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A CASE OF HEMOGREGARINE AND *STRONGYLOIDES SP.* INFESTATION IN SNAKES

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SUMMARY

A local snake farm reporting high mortality and morbidity was investigated. Samples were collected for laboratory examination whereby six faecal and 10 blood samples were processed to isolate any parasites present. Simple floatation technique was done on fecal samples and thin smears for blood samples. Two out of 6 faecal samples were positive for *Strongyloides* eggs. As for blood samples, only one was positive for hemogregarine parasite, a banana-shaped, intra-erythrocyte protozoa. Lice eggs probably from a prey such as rat were found in the snake's faecal sample. Proper treatment and control measures were instituted as advised to prevent further mortality.

Keywords: Haemogregarine, *Strongyloides,* snake, floatation technique, thin blood smears

INTRODUCTION

Captive or free ranging snakes are commonly infested with various parasites, be it protozoans, ectoparasites or helminths. There are several common parasites in snakes such as *Amblyomma spp., Capillaria ovum* and *Cryptosporidia spp.* which cause various health problems leading to illness and death (Rose, 2005). A large number of protozoa can cause diseases in the digestive, respiratory, reproductive and vascular systems. Flukes can cause illnesses in the respiratory and urinary systems. Tapeworms and roundworms will infest the digestive tract. The juvenile stage of roundworms may damage the vital organs during larval migration. A large number of mites and ticks invade the skin and scales of snakes and cause infection (*www.animalhospitals-usa.com*).

Haemogregarine (*Haemogregarina* spp.) is a common intraerythrocyte parasite seen in captive snakes. Mosquitoes and mites are the arthropod vectors most likely to transmit haemogregarines (Viana *et al.*, 2005). Leeches, ticks and other haematophagous arthropods may act as intermediate hosts (Rose, 2005; Ball, 2007). Schizonts can be found in the liver, lungs, pancreas and spleen. The banana shaped organism (merozoites and gametocytes) can be seen within a single red blood cell causing distortion of size and shape (Mohiuddin, *et. al.*, 2007). In severe cases, the snake may show clinical signs such as anemia and dehaemoglobinisation; however, in some cases, no clinical signs are observed. Treatment using anti malarial or anticoccidial drug may be effective against hemogregarine.

Strongyloides may exist as free living or in the parasitic phase. Transmission is direct where the infective larval stage is ingested from contaminated food and water. Strongyloides will pass through the oral cavity and develop into adult worms in the intestines (Fowler, 1986). Clinical signs are anorexia, weight loss and lethargy. The infected snake may develop diarrhea. Loss of fluid and electrolytes from diarrhea may contribute to the death of the snake (Holt *et al.*, 1978). Thiabendazole is effective against strongyloides (Fowler, 1986). Moderate parasitic infestation may not cause obvious clinical signs to the snakes due to the nature of the animals that can cope with disease in the wild. The stress level of the animals may increase due to the parasitic burden causing fluctuation of immunity making it more vulnerable to other pathogens such as bacteria and viruses resulting in secondary disease infections.

MATERIALS AND METHODS

In November 2008, 6 faecal and 10 blood samples from snakes were obtained from a recreational snake park with a history of high mortality. Some of the snakes had inappetance, mouth ulcers and skin problems. The personnel involved in collecting samples were officers from the Department of Veterinary Services and the local snake park staff.

All the samples collected were kept chilled (4-8°C) during transportation to Veterinary Research Institute, Ipoh. All the samples were processed for isolation and identification of parasites. Simple floatation method was done on faecal samples and due to the small amount of

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samples collected, the method chosen was qualitative. The blood samples were subjected to thin blood smear method to isolate and identify blood parasites.

For the floatation method, a small amount of each faecal sample (non specific weight) was placed into individual plastic tubes. Saturated salt water was then added into the plastic tube containing the faecal sample until a meniscus appeared on top of the tube. A cover slip was then gently placed on top of the tube and allowed to set for 10 minutes, allowing any floating worm eggs to stick on to the cover slip. After 10 minutes, the cover slip was lifted horizontally without tilting and placed on to a clean glass slide. Observation using a compound microscope under 100X magnification to detect presence of any worm eggs or protozoa.

For thin blood smear method, a drop of blood sample was placed on a clean glass slide and then spread thinly across the slide. When dried, the thin smear was fixed and stained with Giemsa stain. The stained smear was observed under a light microscope at 1000X magnification for any blood parasite. All results and data were recorded for further evaluation.

RESULTS

Two of the 6 faecal samples received were heavily infested (4+) with *Strongyloides sp.* (Figure 1). In this case, more than 10 strongyloides eggs could be observed in each field of microscope observation under 10x magnification. Strongyloides can be identified by the presence of larvae inside the thin egg sac with the size being 60 x 35μm (Fowler, 1986). The snakes infested by Strongyloides sp. were Green Burmese Python (*Python molurus bivittatus)* and the Blood Python (*Python curtus brongersmai*).

