

First report of *Eimeria lancasterensis* in a Red Squirrel (*Sciurus vulgaris* L.) in Turkey

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SUMMARY: A case of coccidiosis in a young, red male squirrel (*Sciurus vulgaris* L.) has been described in this report. The squirrel was found dead and presented to the department of pathology for necropsy. A traumatic lesion was observed on the face that could have caused death. At necropsy the large and small intestines were swollen due to fluid and gas. During the examination of gut content numerous coccidia oocysts were observed. After sporulation, the oocysts were identified as those of *Eimeria lancasterensis*. In the histopathological examination numerous coccidia developmental stages were observed in the epithelium of small intestine. This is the first report of *Eimeria lancasterensis* identification in squirrels in Turkey.

Key Words: Coccidiosis, *Eimeria lancasterensis*, pathology, squirrel.

Türkiye’de Bir Kızıl Sincapta (*Sciurus vulgaris* L.) *Eimeria lancasterensis* Olgusu

ÖZET: Bu raporda erkek bir kızıl sincapta (*Sciurus vulgaris* L.) saptanan koksidiyoz olgusu sunuldu. Sincap ölü olarak bulunarak nekropsi için patoloji laboratuvarına getirildi. Hayvanın yüz kısmında ölüme sebep olan travmatik bir lezyon saptandı. Nekropside ince ve kalın bağırsakların gaz ve sıvı ile şişkin olduğu gözlemlendi. Bağırsak içeriğinin incelenmesinde çok sayıda koksidiya oosistlerine rastlandı. Sporulasyondan sonra oosistlerin *Eimeria lancasterensis* oosistleri olduğu saptandı. Histopatolojik incelemede bağırsak epitelleri içerisinde çok sayıda koksidiya gelişim devrelerine rastlandı. Bu Türkiye’de sincaplarda rastlanan ilk *Eimeria lancasterensis* raporudur.

Anahtar Sözcükler: *Eimeria lancasterensis*, koksidiyoz, patoloji, sincap.

INTRODUCTION

Coccidia are protozoa that parasitize the intestinal mucosa of all animal species. Coccidiosis affects the living host in many ways, depending upon the tissue preference of the particular parasite involved and the number of oocysts in the initial infection. Most of these parasites attack the mucosa of intestinal tract; therefore symptoms are predominantly enteric. Two genera of most concern are *Eimeria* and *Isospora* (3, 12).

The gross lesions of coccidiosis are variable hyperemia and fluid distention of affected segments, often caudal small intestine, cecum and colon. If the infecting *Eimeria* generate large schizonts, 300 µm in size, pinpoint white foci are visible from both serosal and mucosal surfaces. The mucosa may appear normal, be raised in convoluted hyperplastic patches, or be variably eroded, with or without a fibrinonecrotic pseudomembrane. Erosion and fissuring of the mucosa of the large intestine may be accompanied by bleeding. The severity of the

hyperemia, segmental demarcation, and surface bleeding vary considerably among coccidial species (2, 3, 12).

Although there are some report about presence of oocysts in squirrels, pathological observations in squirrel coccidiosis is very rare (1, 4-8, 11). There is one report about presence of coccidian oocysts in gut content in squirrel in Turkey (9). The aim of this study is to report to presence of *Eimeria lancasterensis* in squirrels in Turkey.

CASE

A young, male died squirrel was brought to the department of pathology for necropsy. A traumatic wound was on the chin of the squirrel. At the necropsy, severe hyperemia was observed at the mesenterial and intestinal serosal vessels. Intestines were tympanic and their content was watery (Figure 1). Slight autolysis was also observed in guts. During the necropsy gut content was collected for parasitological examination. About 5 g of faces were taken from the gut. Fecal sample was examined directly under the microscope. Sporulation for oocyst identification was carried out.

Tissue samples which were taken from the organs during the necropsy were fixed in 10% buffered formaldehyde. Following the routine procedure, tissues were blocked in paraffin and

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cut 5 μ thickness and then stained with hematoxyline-eosin (HE) and examined microscopically. Although aulohitic changes coccidiosis was easily diagnosed in intestinal epithelium during the histopathological examination. Numerous coccidia developmental stages were seen in the epithelial cell. Oval shaped schizonts were full of many banana shaped merozoites. While the oocysts had oval shaped and refractile walls, macrogametes were big including refractile eosinophilic granules. It was noticed that gamonts had round to oval shaped with uniformly eosinophilic staining and dot like nucleus. In some areas free oocysts were observed in lumen of the gut. No indication of bacterial and viral disease was observed at the microscopical examination.



Figure 1. Tympanic appearance of guts in red squirrel.

At the microscopical examination of gut content, numerous oocysts were observed. For sporulation, fecal sample was incubated in 2% potassium dichromate at room temperature for 4 days. The sporocysts were concentrated by centrifugal floatation using saturated salt solution. After incubation oocysts were examined under the light microscope. The species was subsequently identified as *E. lancasterensis* according to the sizes and morphological features of the sporocysts. Spheroid oocysts of *E. lancasterensis* were found and sporulated

oocysts measured approximately 16,6 x 25 μ m, the ovoid sporocysts were measured approximately 7,28x11,8 μ m. No micropyle and oocyt residuum were observed, but one polar granule was present. Stieda and parastieda body were seen in the sporocysts. They contained a granular sporocyst residuum (Figure 2).



Figure 2. Sporulated oocysts of *Eimeria lancasterensis*, x 400.

DISCUSSION

Coccidiosis is caused by a parasitic protozoan, which lives in the gut. Coccidia are obligate intracellular parasites whose development within the cytoplasm of epithelial cells results in the death of each cell that parasitized. When many cells of the intestinal epithelium are parasitized at one time, the denuded mucosa may bleed freely, and intense inflammation involves the lamina propria and some times the submucosa. As large numbers of epithelial cells are destroyed, the remaining epithelium is stimulated to replace that which was lost in domestic animals (3). There is little knowledge about morphology, biology and pathogenesis of *Eimeria sp.* that cause coccidiosis in squirrel (10). Because of the squirrel found death the clinical symptoms could not be examined in present study. This study showed that similar morphology, biology and pathogenesis are also available in squirrel coccidiosis.

Some reports are available about the presence of different coccidial agents (*E. vilasi*, *E. dorneyi*, *E. bentoniensis*, *E. callispermophilli*, *E. morainensis*, *E. larimerensis*, *E. bilamellata*, *E. beecheyi*, *E. callospermophilli*, *E. spermophili*, *E. sciurorum*, *E. andrewsi*, *E. silvana*, *E. mira*, *E. serbica*, *E. confuse*, *E. tamiensis*, *E. dorsalis*, *E. cochisensis*, *E. lancasterensis*, *E. ontariensis*) in squirrel throughout the world ((1, 5-7, 8, 11). There is only one report about the presence of *E. citelli*, *E. hoffmeisteri*, *E. bilamellata* in squirrels in Turkey (9). In this report *E. lancasterensis* was firstly identified from a squirrel. The oocysts were morphologically similar described by Sevinc (10). This agent not previously reported in squirrels in Turkey. Although the prevalence of coccidiosis not known in our country, this report also indicates that coccidiosis can be a problem in squirrels and this is the first report of coccidiosis that was examined both pathologically and parasitologically in a squirrel in our country.

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