

Epidemiological Study on *Trypanosoma evansi* Infection Among Free Living Wild Animals in India

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Received 20 August 1998

ABSTRACT

Although it is not always possible to observe the free-living wild animals closely inside the dense forest as we can not confine them. An attempt was made to keep a close watch on them and a six years epidemiological study of trypanosomiasis (surra) infection was undertaken in free living wild animals, feral cattle and domestic animals in the core and adjacent areas of Ranthambhore National Park (India).

This study suggest a great aspect regarding the conservation strategies and research for the control of surra in the 21st century.

INTRODUCTION

Surra (trypanosomiasis) caused by *Trypanosoma evansi* is an infectious disease of both wild and domestic animals. It affects a wide range of hosts like spotted deer (*Axis axis*), sambar (*Carvus unicolor*), feral cattle, buffaloes, camels, sheep and goats in the northern state of India.

Over the last few years there has been a loss of wild life from Ranthambhore National Park due to this disease.

STUDY AREA

Ranthambhore National Park is located some 350 km south of Delhi in the Rajasthan State. It lies between the latitude 25° 54N to 26° 12N and longitude 76° 22E to 76° 39E.

This dry deciduous forest has a rich biodiversity of fauna and flora with 34 species of mammals, 11 species of reptiles, 9 species of fishes, 262 species of birds and 299 species of flora.

CLIMATOLOGICAL FACTORS

All the Tiger Reserve area is characterized by sub-tropical dry climate with distinct cold (November to February), hot (March to June) and rainy (July to September) seasons. The highest temperature (49°C) is recorded in May-June and the lowest (up to 2°C in December-January). The average rainfall is 800 mm/annum. Droughts are of common occurrence. The relative humidity is on average of 30-40%.

All these condition insure the Blood Sucking arthropods and tabanus fly population are maintained at high level with transmitted *Trypanosoma* between wild and domestic animals in and around the National Park which is surrounded by 91 villages with an estimated 150,000 livestock population and the never ending pressure of migrating livestock.

HISTORY OF TRYPANOPSOMIASIS

An out break of trypanosomiasis occurred in May 1993, August 1994, and June 1997

among wild animals such as spotted deer (*Axis axis*), sambar (*Canvas unicolor*), feral cattle and domestic animals of villages are situated in between the core and buffer zones of the Tiger Reserve. And a six year epidemiological study of trypanosomiasis infection was also undertaken in various species of free living wild animals in side the dense forest.

MATERIALS AND METHODS

In the present study a total number of 753 blood and lymph smear slides collected from the carcasses of wild fauna and ailing, feral cattle and domestic animals. The dead animals were subjected to post mortam examination and sick animals were observed for clinical signs.

The stained blood and lymph smears made from carcasses of wild animals, feral cattle and domestic animals examined in district disease diagnostic laboratory Sawai Madhopur, Rajasthan State (India).

Table 1. Blood and lymph smears collected from wild, feral and domestic animals.

S.No.	Wild Animal	Number of Samples
1	Tiger (<i>Panther rights rights</i>)	8
2	Panther (<i>Panther pardis</i>)	15
3	Hyaena (<i>Hyaena hyaena</i>)	35
4	Spotted Deer (<i>Axis axis</i>)	77
5	Sambar (<i>Carpus unicolor</i>)	83
6	Blue Bull (<i>Boselapus tragocamelus</i>)	17
7	Wild Bull (<i>Suds scruff</i>)	32
8	Jackal (<i>Cams airbus</i>)	12
9	Gazelle (<i>Gazelle gazelle</i>)	17
10	Black-Buck (<i>Antelope cervicapra</i>)	13
11	Feral Cattle	117
12	Buffaloes	155
13	Camel	53
14	Sheep & Goat	119
TOTAL		753

RESULT AND DISCUSSION

Out of 753 stained blood and lymph smears slides 17% of blood and 29% of lymph smears revealed the presence of parasite diagnosed as *Trypanosoma evinsi* however in some affected animals it was not found in the blood smear but it was found in lymph smears, indicating that it is not always possible to find the parasite in the blood.

Table 2. Positive blood and lymph smears for *Trypanosoma evansi*.

S.No.	Animal	Positive Numbers
1	Spotted deer	23
2	Sambar	37
3	Feral Cattle	98
4	Buffalose	87
5	Sheep & Goat	100
6	Camel	23

CLINICAL SIGNS

An attempt was made to keep a close watch on sick wild animals and observed following clinical signs inside the dense forest.

(A) Spotted Deer and Sambar:

- Affected animals displayed a furious countenance, restlessness, staggering gait, loss of vision, anorexia and emaciation.
- Despite attempts to keep them in the forest they always made attempts to run towards water ponds situated at the periphery of the forest and sought relief by bathing in the ponds. It is thought that this behaviour may be due to the animals having a high temperature or to irritation in the sun light.