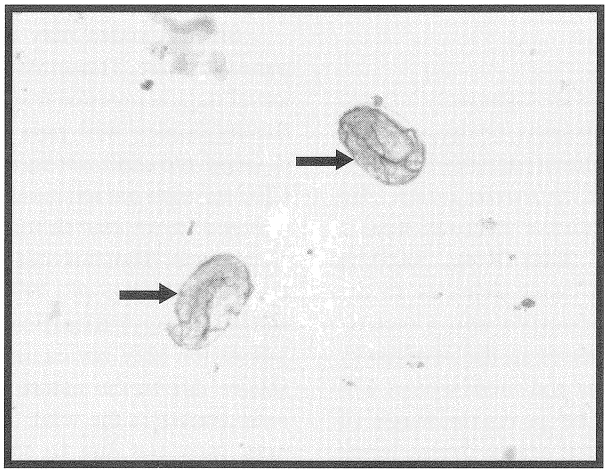

Figure 1: Arrows show strongyloides eggs in wet faecal smear

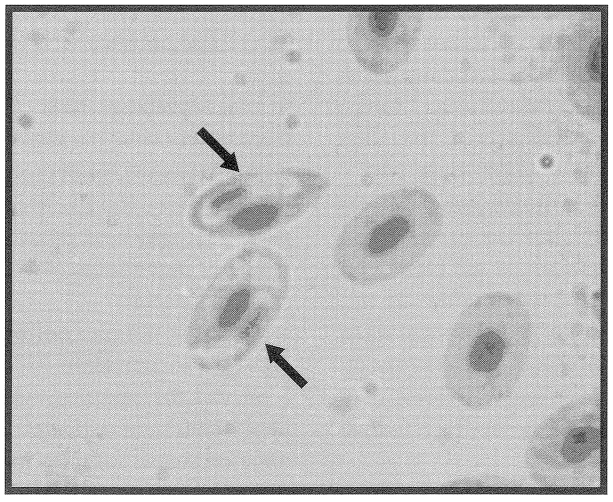

Figure 2: Arrows show banana-shaped haemogregarine parasite inside the red blood cells (1000X magnification, Giemsa stain)

From blood samples, thin blood smear observation revealed intra-erythrocyte protozoa called haemogregarine parasite (*Haemogregarina* spp.) (Figure 2) which is common in snakes (Fowler, 1986). Only 1 out of 10 blood samples was infected with this protozoan parasite. The infected blood was from the Brazilian Rainbow Boa *(Epicrates cenchria chenchria).*

DISCUSSION

The parasitic infections may significantly reduce the immunity of the snakes, thereby precipitating other infections (Brown, *et., al* 2006) As such, management of the snakes should be improved to prevent further parasitic infections by inculcating good husbandry measures. The standard procedures in handling snakes and management of an optimum environment should be practised. There is a need to know the behaviour of snakes, so that early detection of clinical signs such as inappetance, diarrhea and lethargy can be detected treated quickly (Caudell, *et. al.*, 2002). The confinement area should always be clean and adequate feed and water must be provided. It is also important to screen new animals for diseases to make sure they are free from transmissible diseases. Sick animals should be isolated and treated with suitable drugs to ensure safe recovery of the sick animal and to avoid further outbreak.

For carnivorous animals such as snakes, an accurate assessment of the presence of parasite eggs in a faecal sample depends on an overall understanding of parasites in the infected reptile or in the prey. In this case, there was an incidental finding of lice eggs in the faeces of the snake (Figure 3). Lice egg is recognised by its elongated shape with thick wall and a morulla. These eggs were probably from a prey such as a rat or a mouse which was fed to the snake. Furthermore, to obtain precise results on gastrointestinal parasites in a captive carnivorous animal, parasites from the prey or feed should also be examined (Fowler 1986). This paper reports the parasitological findings only. However, laboratory investigations indicate that the cause of mortality in snakes was due to retrovirus and appropriate treatment was instituted immediately.

CONCLUSION

Parasitic diseases are common in captive snakes; and may lead to an elevation of stress level of the animals which in turn can precipitate the occurrence of other infections such as viral or bacterial, thereby causing morbidity and mortality.

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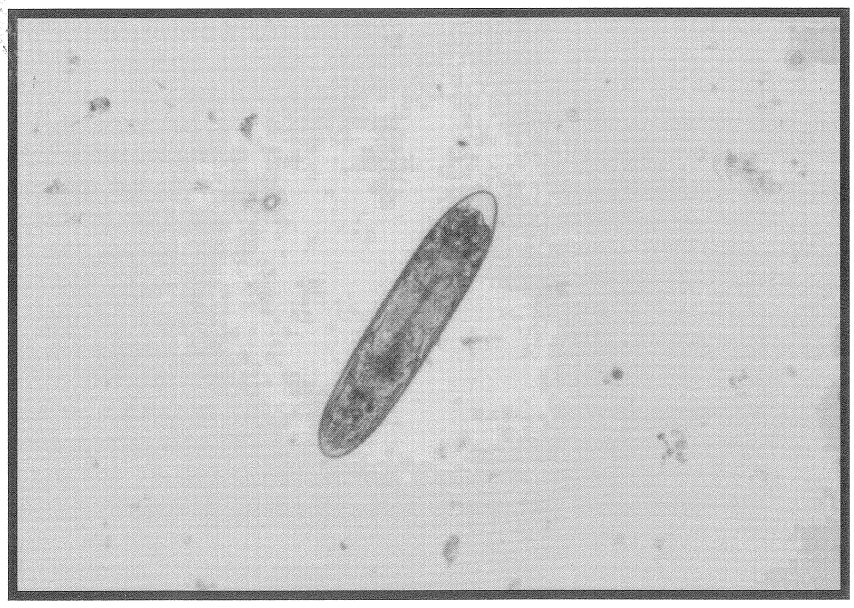

Figure 3: Lice egg in wet faecal smear

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