicolor. We chose four vendors as sampling sources by contacting a local middleman since there is a limited information and restricted permit given by the owner of the shops.

2.2 Collection and Processing of Fecal Samples
A total of 120 fecal samples (20-30 g) from each individual G. bicolor at the selected sites (5 ind./site) were collected randomly and stored into a sterile sample cup. The fecal samples directly from the cloaca or freshly dropped feces from the ground were separately sampled over a period from July to August 2019 on a weekly basis.

2.3 Coproscopical Analyses
Fecal samples were prepared following the modified saturated salt flotation technique [9]. Fecal sample weighing ± 10 g were diluted into saturated NaCl solution (1:10, w/v) in a flask. The flask was let to settle for 20 min for...
sedimentation. A drop of liquid was pipetted and spotted on an object glass for microscope observation. The gastrointestinal (GI) parasites were visually identified for their resemblance morphologically to at least the genera level by using available literatures in Balai Veteriner Medan, Medan city, North Sumatra [10], [11], [12].

2.4 Data Analysis
The data was presented in percentage (%) for prevalence and mean ± SD for intensity and frequency for relative density [13]. The formulation for calculating parasitic infestation is described as follows:

\[
\text{Prevalence} = \frac{\text{Number of infected individuals}}{\text{Number of hosts}} \times 100
\]

\[
\text{Mean intensity} = \frac{\text{Total number of infected individuals}}{\text{Number of hosts}}
\]

Relative density = \[
\frac{\text{Total number of infected individuals}}{\text{Number of infected and non-infectected individuals}}
\]

The categorization on ecological parameters of parasites was based on Williams and Williams [14] to assess the status of infestation by gastrointestinal parasites to G. bicolor.

<table>
<thead>
<tr>
<th>TABLE 1</th>
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<tbody>
<tr>
<td>PREVALENCE OF GASTROINTESTINAL PARASITE IN FECAL SAMPLES FROM GARRULAX BICOLOR</td>
</tr>
<tr>
<td>PARASITES</td>
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<tr>
<td>COCCIDIA</td>
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<tr>
<td>CESTODA</td>
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<td>NEMATODA</td>
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<tr>
<td>ENOPLODA</td>
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<td>Strongyliida Amidostomatidae Amidostomum sp.</td>
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3. RESULTS AND DISCUSSION
In total of 120 fecal samples examined, 68 (56.6 %) were detected positive to be infected by gastrointestinal parasites. The prevalence of parasitic species found in fecal samples of G. bicolor from bird markets is presented in Table 1. Six helminths were recovered, which are classified into two cestodes and four nematodes along with one coccidian oocyst (Eimeria sp). Raillietina sp. was categorized as the most frequent parasite detected (56.6 %) followed by Amidostomum (47.5 %), Eimeria (36.6 %), Choanotaenia (12.5 %), Capillaria (0.07 %), Heterakis (0.06 %), and Ascarida (0.03 %). Scabies mites (Sarcoptes scabiei: Sarcoptidae) are also present in the stool samples although not considered in this study. The intensity and relative density from each parasitic species is presented in Table 2. Severe infection was shown by Raillietina (75.0±22.6) with density of 3.3/ind, followed by the remaining moderate infections by Ascarida (20.0±13.4), Eimeria (18.1±10.3), Choanotaenia (11.7±5.1), Heterakis (9.7±5.35), and Capillaria (6.1±3.6). The range of infestation found in one individual G. bicolor was the highest by Raillietina (10-100/ ind). Study on endoparasitic infection on G. bicolor is still limited. A recent documentation on deadly coccidiosis was reported on G. chinensis which was caused by the coccidian Isospora (Coccidia: Eimeriidae) through the use of molecular identification [15]. In addition, our finding on coccidian was only limited to Eimeria, which is classified as a common parasite with limited information on a peculiar disease to Garrulax spp. The health risks posed by this protozoan to birds may extend from anorexia, fluffy feathers, excess diarrhea, gastrointestinal disorders, and decreased physiological state leading to other epidemic diseases, e.g mycoplasmosis and colibacillosis [16], [17]. The helminths dominate in terms of prevalences, intensities and relative densities. Although the studies on helminth parasites have been focused on commercial poultries, their presences in exotic species must also be evaluated to ensure the health risk on particular endangered species, especially the captive G. bicolor in markets. In our findings, the cestode Raillietina spp. and the nematode Amidostomum spp. are the most prevalent in G. bicolor fecal samples. Helminthes species are considered as secondary pathogen to birds which may cause anorexia,
enteritis, ulceration and death [18]. In specific to members of Raillietina spp., these species are well documented in commercially-bred chickens which caused significantly low performance in poultry industry in the tropical countries [19], [20], [21]. Until now, there is no documentation of parasitological disease on G. bicolor which lead into mortality. In fact, Busina et al [6] have reported the total mortality of G. bicolor reaching 16% in bird markets with varying results among months. Although no direct evidence on housing condition and health risk in the bird markets, the documented endoparasites in our study may suggest the lack or poor bird housing and care.

4. CONCLUSION
Coprosocipical analysis on Garrulax bicolor traded and reared in four representative bird markets in Medan city, North Sumatra revealed the high prevalence of cestode Raillietina spp. (>50 %) with the discovery of one coccidia (Eimeria) and six parasitic helminthes (Amostrongyllum, Ascarida, Capillaria, Choanotaenia, Heterakis, Raillietina). The intensity displayed by Raillietina is considered as severe which may pose some health risks to G. bicolor.

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6 REFERENCES