

## Bovine Tick-borne Protozoan Diseases: Emerging Threats

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Editorial

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**Received:** July 18, 2013

**Published:** August 09, 2013

**Citation:** El-Ashker MR. (2013). Bovine Tick-borne Protozoan Diseases: Emerging Threats, Int J Vet Health Sci Res, 01(e1), 01. doi: <http://dx.doi.org/10.19070/2332-2748-130001e>

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Tick-borne protozoan diseases, *Theileriosis* and *Babesiosis*, are major health and management problems of cattle, small ruminants and buffaloes in Africa, Asia and Latin America. Recently, tick-borne diseases were ranked high in terms of their impact on poor farming communities in developing countries. Whereas the global economic importance of ticks is particularly high for livestock, there is also a relevant impact on public health in the northern hemisphere. Laboratory diagnosis of infection with piroplasm was traditionally based on microscopy of peripheral blood smears to find the parasites within erythrocytes as well as serological tests. Nevertheless, both methods have limitations in detecting carrier animals with low numbers of infected erythrocytes and

discriminating pathogenic from non-pathogenic species, particularly in mixed infections, and cross-reactivity problems have been described for serology. To overcome these drawbacks, molecular tests based on PCR assays have been used for the sensitive and specific detection of several piroplasms. More recently, real-time PCR procedures have been developed for a more rapid detection of the infection with reduced contamination risk and generally with higher sensitivity. However, the multiplexing capacity of PCR assays is limited and does not allow for the simultaneous detection of the various *Babesia* and *Theileria* spp. that can infect a single host. Interestingly, the DNA microarray assays have proven to be useful for monitoring waterborne protozoan pathogens; however to date, it is not implicated in diagnosis of bovine tick-borne protozoan diseases. The DNA microarray format may have the potential to differentiate among several clinically important tick-borne piroplasms within a few hours. The uniquely designed DNA microarray may eventually allow rapid differentiation of specific parasite genotypes and assist in diagnostic and epidemiological studies of veterinary parasites.

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