Post mortem lesions: Pathological changes consisted of enlarged spleen, liver & lymph node, anaemia, emaciation and pneumonia.

(B) Domestic Animals (Clinical Signs):

- They had intermittent fevers (107 degrees F) lasting for 3-4 days and oedematous swelling in the submandibular regions, dewlap and belly. Lactating animals developed clinical signs quicker. They were found off feed, dull, restless in strong daylight with red sunken eyes showing slight lacrimation. Muscular weakness resulted in reluctance to walk and an unsteady gait. There was also partial loss of vision, tympany, diarrhoea and swelling of lymph nodes.

Post mortem lesions: All the animals were found to have pneumonia and enlarged livers and spleens, serous exudate was seen in the pericardial and abdominal cavity.

TREATMENT OF AFFECTED ANIMAL (LIVESTOCK)

Quinapyramine sulphate which acts as both curative and a prophylactic was administered by the subcutaneous route with doses of 5 mg/kg of body weight. It is important that body weight be assessed as accurately as possible and appropriate dose administered to prevent the drug resistance.

The following formula was used:

$$W = L \times G/D$$

W = Weight of animal in kg

L = Length of animal (poll to head of tail in cm)

G = Girth of animal

D = 64.5 if girth less than 164 cm, 61.0 if girth between 165 cm and 200 cm and 57.5 if girth more than 200 cm

PROBLEMS RELATED WITH SURRA

Natural habitats of this Park is a common grazing pastureland of wild, feral and domestic animals. The forest fodder in the diet of livestock and percentage at wildlife species and livestock dung in a hectare of forest pastureland indicates the enormous grazing pressure on the park. It is presumed that tabanus and other blood sucking arthropods might

Table 3. Forest fodder in the diet of domestic animals

S. No.	Season	Forest Fodder	Other Fodder
1	Winter	43%	57%
2	Summer	19%	81%
3	Monsoon	44%	56%

have injected the organism in the wild animal after biting domestic animal and feral cattle in areas adjacent to the tiger reserve.

Table 4. Percentage of wild and domestic animal dung in a hectare of forest pastureland.

Wild animal		Livestock	
Species	% dung / he	Species	% dung / he
Blue bull	30	Cattle	33
Spotted deer	39	Sheep and goat	55
Sambar	17	Camel	10
BN hare	3	Donkey	2
Porcupine	3.2		
Slot bear	2		
Hyena	3		
Panther	2		
Tiger	0.8		

These data indicates the enormous grazing pressure on the park. Due to intimate contact between wild and domestic animals, surra is seen a large group of wild animals. That is playing a threatening role in degradation of the wild animals. This genetic erosion at alarming rate is causing an ecological hazard.

FIELD LEVEL CONSTRAINTS

- Poor diagnosis due to poorly unequipped laboratories. In field condition there is no laboratories.
- Chemo trypanocidal drugs are much more costly and there is a shortage in supply of drugs in the field and Indian Market.
- No choice of drug for the purpose of treatment in Indian Market.
- Livestock owners are uneducated they believe in superstitions, not interested in treatment due to their poor economy.
- Eradication of wildlife is no longer considered to be of value. blood sucking arthropods and tebanus fly are abundant in the forest which is the habitat of wild animals.
- Cattle slaughter is totally prohibited in Rajasthan State because of religious taboos associated with the holy cow.
- The major problem which we field veterinarian are currently facing and will face in future is trypanocidal drugs resistance and relapse of parasitaemia in *Trypanosoma evansi* infection in domestic animal due to under dosing, lack of confirmatory diagnosis and miss use of drug which leads first to individual resistance and then to area resistance.

SUGGESTIONS

Unless, we fulfil the biomass demands of the populace living near the fringes of tiger reserve no policy will prevent the local people from drawing their requirement from the Ranthambhore National Park, in a democratic setup no regulation and policing can prevent local people from meeting their demands hence, alternatives have to be provided.

Keeping in views the above facts and control of trypanosomiasis the following veterinary

based strategies should be considered in endemic areas.

- Control of domestic animal movement in side the forest forcely adopted.
- Genetic upgrading at local livestock to reduced grazing pressure on the natural habitats.
- Trypanocidal drugs should be used before the onset of rainy season and animal diagnosed as suffering from surra should be treated immediately.
- New diagnostic tests should be developed for early detection of cases of surra.
- Without money nothing is possible we need special funds for well equipped laboratory, drugs and to arrange financial help for needy farmers for purchasing high milking stalled cross bred livestock, feed and fodder in the form of loan by cooperative society.
- This is the only way to control surra in wild and domestic animals in the 21st century in India

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