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Mortality of domesticated java deer attributed to Surra

Nurulaini, R., Jamnah, O., Adnan, M., Zaini, C.M., Khadijah, S., Rafiah, A.[1] and Chandrawathani, P.
Veterinary Research Institute, 59, Jalan Sultan Azlan Shah, 3400, Ipoh, Perak
[1] Pusat Ternakan Haiwan Lenggong, 33400, Perak
Email: nur1709yahoo.com
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Abstract. This paper reports an outbreak of trypanosomiasis due to *Trypanosoma evansi* in Java deer (*Cervus timorensis*) on a government deer farm in Lenggong, Perak. Seventeen adult female Java deer were found dead within a week. Symptoms of dullness, inappetence, anaemia, anorexia, respiratory distress and recumbency were seen prior to death in the infected Java deer. Beside trypanosomiasis, other parasitic infections such as theileriosis, helminthiasis and ectoparasite infestation were also recorded. Post mortem results showed generalized anaemia in most animals with isolated cases of jaundice. There was no significant finding with respect to bacteriological and viral investigations.

INTRODUCTION

Statistics from The Department of Veterinary Services in Peninsular Malaysia showed that the population of deer for 2004 was 8, 402 heads while in 2003 the population was 8, 077 heads, an increment of 3.8%. Although the total population is stable, it is nevertheless important to breed domesticated deer for future large scale projects to increase the breeding population. This is in view of increasing the number of species of animals for human consumption as in the national agriculture policy (NAP3).As a result, investigations into the health and management of domesticated deer is critical to support the new industry. Parasite infections, such as *Trypanosoma evansi*, are one of the causes of mortality and morbidity in domesticated deer.

Trypanosoma evansi is a widely distributed pathogenic species of protozoa transmitted mechanically by tabanid flies. Trypanosomes live in the blood plasma and tissue fluids of vertebrate hosts such as cattle, horse, dog and camel. It infects domestic animals and has a very wide distribution through the East, through Asia, some parts of Africa and South America (Richardson & Kendall, 1963). In Malaysia, *T. evansi* infection in horses was reported in 1978 (Ng & Vanselow, 1978), in cattle and buffaloes in 1989, 1999 and 2002, (Sani *et al.*, 1989; Zary Shariman, 1999; Ahmad Hafiz *et al.*, 2002).

The diagnosis of disease is usually based on the demonstration of the parasite in the blood, supplemented by haematological, biochemical and serological tests. The disease in susceptible animals is manifested by pyrexia, directly associated with parasitaemia, together with a progressive anaemia, loss of condition and lassitude. Recurrent episodes of fever and parasitaemia occur during the course of the disease. Oedema, particularly of the lower parts of the body, urticarial plaques and petechial haemorrhages of the serous membranes are often observed (OIE, 2004). In farmed deer, parasites such as gastrointestinal nematodes, *Dictyocaulus viviparous* and *Elaphostrongylus cervi* are common (Fletcher, 1982; Mason & Gladen, 1983; Mason, 1994) and often cause mortality and morbidity in deer (Fletcher, 1982).

MATERIALS AND METHODS

An investigation of the parasitic infections of deer was conducted on samples submitted to the Veterinary Research Institute, Ipoh, Perak from a government deer farm located in Lenggong, Perak. This farm has a total population of 1300 deer of various species, such as *Cervus timorensis* (Java deer), *Cervus unicolor equinus* (Sambar deer), *Axis axis* (Axis deer) and *Taurofragus oryx* (Eland). The animals grazed in groups of 80-100 on individual paddocks averaging 3-4 acres per paddock. Supplement pellet feed was provided in feed troughs. They were dewormed 6 times per year and deticked 12 times per year with ivermectin/biomectin drug. In March 2006, 17 adult female Java deer (12-13 years old) were found dead within a week. The deer exhibited dullness, inappetence, anaemia, anorexia, respiratory distress and recumbency before death. A *C. timorensis* (Java deer) carcass was sent for post mortem to VRI on 29th March 2006. The animal was very thin and the carcass had ticks. Post mortem results showed a wound with pus was found at the dorsal backbone. The mucosal membrane of the eye was pale. The lungs were pale and filled with fluid. The pleural layer was also pale and heart was congested. There were haemorrhagic spots on the liver. The epidermal layer of the skin was jaundiced. The differential diagnosis were babesiosis, tetanus, viral infection and bacterial infection before laboratory investigations were conducted.

