

Identification of Ectoparasites and Gastrointestinal Parasites in Eurasian Tree Sparrow (*Passer montanus*)

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Abstract

This study aims to determine the prevalence and identify ectoparasite and gastrointestinal parasites in Eurasian tree sparrow (*Passer montanus*) in Kediri Regency, East Java, Indonesia. The research was conducted in January 2021 with 100 samples of body swabs and feces of Eurasian tree sparrow. The examination was done in the Anugerah Satwa Veterinary Clinic in Kediri Regency using direct smear and flotation methods. The observations in this study showed that from 100 samples of body swabs, 38 samples (38%) were infested with ectoparasites which are *Dermoglyphus* sp. and *Strelkoviacarus* sp. and from 100 feces samples, 47 samples (47%) were infected with helminthic eggs with the single infections by *Ascaridia* sp. as much as 12%, *Dispharynx* sp. as much as 1% and mixed infections of *Ascaridia* sp. and *Dispharynx* sp. were 25%. Assessed by examination for the protozoa also found that *Isospora* sp. was present with prevalence of 100% of the 100 sparrow feces samples examined.

Keywords: Ectoparasite, Eurasian, Tree Sparrow, Gastrointestinal, Kediri, Prevalence.

Introduction

Sparrow (*Passer montanus*) is the most common bird found in the surrounding environment. Their familiarity with humans is one of the unique characteristics of sparrow (MacKinnon *et al.*, 2010). Sparrows usually live in groups around houses, warehouses and others. They forage in various open fields that produce small seeds. This habit then gave rise to the assumption that sparrows can be a source of disease transmission for other birds such as migratory birds. Because sparrow can enter the surrounding settlements to seek food and can transmit parasites, so that the identification of ectoparasites and parasitic gastrointestinals in sparrow is very important to find out the prevalence level of parasitic infestations for further controlling parasites. In addition, no research has been conducted on the identification of ectoparasites and gastrointestinal parasites in sparrows in Indonesia. A similar study conducted by Ozmen *et al.* (2013) on sparrows in Mount Toros southwestern Turkey, he found the presence of endoparasites with a prevalence of 85.4%.

Ectoparasites are parasites that live on the outside of the surface of the host's body. The

presence of ectoparasites in the body of poultry can cause various losses such as irritation, parasite infestation (myiasis) and various other forms of allergic reactions (Norouzi *et al.*, 2018). Ectoparasites generally do not cause death but can be economically detrimental. High rates of ectoparasite infestation can result in acute death, such as mortality without signs of symptoms first. Even some parasites can be transmitted to humans or called zoonoses. On the other hand, digestive diseases can also cause the same problem. One way to diagnose the presence of this type of gastrointestinal parasite in the animal's body is by examining fresh feces (Sahani *et al.*, 2018).

Methods

The sample consisted of two types of samples, 100 samples of sparrow feces and 100 swab samples on several parts of the sparrow's body, including: back, wings, chest, tail and neck, including fine and coarse sparrow feathers using a cotton bud moistened with alcohol, then the two types of samples will be identified through a microscope. This research carried out in January 2021 and the sample examination took place at the Anugerah Satwa Clinic in Kediri.



Tools

The tools used are cotton, scalpel, glove, object glass, cover glass, plastic bag, test tube, and microscope.

Materials

The materials used in this study included: feces and swabs of several parts of the sparrow's body (back, wings, chest, tail and neck, including fine and coarse feathers), distilled water, 70% alcohol, 5% potassium dichromate and saturated NaCl.

Preparation

Sparrows are collected from residential areas which are the habitat of sparrows by using *pulut* as sparrow traps. After obtaining sparrows, specimens will be kept for approximately one week in individual cages by labeling each sparrow sample. The purpose of individual cages is to obtain the feces of each sparrow.

Sample Inspection

Sample examination was carried out at the Anugerah Satwa Animal Clinic in Kediri. The step after obtaining the feces of each individual from the sparrow is to look for ectoparasites that infest the sparrow using the results of the examination on the sparrow's body, then examined using a microscope with a magnification of 100x, as well as the feces to determine the presence of worm egg infestation using the floating method because it is more efficient in finding various kinds of worm eggs and protozoa. The next step is to examine under a microscope with a magnification of 100x-400x to confirm the presence or absence of parasites in the sparrow feces sample, if there are parasites, they will be identified and data presented.

