THEILERIOSIS A TICK-BORNE DISEASES IN LIVESTOCK: THE BASIC UNDERSTANDING

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ABSTRACT

Vector-borne parasites are the predominant reason for mortality and morbidity in livestock globally. The major tickborne diseases in livestock include Theileriosis, bebesiosis, and anaplasmosis. These diseases are a major threat to dairy animals and are responsible for significant economic loss to the dairy industry. In ruminants, theileriosis is more prevalent. It is caused by two organisms, T. annulate and T. parva but in India, T. annulate is more common.

INTRODUCTION

Theileria is a unicellular and eukaryotic protozoan parasite. It comes under the phylum Apicomplexa similar to Plasmodium. Apicomplexa phylum have some unique features such as apical organs for the entry of parasite into host cells. It is caused by two organisms, *T. annulate* and *T. parva* but in India, *T. annulate* is more common. *T. annulata* is transmitted by different species of hyalomma (tick). The complex life cycle of *Theileria* starts at high temperature in summer, tick feeds on animal blood. Theileriosis is also called a lymphoproliferative disease because *Theileria* converts WBCs into cancer-like cells by transforming them. Transformation of the WBCs is a unique characteristic of *T.annulata.* These infected cells produce several cytokines such as TNF-alpha, responsible for inducing various symptoms of theileriosis. In comparison to indigenous, the cross bred animals are more susceptible to theileriosis. There are various acute and chronic cases of theileriosis in dairy animals. Common clinical symptoms are fever, conjunctivitis, lymph node enlargement, anemia, respiratory abnormalities, weight loss, decreased milk production, abortion, diarrhea, weakness, nasal discharge, anorexia and sudden death of animals etc. Carrier animals are major reason behind prevalence of this disease because even after recovery from acute infection, animal become carrier for the disease. This article gives us a basic idea about prevention, treatment, diagnosis and life cycle of *Theileria* parasite.
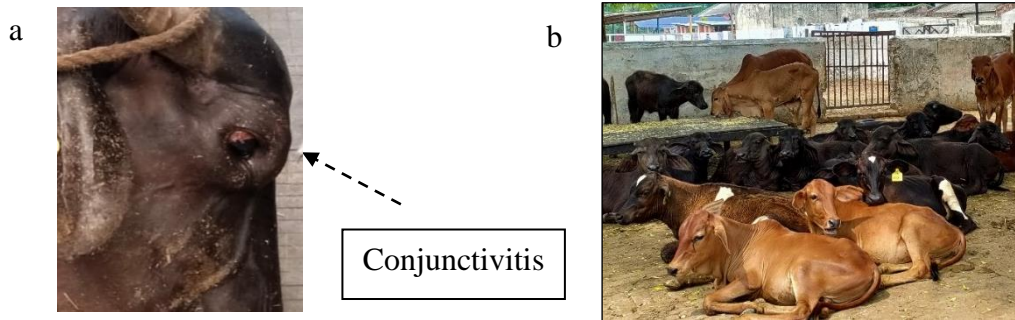
a

b

Conjunctivitis

_Fig_ure: a) Conjunctivitis, the symptom of theileriosis and b) Group of animals in herd

LIFE CYCLE

- The Life cycle of _Theileria_ parasite complete in carrier/vector and host.

- There are two phases, sexual and asexual. Sexual phase takes place in tick and asexual phase in host cell.

- In host cell, _Theileria_ parasite infect two type of cells, WBCs and RBCs.

- In WBCs, there are development of two stages of parasite, schizoints and merozoites but in RBCs there is development of Piroplasm stage.

- Sporozoite stage from tick saliva is infectious for host and piroplasm stage in host RBCs is infectious for tick.
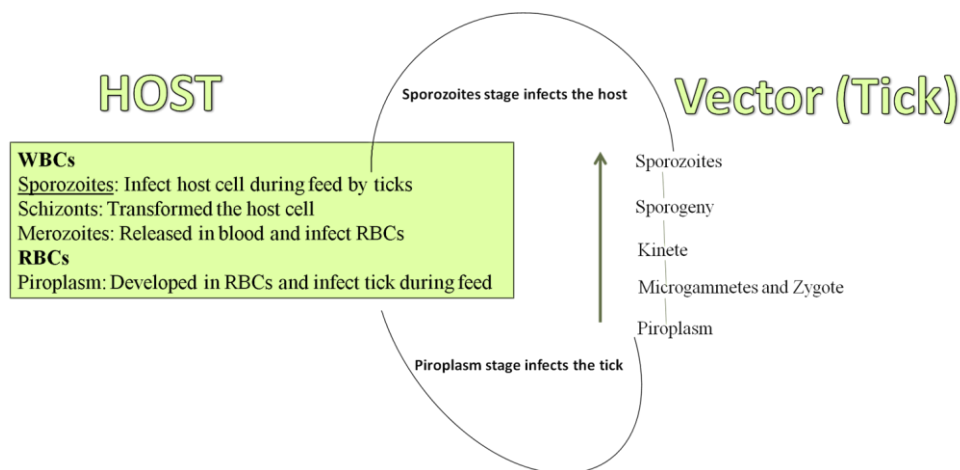