Blood samples were collected from live animals in EDTA (ethylenediaminetetraacetic acid) and heparinised tubes. Simultaneously, faecal samples were also collected for faecal examination. Organ samples and tick specimens were collected from dead animals and sent for disease investigation and parasite identification. Faecal samples were subjected to McMaster and floatation method for identification of helminth eggs. Blood smears and impression smears were made, fixed with methanol and then stained with freshly filtered Giemsa stain at pH 7.2. All the stained smears were then examined under microscope for the presence of blood protozoa. A total of 24 blood samples from animals showing clinical symptoms were also subjected to buffy coat examination for trypanosomiasis.

RESULTS

Based on Table 1, it was found that 8 blood samples out of 24 were positive for *T. evansi* and 21 samples were positive for *Theileria orientalis.* No bacteria and viruses were isolated from organ samples.

One of the blood samples was sent for Complete Blood Count (CBC) and showed a low Packed Cell Volume (15%). From a total of 54 faecal samples, 3 samples were found positive for strongyle eggs. Impression smears of the lungs, heart, liver, spleen and kidney were positive for *T. evansi* and *T. orientalis.* Examination of the smears

Table 1. Positive results from samples received

No.	Samples received	Results
1	24 blood (EDTA and Heparin)	8 positive for *Trypanosoma evansi*, 20 positive for *Theileria orientalis*
2	54 faecal samples	3 positive for strongyle egg
3	Tick samples	Identified as *Rhipicephalus sanguineus* and *Boophilus microplus*
4	Organ samples from carcass	Positive for *Trypanosoma evansi* and *Theileria orientalis*

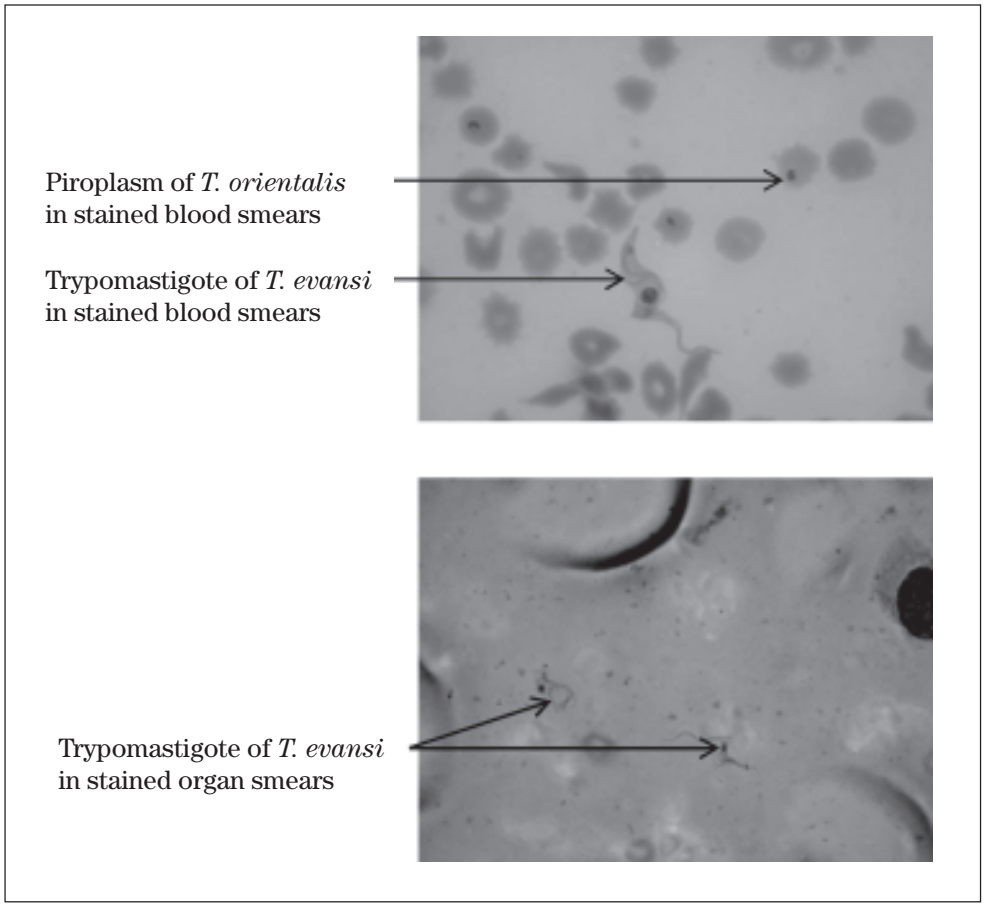
showed presence of trypomastigote for *T. evansi* and piroplasm for *T. orientalis*.

