Introduction
CHAPTER I

Introduction

Trypanosomiasis is a important haemoproteozoan infection occurring through out the tropical and subtropical regions of the world. There are several species of trypanosomes, causing devastating effect on livestock health. It may cause considerable morbidity and mortality of domestic animals as well as of wild animals.

Trypanosoma evansi was first isolated from infected camels and equids in the Dera Ismail Khan district of Punjab in 1880. Apart from camels, T. evansi affects a variety of domestic and wild animals viz. horses, mules, cattle, buffaloes, sheep, goats, dogs, and pigs, wild animals viz, elephants, deers, tigers, foxes, jackals etc., (Varadharajan, 2000). In cattle and buffaloes T. evansi infection is generally persistent as latent or sub clinical condition and both serve as reservoirs without showing any clinical signs but when the animals are exposed to adverse climatic conditions like stress, viral vaccinations or the presence of intercurrent diseases, the parasites multiply and the animal exhibits febrile and neurological symptoms (Sastry, 1983). Serious outbreaks are likely to occur at times with high morbidity and mortality (Verma, 1989).

Trypanosomiasis is endemic in certain areas with dense forest, heavy rainfall and high insect vectors density. The cases are commonly encountered and treated by field veterinarians. Although the disease has febrile course accompanied with neurological signs, however these symptoms are not constant. Atypical forms of trypanosomiasis are encountered by field veterinarians although there are few published reports about them. In fact many cases of pyrexia, persistent anorexia with or without neurological signs which do not respond to
antibiotics are successfully treated with trypanocidal drugs. This type of response to trypanocidal drugs even though not supported by microscopic confirmation of blood smear offers some evidence of the prevalence of sub clinical or atypical trypanosomiasis in endemic areas. Such cases are encountered in Vidharbha region too (Sapre et al., 1984).

The carrier animal may remain a source of infection to other animals including dogs and cat. Flea or ticks are considered to be more likely vectors than Tabanus amaenus in dogs (Shien, 1971). T. evansi can also be successfully transmitted orally in dogs by allowing them to feed on infected meat and blood. (Raina et al., 1985)

Mosquitoes are also said to be able to transmit trypanosomes if interval between blood meals is short. Cats and dogs are very susceptible to trypanosomiasis with mortality rate up to 100%. Dogs usually experience acute fatal infection with T. evansi (Dilememan, 1986). This infection is common in dogs which may be due to co-existence and co-habitation with bovines, cross infection might be existing between bovines and canines.

In dogs four species of trypanosomes have been found to cause the clinical infection in different parts of the world viz. T. cruzi, T. evansi, T. brucei and T. rangeli. First three species are pathogenic and T. evansi is common in India, while T. rangeli is apparently non pathogenic (Catcott 1968).

A clinical case of surra in dog with classical clinical manifestation viz. Recurrent fever, Oedematous swelling, corneal opacity, neurogenic signs etc. can be easily diagnosed and treated. But the same is not necessary in all types of the cases especially, advanced case of surra in dogs may present wide variety of symptoms creating difficulty in differential diagnosis unless a blood examination
is done, for ex. Nervous signs accompanying laryngeal edema causing change in
voice of the dog may mislead for rabies. (Soulsby 1982).

Severe hematological changes like significant decrease in hemoglobin,
packed cell volume and total erythrocyte count with leucopenia and neutrophilia
develops in this infection (Sharma et al, 1988). Similarly hypoglycemia,
hypoproteinaemia, hypoalbuminia, decrease in A:G ratio with increase in ALT
level has been recorded in dogs suffering from T. evansi infection (Arora and
Pathak, 1995). Reduction in CSF sugar with increase in leucocyte count also
noted in canine trypanosomiasis (Rabiprakash and Sapre, 1994). These leading
findings have been included as parameters in the present study for detail
investigation in infected dogs, taking into consideration the importance of this
disease and the scanty information available from this area for prompt diagnosis
and treatment..

For want of correct diagnosis and lack of awareness about the possible
occurrence of this disease in dogs may result in case fatality. Most of the time co
existing disease might divert the attention of the physician, there by leads to
incomplete response to the treatment.

Few allopathic trypanocidal preparations are being used for the treatment
of clinical cases. Some constraints like development of drug resistance, side
effects and high cost may arise during usage of such drugs. Now a days greater
attention is being given towards the use of herbal medicines in view of minimum
or negligible toxicity, as well as ease of administration and low cost.

The origin of herbal medicine has been attributed to our ancestors, who
had acquired the knowledge of plants mainly by trial and error to determine their
medicinal value. Once these attributes were learnt the information was passed on
from generation to generation added upon by fresh discoveries (Devegowda, 1998).

Indian Ayurveda being considered in noteworthy system of traditional medicine practice the uses mainly medicinal plants for the treatment of ailments in both, human beings and animals. Traditional medicines are experiencing a revival in the veterinary sector too. The herbal medicines have a great efficacious, potent, inexpensive, accessible and safe solution to prevent and treat various animal health problems (Arora, 1965).

Some plants viz. Azadirachta indica, Calotropis procera and Parthenium hysterophorus were selected for evaluation of their trypanocidal efficacy in the present study. These plants were selected because they possess antiprotozoal activity and alleviate one or many of the clinical symptoms such as intermittent fever, anemia, jaundice and hepatomegaly commonly associated with trypanosomiasis. The trypanocidal activity of aqueous extract of A.indica leaves against T. brucei infection, in-vivo claimed by Nok et al (1993). On evaluation 50% ethanolic extract of P. hysterophorus flowers found to posses trypanocidal activity in vitro, the extract was also found to be successful in exerting its antitrypanosomal effect when administered in T.evansi infected mice (Talakal et al. 1995, Pathak et al. 1997).

C. procera reported to be useful in the treatment of intermittent fever and malarial fever (Nadkarni 1976) C. procera root extract also reported to possess antibacterial activity when evaluated in vitro (Jain et al. 1996).

The therapeuetic efficacy of these plants evaluated either in vitro or in mice only by earlier workers. Therefore it was proposed to study the trypanocidal
efficacy of *A. indica* leaves, *P. hysterophorum* flowers, *C. procera* roots by preparing their 50% alcoholic extracts in experimentally *T. evansi* infected dogs.

The trypanocidal efficacy of plants under study was assessed on the basis of reduction in number, motility and infectivity of the parasite. Simultaneously haematobiochemical and cerebrospinal fluid changes were monitored in dogs during the period of study to correlate these findings with that of clinical manifestations and treatment. As such rearing or possessing of pets is of much importance nowadays as dogs are being brought up not less than a loving family member. Trypanosomiasis in canines can prove fatal if not diagnosed and treated in time. Keeping in view the increased trend of dog keeping and vital importance of canine trypanosomiasis.

Canine trypanosomiasis and its herbal treatment chosen in view of scanty work done in this area.

Hence, the proposed study planned was with following objectives.

1. To study clinical syndrome of canine trypanosomiasis
2. To study the haematobiochemical alterations to ascertain the effect of parasitism and / or treatment.
3. To study the biochemical and cellular alterations in cerebrospinal fluid.
4. To study the pathological changes in experimental canine trypanosomiasis.
5. To study the trypanocidal efficacy of different indigenous plant extracts.