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The effects of *Theileria orientalis* Ikeda on bull fertility and  
libido

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## Abstract

*Theileria orientalis* is a blood-borne parasite that is prevalent in New Zealand and other countries. The recent emergence (2012) of Ikeda-type *orientalis* has resulted in an epidemic of bovine anaemia in both dairy and beef cattle herds. The disease is spread by *Haemaphysalis longicornis* which is prevalent in the majority of the North Island.

The Ikeda type has been found to be more pathogenic than previously discovered types such as Chitose and Buffeli. Little is known about how Ikeda-type affects the reproductive performance of bulls. The aim of this experiment was to examine the effects of *Theileria* Ikeda on the fertility and libido of bulls. A group of 17 bulls were used in the experiment with 10 being infused with *Theileria* Ikeda-infected blood from two donor cows and the remaining 7 bulls used as controls. All 10 of the treatment bulls were successfully infected with *Theileria* and became clinically anaemic (Haematocrit below 24) between days 47 and 84 post transfusion. Semen and libido was tested every 2 weeks throughout the experiment. There was no observed change in wave motion score of semen between infected ( $7.51 \pm 0.18$ ) and control ( $7.08 \pm 0.35$ ) treatment groups ( $P=0.2935$ ) along with no change in forward motion between infected ( $7.82 \pm 0.16$ ) and control ( $7.64 \pm 0.2610$ ) treatment groups ( $P=0.5579$ ). The percentage of normal sperm ( $P=0.0032$ ) was lower in the infected bulls ( $91.9 \pm 0.05$ ) compared to the control group ( $94.25 \pm 0.06$ ) although the density of sperm in an ejaculate ( $P=0.0044$ ) was higher in infected bulls ( $1.45 \times 10^{10} \pm 6.88 \times 10^6$  sperm per mL) compared to control bulls ( $1.14 \times 10^{10} \pm 9.82 \times 10^6$  sperm per ml). Time to first mount ( $P=0.7374$ ) and gap between first and second mount ( $P=0.2204$ ) was not significantly different between infected and control groups. The number of mounts was similar between infected ( $2.33 \pm 0.28$ ) and control ( $2.36 \pm 0.17$ ) treatment groups ( $P=0.9269$ ) and there was no interaction with time ( $P=0.2221$ ). However, there was a significant effect of treatment on order of service with infected bulls coming in to the yard later in the herd on day 55 and was statistically significant ( $P=0.02$ ). In conclusion, changes in fertility occurred in infected bulls but were not drastic enough to indicate a decrease in overall fertility. The only measure of libido affected was order and it is unknown how this would affect pregnancy rates in a herd situation.

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## List of abbreviations

TABA- Theileria associated bovine anaemia

MPSP- Major piroplasm surface protein

qPCR- Quantitative polymerase chain reaction

FANI card- Field anaemia nearest indicator card

HCT- Haematocrit

LH- Luteinizing hormone

GnRH- Gonadotrophin releasing hormone

FSH- Follicle stimulating hormone

ABP- Androgen binding hormone

HPT- Hypothalamo-pituitary- testicular axis

ASA- Antisperm antibodies

DNA- Deoxyribonucleic acid