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Report

Preliminary study on the occurrence of intestinal parasites in Malayan tapir (*Tapirus indicus*) in Zoo Negara, Malaysia

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Abstract
A preliminary study was conducted to investigate the occurrence of intestinal parasites in the faeces of captive Malayan tapir in Zoo Negara, Malaysia. A total of 12 fresh faecal samples were collected from three different individuals and screened for eggs and larvae using the sedimentation technique. The results shows that S*trongylus* sp. infection was the highest with 43 %, followed by *Strongyloide*s sp. and *Fasciola* sp. with 17 % each, *Balantidium* sp. 11 %, *Ascaris* sp. 9 % and unidentified 3 %. *Fasciola* sp. and *Ascaris* sp. were found in samples obtained from one individual kept in a cage while *Balantidium* sp. was found in the free-roaming individuals. Previous information on parasitic diseases in tapir was largely derived from those found in the wild. This study highlights the first record on parasitic infection in captive tapir in Malaysia. In addition, due to pathogenic importance of the parasites to both animals and humans, the population should be closely monitored. Considering the endangered status of the Malayan tapir, further studies are needed to highlight this issue.

Keywords: Malayan tapir, Intestinal parasite, Human-infectious, Zoo Negara

Introduction
The Malayan Tapir, *Tapirus indicus* belongs to the Tapiridae family of Perissodactyla order. There are four living species which are endemic to certain regions around the world with the Malayan Tapir being recorded only in Southern Burma, Malay Peninsula, Thailand and Sumatra (Barongi, 1993). Although the species is listed as vulnerable, little is known about the Malayan Tapir (Lynam et al., 2008). For example, despite continuous deforestation and human disturbances that threaten the species, it is difficult to implement appropriate actions as very little information is known regarding regional statuses and threats faced by the population (Brooks et al., 1997). Captive tapir populations face similar problems due to improper confinement conditions. According to Barongi (1993), there are about 175 tapir in captivity around the world. Various zoonotic parasites have been reported to occur in captive tapirs which include human infective species of gastrointestinal protozoa like *Balantidium coli* and *Entamoeba histolytica* (Cruz-Aldan et al.,

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2006). In addition, some of the infections are easily transmitted to humans which raise concern in managing the captive population. Therefore, there is a need to identify and diagnose parasitic infections in captive animals in particular that of the Malayan tapir to facilitate appropriate treatment, control and management of the species in captivity. Hence, the following preliminary study was conducted to highlight the prevalence of internal parasitic infection in the Malayan Tapir at Zoo Negara, Malaysia.

Materials and Methods

The study was conducted in Zoo Negara which is situated in Ulu Klang, Kuala Lumpur (3°12'35"N 101°45'28"E). Currently, the zoo has five tapir; four adults and one juvenile. However, two of them, a female and her young were not available during this study due to health and safety reasons. Hence, only faeces from three individuals were examined. Two of them were kept outdoors in a semi-confined area equipped with a pool, while the remaining one was restrained in a small enclosure due to an injury.

The faecal samples were obtained between 7am–8am for five days. Upon collection, the samples were kept in an air-tight container and a part of them were preserved in 10% formalin before being transported to the laboratory. Based on the method used by Hernandez-Divers et al. (1997), one gram of fresh sample was mixed thoroughly with five millimetres of acetic acid. The mixture was then allowed to settle for one minute and later poured into a centrifuge tube. Later, an identical volume of ether was added, mixed thoroughly and centrifuged for one minute at 1,500 rpm. The top layers of the mixed solution containing ether and acetic acid were discarded leaving only the sediment for microscopic examination. Meanwhile, the preserved samples undergo the formalin-ethyl acetate technique (Truant et al., 1981) to separate the eggs and larvae from faecal materials before being subjected to microscopic examination. All samples tested were replicated and analyzed for parasites larva or eggs that may present in them.

Results and Discussion

A total 12 faecal samples were collected from three different Malayan tapir individuals. Based on the 1–5 scale of body conditioned scores (BCS) and faecal score (FS) developed by Clauss et al. (2009), the individuals studied had high BCS, from 4 to 5, characterized by moderate to obese and also high FS, from 3 to 5, characterized by loose and slightly moist to very moist. These reflect the

general well-being of the captive tapirs which are in good health and had sufficient fibre intake in their diet.

