

Case Submission (with diagnosis)

Submitter Laura Brandt and Harold Tvedten
Employer Gribbles Veterinary
 35 O'Rorke Road
 PO Box 12049
 Penrose, Auckland New Zealand 1642
Phone 64 9 5744709
Fax 64 7 8500770
E-mail laura.brant@gribbles.co.nz

Specimen: History, laboratory data, blood smear, photo of blood.

Signalment:

The Gribbles Veterinary laboratory received an EDTA blood sample from a cow with a specific request to look for this disease.

Table

Test (March 21, 2014)	Patient	Reference Values
Hematocrit	12 %	24-36
Hemoglobin	40 g/L	85-130

Figure 1

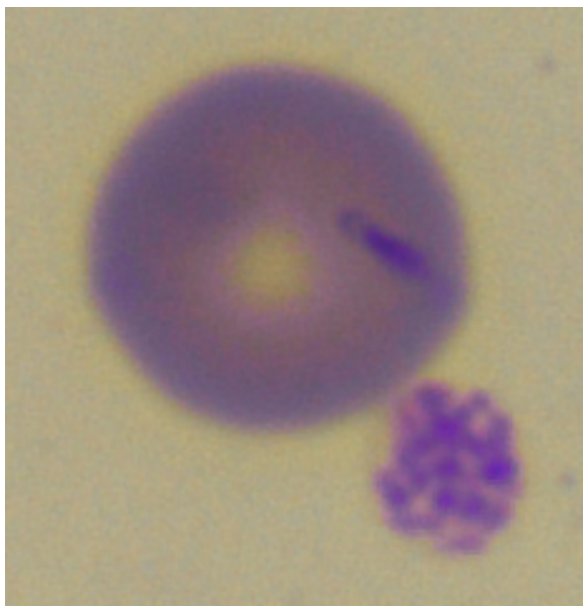


Figure 2

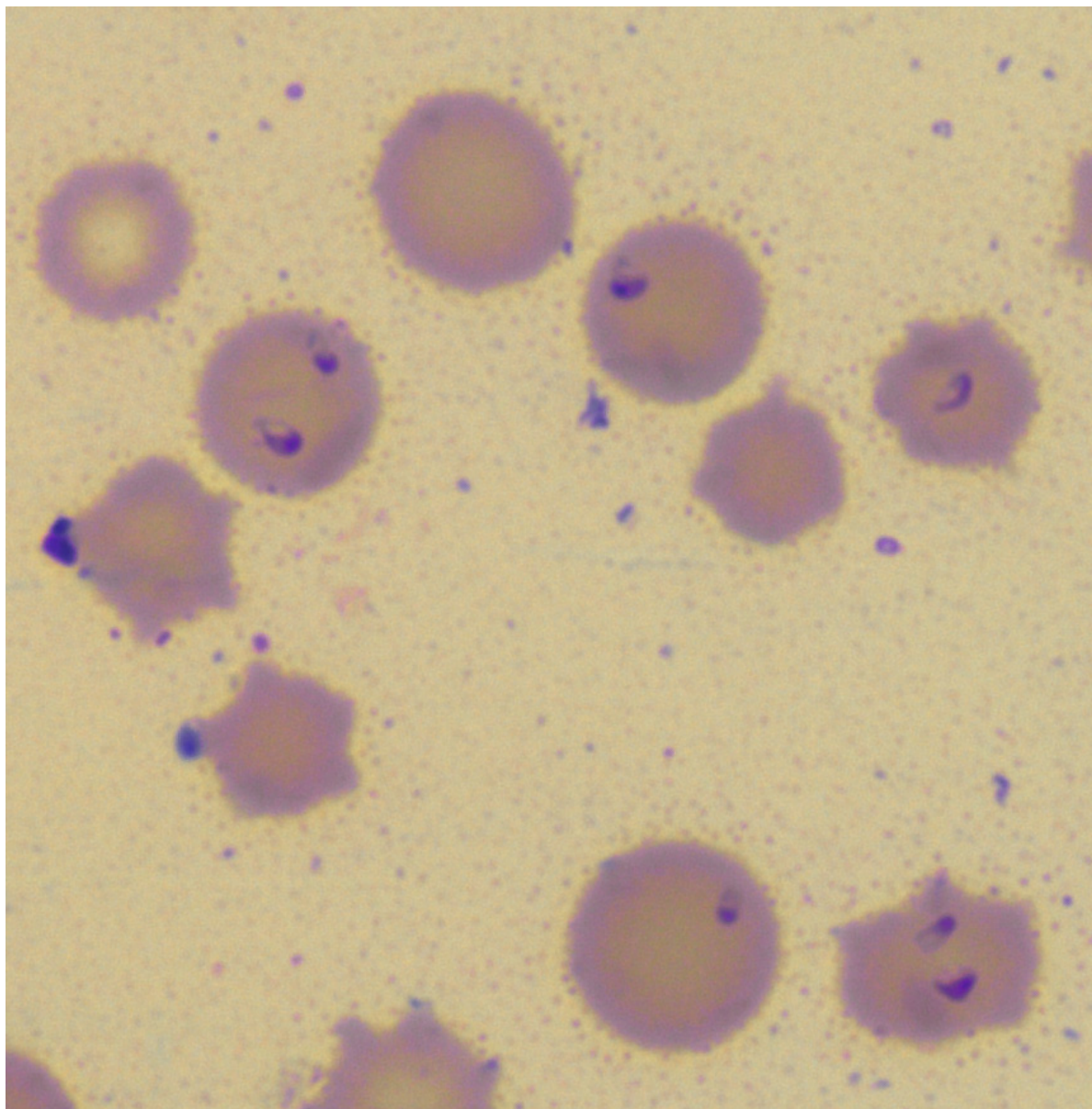
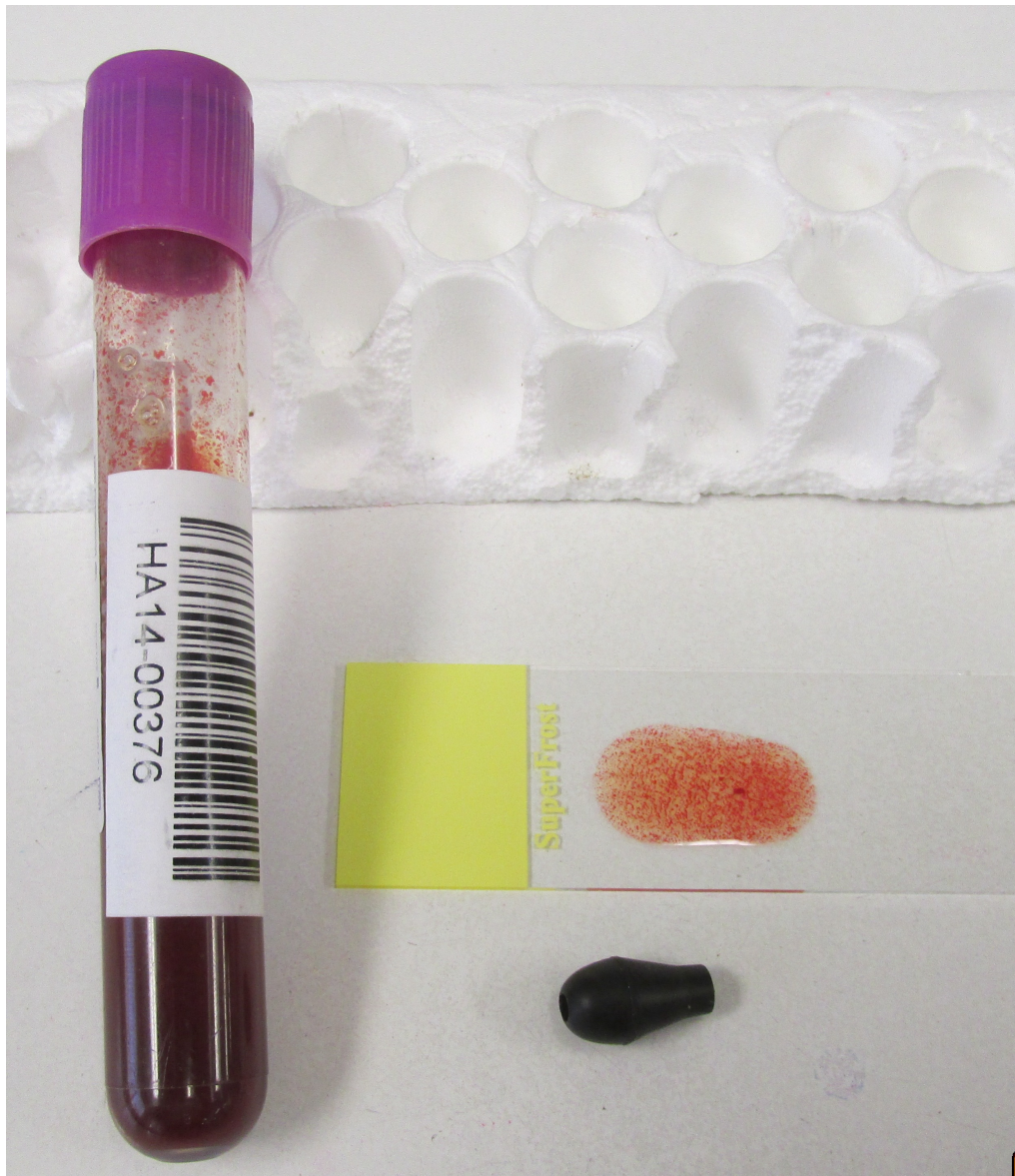