Figure: Outline for life cycle of T. annulata

PREVENTION OF TICK-BORNE DISEASE

Some points to control the tick-borne disease given as:

- Cleanliness of animals as well as animal's herds.

- Vaccination strategy is also important to prevent tick borne diseases. Live Attenuated vaccines are available for tick borne diseases.

- It is challenging to control tick born disease because of carrier animals. Carrier animals play important role to complete the cycle of parasite in host and tick body. So, isolation of carrier animals can control the disease.

- It is important to get the farmers aware about clinical symptoms, prevention and treatment of tick-borne diseases. Because experience person can diagnose disease even from clinical symptoms. So, awareness is essential for further confirmation steps.
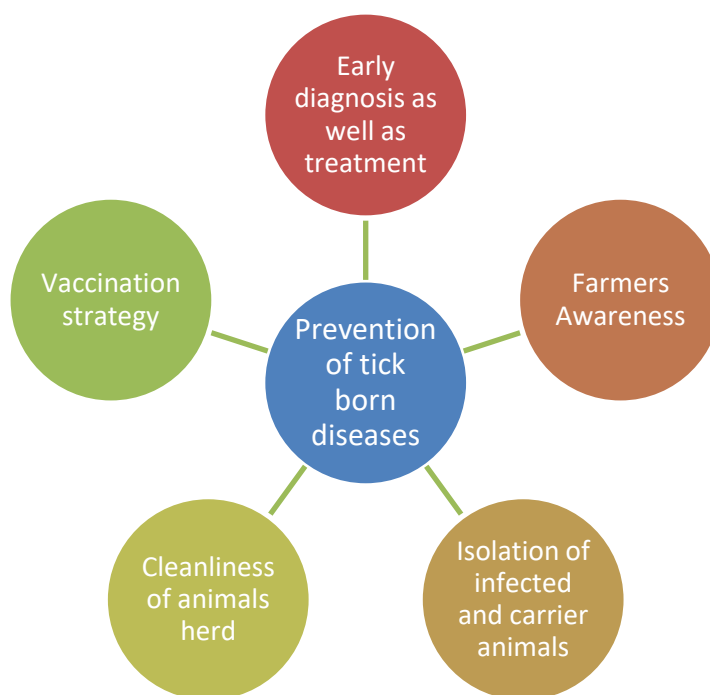

Figure: **Possible prevention and control measures for tick-borne disease.**

DIFFERENT DIAGNOSTIC METHODS

The most common used diagnosis methods are given as:

- The simplest tests for diagnosis of theileriosis are observation of clinical symptoms such as Fever, conjunctiva, lymph node enlargement, anemia, respiratory abnormalities, weight loss, weakness and sudden death of animals etc.

- Due to intracellular nature of parasite, it can also easily diagnose under microscopy by Geimsa staining of blood smear. This is simplest tests for diagnosis in which detection of macroschizonts and piroplasm by just blood smears stained with Geimsa.

- Molecular based methods of diagnosis are the polymerase chain reaction, reverse line blotting assay (RLB) and Loop mediated isothermal amplification (LAMP) assays. These methods detect DNA of parasite in the host blood. This is antigen-based method of diagnosis.
- Serological based methods such as enzyme linked immunosorbent assays (ELISA)and lateral flow immunoassay (LFIA) in which detection antigen/antibodies in the blood of infected animals. These can be both antigen and antibody based.

CONCLUSION

Theileriosis is responsible for significant economic loss to the dairy industry. Both Animals are more prone to this kind of diseases because of dirtiness of animal herd. Carrier animals are major reason behind prevalence of this disease because even after recovery from acute infection, animal become carrier for the disease. Morbidity and Mortality rate is very high because undiagnosed and untreated animals die within weeks, so diagnosis is very much important for effective early treatment.

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