Based on Figure 1, four nematodes (nemathelminths: *Strongylus* sp., *Strongyloides* sp. and *Ascaris* sp.; platyhelminthes: *Fasciola* sp.) and one protozoan (*Balantidium* sp.) were identified in the samples obtained. Hence, helminth infection was more common compared to protozoa infection. In detail, *Strongylus* sp. had the highest prevalence with 43 %, followed by *Strongyloides* sp. and *Fasciola* sp. each with 17 %, *Balantidium* sp. 11 %, *Ascaris* sp. 9 % and one unidentified parasite 3 %. In addition, *Fasciola* sp. and *Ascaris* sp. were only found in samples obtained from the individual restrained in the cage. *Balantidium* sp. was only found in samples obtained from the free-roaming individuals. The resulting infections of these parasites are often asymptomatic although they may cause haemorrhage, abdominal discomfort and pain to those infected. Both *Fasciola* sp. and *Ascris* sp. are food-borne parasites that often get ingested by their host from eating unhygienic food or may also be contracted from a number of vectors including the house fly (*Musca domestica*) and Oriental latrine fly (*Chrysomya megacephala*). These are some of the common flies that have been tested positive for helminth ova attached to their external surfaces (Monzon et al., 1991). As for the presence of the *Balantidium* sp., field observation suggests that the tapirs studied may have accidentally ingested the parasite or its cyst through contaminated water in the pool as this is the most common transmission mechanism (Schuster and Ramirez-Avila, 2008).

According to Ramsay & Zainuddin (1993), almost all of the information

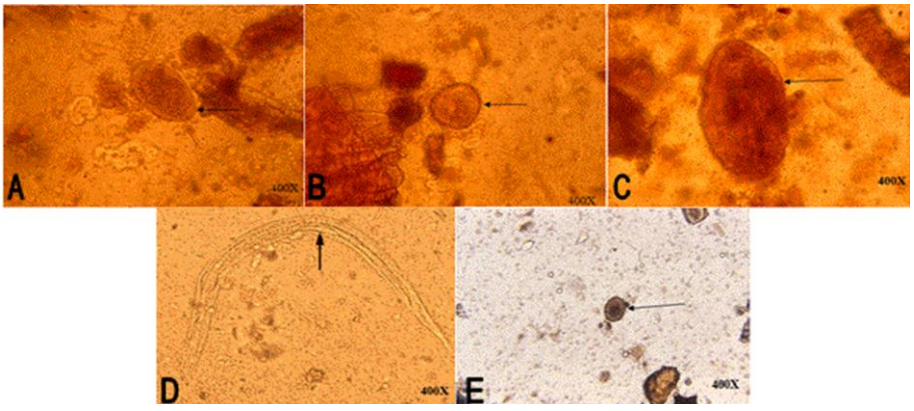

Figure 1: Examples of the different types of parasite stages found in Malayan Tapir faecal samples in Zoo Negara. **A** *Fasciola* sp. egg. B *Balantidium* sp. cyst. **C** *Strongylus* sp. egg. **D** Rhabditoid larva of *Strongyloides* sp. **E** *Ascaris* sp. egg.

available on parasitic diseases is largely derived from free-ranging tapirs. There is no record of intestinal parasites in captive tapir in Malaysia for comparison purpose. However, at least two of the parasites found in this study i.e. *Balantidium* sp. and *Ascaris* sp. have been recorded in the faeces of other captive mammals in the zoo (Lim et al., 2008), but not in tapir. Although there is less concern about heavy infection among the studied population, some of the parasites found in this preliminary study are of pathogenic importance to both animals and humans. Without proper care, animal handlers may be infected with these parasites either through contact with contaminated water and food, or when handling infected individuals. The problems caused by these parasites to humans are similar to those found in animals but in some cases it can be worse. Further studies should be conducted to determine the risk of contracting zoonotic diseases among workers and animals, given current conditions.

In general, there is a need to conduct regular monitoring on parasite load among animals at the zoo, particularly on the tapir population. Concurrently, the zoo management needs to maintain high husbandary standards from time to time to avoid higher degree infection as stressed by Lim et al. (2008). Considering the endangered status of the Malayan tapir, the pathogenic importance of intestinal parasites found and observations in the field, several suggestions are made: 1) install a proper septic system for waste water and solid matter disposal or treatment, 2) proper handling and safety training for handlers and keepers and, 3) encourage more researches to facilitate collection of scientific data to aid in future conservation of the Malayan tapir.

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