Figure 3



Questions

1. What caused the anemia?
2. Was the anemia regenerative or non-regenerative?
3. How common is this disease?
4. What is the most diagnostic test?

Diagnosis *Theileria orientalis* Ikeda variant

A new strain of *Theileria orientalis* was identified in New Zealand in 2012-2013. A less virulent strain had been present for many years earlier. Cases of *Theileria orientalis* Ikeda variant -associated anaemia were noted in beef calves born on farms in the north side of the north island in the spring of 2012. These were the first cases of anaemia associated with *Theileria* reported in calves in New Zealand. The new variant Ikeda is much more virulent and more consistently causes severe disease than the endemic strain previously in New Zealand. The Ikeda strain causes serious disease in Australia and Asia. *T. orientalis* (ikeda) associated bovine anaemia was first reported in New South Wales, Australia, in November 2006 (Izzo et al, 2010) and has since spread by cattle movements down the coast to southeast Victoria and overland into Western Australia. This is the same strain of *T. orientalis* (Kamau et al, 2011; Eamens et al, 2013) as associated with the New Zealand disease outbreak.

Theileria appeared to enter beef herds in the north end of the North Island but spread to dairy herds in the upper middle part of the North Island (Figures 3 + 4). This matched the distribution of ticks on the island (Figure 5). Spatial temporal modelling has shown that there is significant local spread of infection for up to 5km and within 30 days of a farm being infected. Methods of local spread are currently being investigated but could possibly involve stable flies, *Stomoxys calcitrans*, mechanical transference of infection or rabbits and hares physically transporting infected ticks. Local spread is suggested as the cause of outbreaks on farms where there has been no recorded cattle movement onto the affected properties.

Figure 3

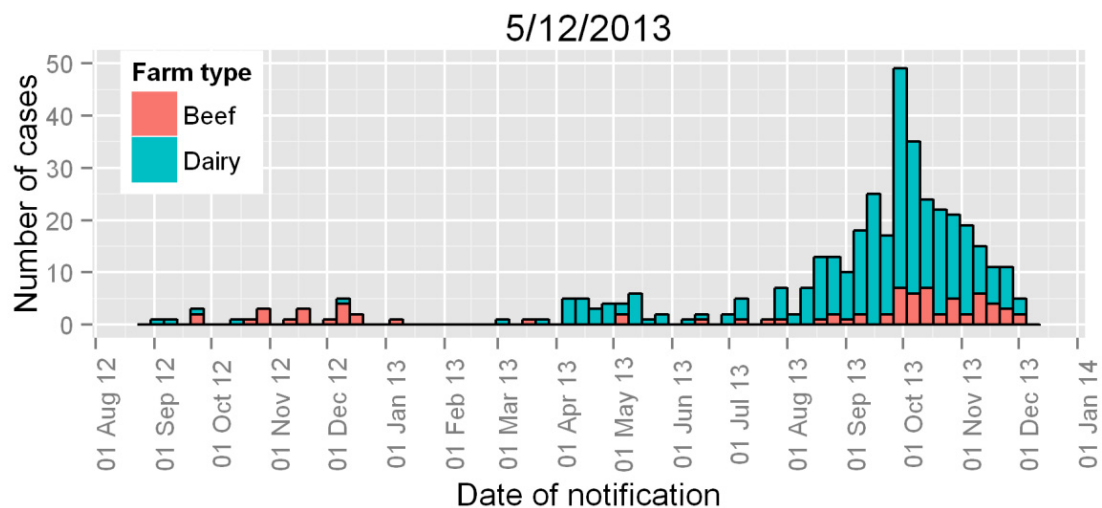


Figure 4 Location of Theileria infected cattle.