DISCUSSION

All the surviving animals were treated intramuscular with diminazene aceturate for trypanosomiasis and theileriosis, while biomectin/ivermectin was administered subcutaneous for worm and tick control. There was no mortality reported after treatment. This is the first case of trypanosomiasis in the farm affecting only the *C. timorensis* adult female deer**.**

Generally, trypanosomes has few developmental stages which are trypomastigote, epimastigote and amastigote. Trypomastigote is the stage that can be found in vertebrate hosts. During diagnostic investigation, it is the trypomastigote stage which is detected in the blood. Disease transmission is by biting-flies such as *Tabanus* sp, *Stomoxys* sp and *Lyperosia* sp. However, vampire bat may also act as one of the vectors as in Central and South America (Soulsby, 1982). In this farm the tick samples collected were not the vector for *T. evansi*. The ticks were identified as *Boophilus microplus* and *Rhipicephalus sanguineus*. *Boophilus microplus* and *R. sanguineus* are blood sucking ticks which may be able to transmit *Theileria*.

The disease transmission begins when blood from trypanosome infected animal is ingested by the fly and then is inoculated into other animals. Then, it will grow; enter the lymph nodes and to the bloodstream, where they rapidly divide by binary fission. The disease severity varies within species and age of the animals. Incubation period is usually 1-4 week (The Merck Veterinary Manual, 2005).



Bacterial infection suggestive of botulism, heavy metal or plant poisoning is not a possible cause of mortality of deer in this case, as clinical symptoms, history and post mortem results as well as lab investigations did not show any indication of this condition.

In 1983, Habsah Muda reported the negative findings for parasite worms from faecal samples of *C. timorensis* and *C. unicolor* deer of Kurau and Sungkai, Perak. The examination of the lungs and liver for parasites were also negative. It was also reported that ectoparasite from the family Ixodidae was present.

Epidemiological study of gastrointestinal nematode of Sambar deer (*C. unicolor*) in captivity in semi-wild condition by Nik Ahmad Irwan Izzaudin (2005) reported on the findings of *Trichostongylus* sp., *Cooperia* sp. and *Oesophagostomum* sp. in the deer. Management plays an important role for deer in captivity. Deer farms need to have good management in order to succeed (Habsah Muda, 1983). Poor management such as lack of staff to manage the animals may affect its health where it may cause inadequate feeding and therefore may cause stress and infection.

Since trypanosomiasis in animals causes mortality and morbidity, new improved diagnostic techniques for fast detection of the organism are needed. The control of trypanosome infection in government farms can be done through frequent screening and monitoring of the animals. This is a more cost-effective method of controlling the disease rather than waiting for emergency interventions during outbreaks.

REFERENCES

Ahmad Hafiz, B., Wahab, A.R., Zaini, C.M. & Chandrawathani, P. (2002). The incidence of *Trypanosoma evansi* in cattle and buffaloes around Ipoh. In: Proceedings of the 12th Federation of Asian Veterinary Association Congress, Kuala Lumpur. P 181.

Department of Veterinary Services Malaysia. (http://agrolink.moa.my/jph/).

Fletcher, T.J. (1982). Management problems and disease in farmed deer. *The Veterinary Record* **111:** 219-223.

Habsah Muda. (1983). Some notes on deer in captivity in semi-wild condition. *The Journal of Wildlife Parks* **2:** 70-92

Mason, P.C.(1994). Parasites of deer in New Zealand. *New Zealand Journal of Zoology* **21:** 39-47.

Mason, P.C. and Gladden, N.R. (1983). Survey of internal parasitism and anthelmintic use in farmed deer. *New Zealand Veterinary Journal* **31:** 217-220.

Nik Ahmad. (2005). Worm egg counts and species of nematode in farmed sambar deer from Malaysian Wildlife Conservation Centre, Sungkai, Perak. MSc Thesis.

Ng, B.K.Y. & Vanselow, B. (1978). Outbreak of surra in horses and the pathogenesis of the anaemia. *Kajian Veterinar* **10** (2): 88-98.

OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (2004). 5th edition. France. 759-763 pp.

Richardson, U.F. & Kendall, S.B. (1963). *Veterinary Protozoology*. Oliver & Boyd Ltd. P 55.

Sani, R.A., Chandrawathani, P. & Rosli, M. (1989). Gastrointestinal parasites and *Trypanosoma evansi* in buffaloes. In: Proceedings of the final research coordination meeting on the use of nuclear techniques to improve domestic buffalo production, Australia. pp. 201-212.

Soulsby, E.J.L. (1982). *Helminths, Arthropods and Protozoa of Domesticated Animals*, 7th edition. Baillière Tindall. London. 514 - 534 pp.

The Merck Veterinary Manual (online version). (2005). 9th edition. Merck & Co., Inc, USA.

Zary Shariman, Y. (1999). Kadar prevalens *Trypanosoma evansi* di ladang ternakan lembu di sekitar kawasan Ipoh. BSc thesis, Universiti Sains Malaysia.