Floating Method

The principle of this method is based on the density of eggs and protozoa which are lighter than the density of the solution used so that the eggs and protozoa will float on the surface (Natadisastra and Agoes, 2009). This study used a saturated NaCl solution with a concentration of 36.5%. The first step is to insert the stool sample into the test tube, then mix the Saturated NaCl solution into the test tube until it is at a height attached to the lip of the test tube, then cover it slowly with an object glass and wait approximately 20-30 minutes for the worm eggs and Protozoa rise to the surface. The next step is to take the object glass carefully so it doesn't spill and then cover it with a cover glass, the sample will then be examined under a microscope with a magnification of 100x-400x.

Ectoparasite Examination Method

Sampling of ectoparasites was obtained by examining several parts of the sparrow's body, including the back, wings, chest, tail and neck, including the fine and coarse feathers of the sparrow using a cotton bud moistened with 70% alcohol, which will then be identified using the native method through a microscope at 100x magnification.

Data Analysis

The data obtained analyzed descriptively, by calculating the percentage of positive samples for the presence of ectoparasites and gastrointestinal parasites in sparrows, so that the total number of positive samples was compared to the total number of samples. Where the percentage of parasites found can be determined by the formula: positive sample (%) = $\frac{\text{Number of positive samples}}{\text{total sample}} \times 100\%$ (Budiharta and Suardana, 2007).

Results and Discussion

Identification of Ectoparasite Examination

The identification results of ectoparasites on sparrows (*Passer montanus*) taken in January 2021, in Kediri Regency, through an examination on several parts of the sparrow's body, showed positive results for infection with ectoparasites from the species *Dermoglyphus* sp. and *Strelkoviacarus* sp., species of sparrow ectoparasites from examination through the preparation of slides without staining can be seen in Figure 1 and 2.

The sparrow's ectoparasite examination showed a positive result of being infected with ectoparasites. From the picture above, the ectoparasites obtained from the sparrow's body are mites belonging to the Analgidae family. The results of the slide identification of mite preparations from the body parts of the sparrows were of the genus *Dermoglyphus* sp. and *Strelkoviacarus* sp.. According to Hernandez *et al.* (2020), *Strelkoviacarus* sp. can be identified through the idiosomal picture of *Strelkoviacarus* sp. where there is an anal plate and opisthosomal shields, while *Dermoglyphus* sp. can be identified from the appearance of the ventral gnathosoma and idiosoma.

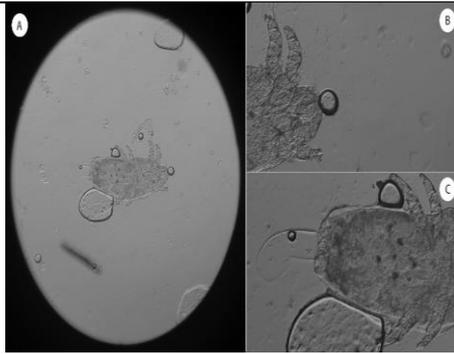


Figure 1. Description: A Full description of *Dermoglyphus* sp. at 100x magnification, B. Ventral view of gnathosoma *Dermoglyphus* sp., C. Idiosoma section of *Dermoglyphus* sp. looks elongated and there are 2 pairs of tarsus III and IV.

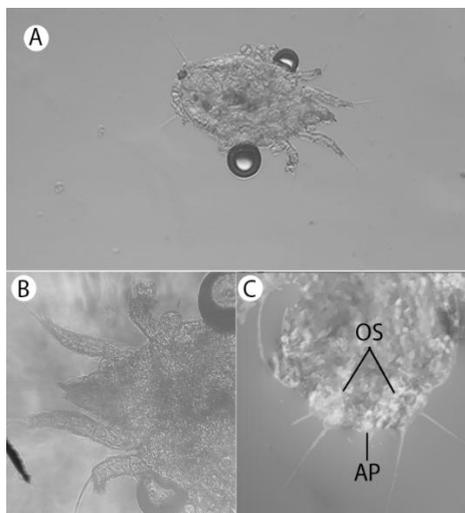


Figure 2. Description: A. Full picture of *Strelkoviacarus* sp. at 100x magnification, B. Overview gnathosomes of *Strelkoviacarus* sp., C.

On the ventral side of *Strelkoviacarus* sp. there is an anal plate (AP) and opisthosomal shields (OS).