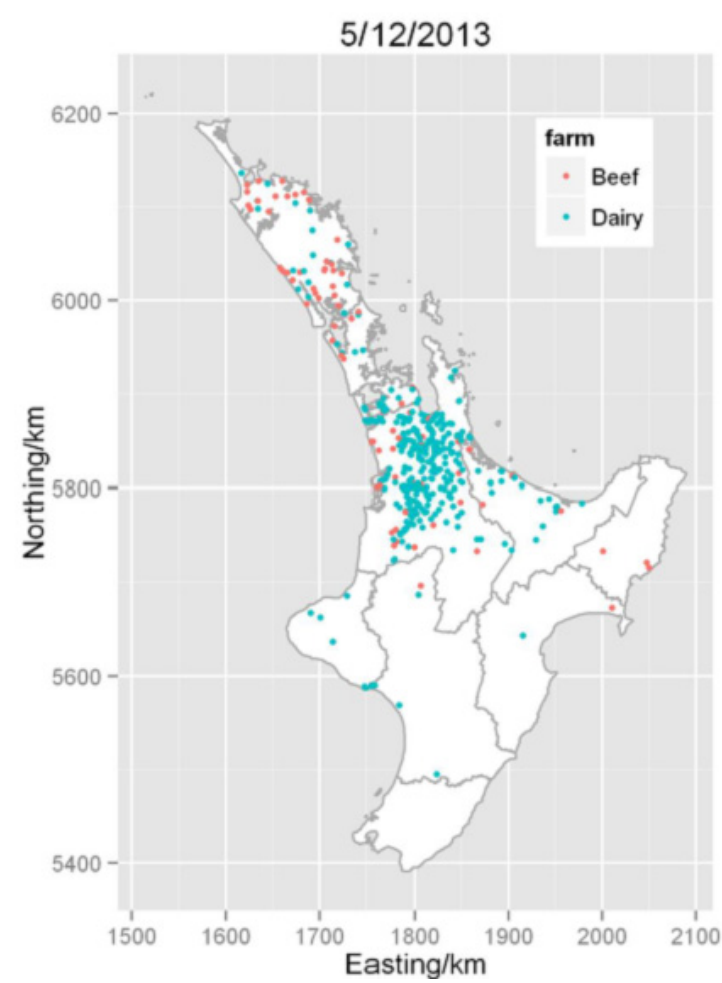
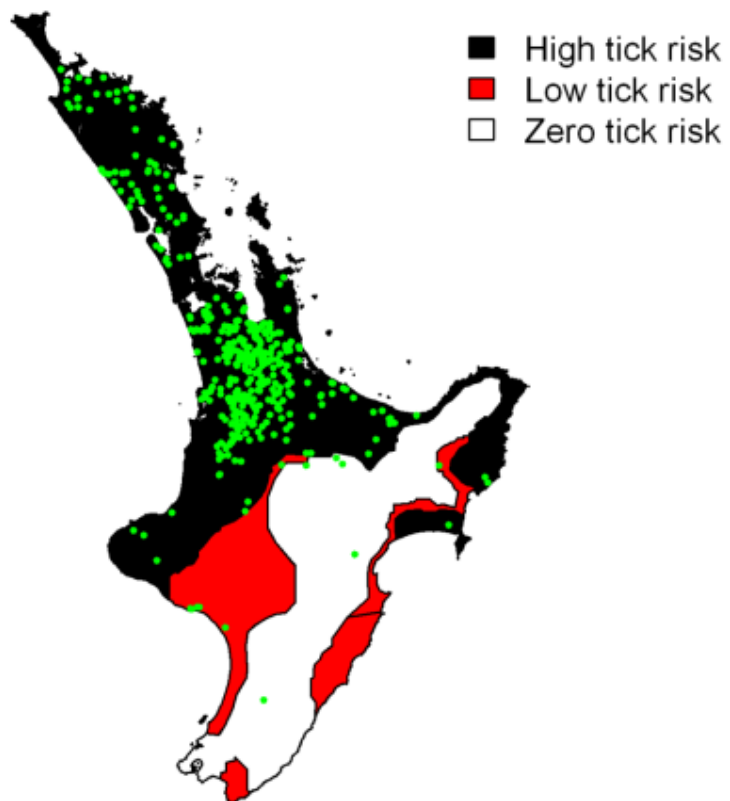


Figure 5 Location of Theileria infected cattle superimposed on map of tick incidence.