The results of ectoparasites based on the examination of 100 review samples on several parts of the sparrow's body taken in Kediri Regency in percentage form, can be seen in Table 1.

Based on the results obtained from 100 samples of sparrows in Kediri Regency, the prevalence of *Dermoglyphus* sp. by 45% and *Strelkoviacarus* sp. by 37%. The prevalence is lower than the results of previous studies with the prevalence rate of *Dermoglyphus* sp. by 55%. The high prevalence of infection is due to differences in rainfall where the previous study was carried out when the peak of the rainy season occurred, where the very humid

temperature allowed the ectoparasites to survive and continue their life cycle.

Table 1. Results of Examination of Ectoparasites in Sparrows

Predilection	Ectoparasite species	Total	%
Ectoparasite	<i>Dermoglyphus</i> sp.	45	45
	<i>Strelkoviacarus</i> sp.	37	37

Endoparasite Examination Identification

The following are the egg of worms and protozoa found in the sparrow's digestive tract through the examination of feces using the floating method, which can be seen in Figure 3 and 4.

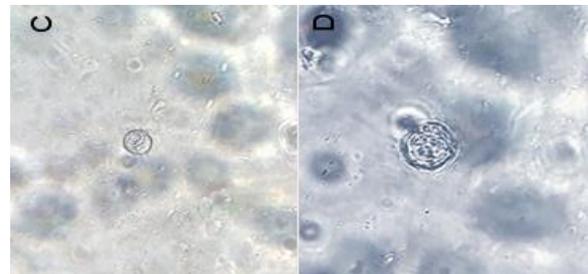


Figure 3. Description; A. Eggs of *Dispharynx* sp. at 400x magnification, B. Eggs of *Ascaridia* sp. at 400x magnification.

On the results of endoparasite examination found worm eggs, among others: Eggs of *Ascaridia* sp. and the eggs of *Dispharynx* sp. and the discovery of the protozoa *Isoospora* sp. obtained by flotation method in sparrow feces. The results of the examination in percentage forms can be seen in Table 2 and 3.



Figure 4. The results of faecal examination found the parasite *Isoospora* sp., has 2 sporocysts where each sporocyst contains 4 sporozoites.

Table 2. Results of Examination of Worm Eggs Parasites in Sparrows Fecal

Worm eggs		Total	%
Species	Family		
<i>Ascaridia</i> sp.	Ascarididae	37	37
<i>Dispharynx</i> sp.	Acuariidae	26	26

Table 3. Protozoa Examination Results in Sparrows Fecal

Protozoa		Total	%
Species	Family		
<i>Isoospora</i> sp.	Eimeriidae	100	100%

From the results of endoparasite research conducted on 100 samples of sparrow feces, it was found that there was an infestation of *Ascaridia* sp. as much as 37% and eggs of *Dispharynx* sp. as much as 26%. The number of egg infestations of *Ascaridia* sp. caused by *Ascaridia* sp. is one of the endoparasites that has a direct life cycle without the need for an intermediate host and is supported by environmental conditions. This is supported by Permin (2001), birds that are allowed to roam freely, tropical climate and high humidity are favorable for the development of worm eggs, larval survival and infective eggs. On examination of the protozoa also found the presence of infestations of *Isoospora* sp. with the prevalence of 100% of the 100 sparrow feces samples examined. The mode of transmission of protozoa is through food and drink contaminated by the infective stage (trophozoites, cysts, or oocysts). Associated with the habit of sparrows who like to live in groups and fly looking for food together, it is very possible to be the cause of many sparrows infected with *Isoospora* sp.

Conclusion and Suggestion

On examination of ectoparasites, the species *Dermoglyphus* sp. and *Strelkoviacarus* sp. were found. Similarly, examination of stool samples found the presence of worm eggs from the species *Ascaridia* sp. and *Dispharynx* sp. and found a protozoa, namely *Isoospora* sp.

The percentage results from the grouping of parasitic infestations showed that from 100 samples of sparrows, 47 (47%) were infected with ectoparasites, 38 (38%) were infected with worms and 100 (100%) were infected with protozoa.

After conducting this research, the suggestions that can be given are provide education to poultry farmers to protect the cage

from the possibility of other birds entering the poultry cage, which allows the spread of parasites by other birds and next further research to determine the species of protozoa that infect sparrows molecularly using a PCR test.

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