Diagnosis is commonly by observation of the organism in blood smears (Figures 6, 7 + 8). Theileria is quite variable in shape and often thin and linear (Figures 1 + 6). An erythrocyte is about 6 μm in diameter so the protozoa is about 2 μm long and often 1 μm wide. The more sensitive and definitive is real time PCR which can also identify which strain is involved. It is diagnosed weekly to even daily at the Hamilton New Zealand laboratory. Autoagglutination occurs but is uncommonly reported. Autoagglutination after saline dilution was in a different cow with Theileria. Blood parasites commonly cause anemia by immune mediated hemolysis. Transfusions are used if the Hct drops below 12 %

Figure 6

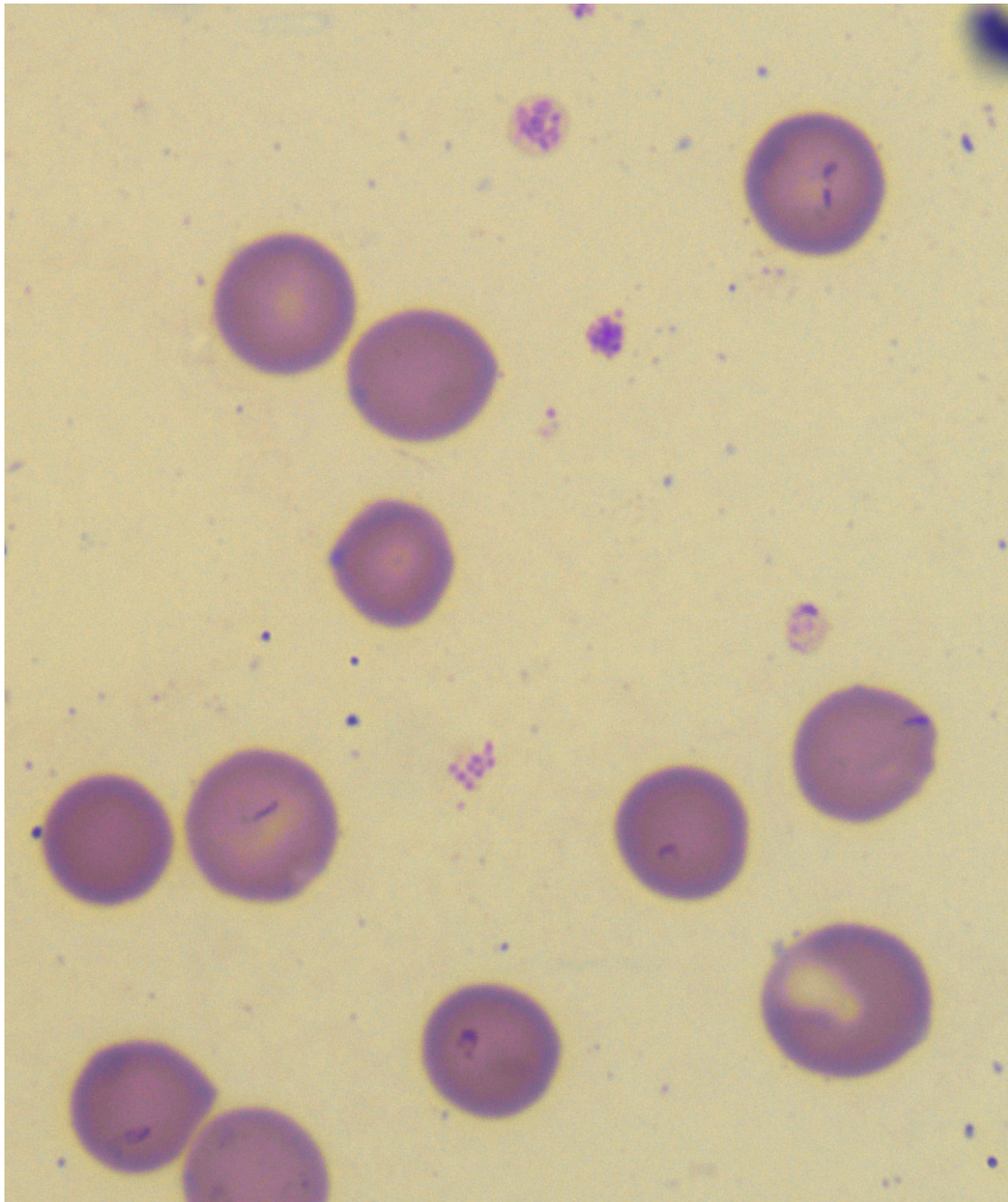
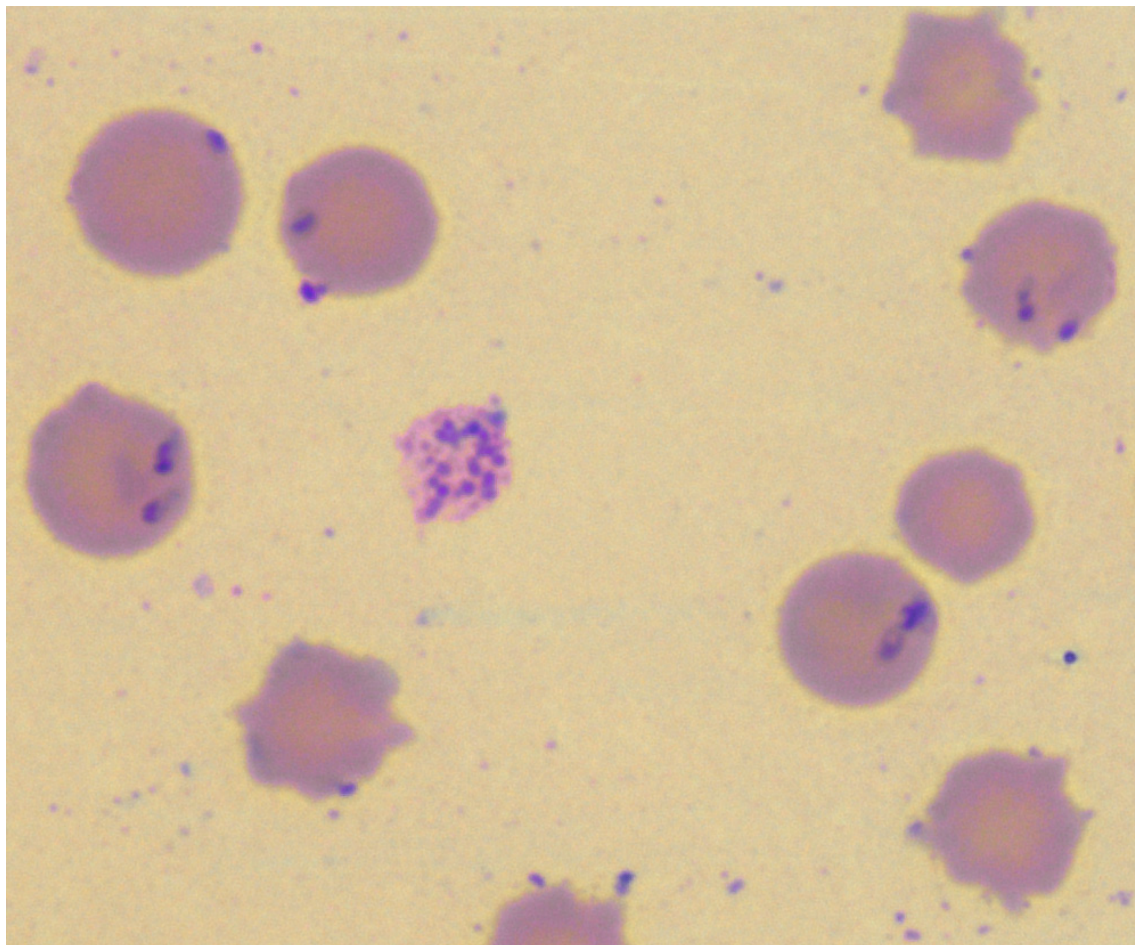


Figure 7



References

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- NZVA: <http://www.nzva.org.nz/theileria-orientalis?destination=node%2F3164>