

Overview of Tropical Thileriosis in Sudan



Several TBDs in cattle in Sudan

- Tropical Thileriosis (*Theileria annulata* infection)
- Babesiosis (*Babesia bigemina*, *B. bovis*)
- Anaplasmosis (*Anaplasma marginale*, *A. centrale*).
- Other parasites *T. mutans*, *T. velifera*, *Cowdria ruminantium*.
- **Most important is tropical Thileriosis**

Reported in Sudan since 1920:

- Earlier surveys based on Blood smears and L. N. Biopsies disease widespread in Khartoum and River Nile States, Kordofan (Western Sudan).
- Serosurveys using IFA (1983)
- Infection widespread in Khartoum, White Nile, Gezira and Blue Nile (Overall prevalence rate 38.9%) 90% in Khartoum to 13% in Blue Nile.
- Serosurveys (2005) using ELISA (Ta SP).
Evidence of infection in all Northern Sudan
- Prevalence highest (90.5%) in Khartoum State.
- RLB, PCR in Khartoum State (48%, 65% respectively) to 18.6% in Kassala by PCR.
- Disease (clinical) is diagnosed year round with peaks in hot dry (May – July) and dry – cold (Nov. – Jan.). stresses (heat, lack of feeds) and higher tick transmission.
- **Mainly in exotic breeds and their crosses. Rare in indigenous animals.**

- Diagnosis based mainly on microscopic examination of blood and LN smears stained with Giemsa
- Other methods (PCR – ELISA – LAMP) are well establishedproblems with RLB.
- Peracute and sudden death sometimes seen in exotic breeds
- Problematic you can only see few schizonts in superficial LN, more in internal organs.
- Confused with pleuropneumonia because of lung edema
- Noticeable rise in seroprevalence over the last 20 years in some areas
e.g 1983 using IFA it was 13.2% in Um Benine(B.Nile),
2005 using ELISA it was 35%
- suitable environment for establishment of the tick vector has been created (increased dairy farming around urban areas)
- Vector also extended to new areas (South Darfur)
- **Tropical theileriosis is now a problem and may become more so in coming years.**

Table 1 Prevalence rates of *T. annulata* antibodies using indirect ELISA among cattle in different locations in the Sudan during the year 2001–2002

Locations	Towns	No. examined	<i>T. annulata</i> Positive (%)
Northern Sudan	Atbara	40	32 (80)
	El Damer	40	37 (92.5)
Blue Nile	Madani	40	5 (12.5)
	Sennar	40	16 (40)
	Um Benin	40	14 (35)
	Damazin	40	12 (30)
Eastern Sudan	Gadarif	40	4 (10)
	Kassala	40	4 (10)
	Port Sudan	40	4 (10)
White Nile	El Dieum	40	8 (20)
	Rabak	40	15 (37.5)
	Kosti	40	15 (37.5)
Western Sudan	El Obied	40	11 (27.5)
	Nyala	40	2 (5)
	Fashir	40	6 (15)
	Total	600	185/600 (30.8)

Table 2 Comparison of *T. annulata* antibodies using indirect ELISA among four age groups of cattle in the Sudan during the period 2001–2002

Age groups	<i>T. annulata</i> (P/E)
<1 year	31.3% (47/150)
1–2 years	26.7% (40/150)
2–4 years	33.3% (50/150)
>4 years	32.7% (49/150)
Total	30.8% (185/600)

P/E number positive/number examined

Table 3 Comparison of *T. annulata* antibodies using indirect ELISA among indigenous and crossbreeds of cattle in the Sudan during the period 2001–2002

Breeds	<i>T. annulata</i> (P/E)
Cross	29.5% (93/315)
Indigenous	32.3% (92/285)
Total	30.8% (185/600)

P/E number positive/number examined

Table 4: Prevalence rates of *Theileria annulata* in different locations in the Sudan during the year 2001-2002 according to Blood smear technique.

Location	No. examined	BST
		Positive (%)
Atbara	178	40 (22.5)
Edamer	72	18 (25)
Khartoum	200	76 (38)
Madani	176	15 (8.5)
Sennar	200	31 (15.5)
Um Benin	147	4 (2.7)
Edamazin	200	20 (10)
Gadarif	142	4 (2.8)
Kassala	150	12 (8)
Port Sudan	170	17 (10)
Edueim	140	19 (13.6)
Rabak	185	30 (16.2)
Kosti	65	16 (24.6)
El Obied	200	36 (18)
Nyala	205	8 (3.9)
Fasher	100	7 (7)
Genina	131	11(8.4)
Total	2661	364 (13.8)

The values in parentheses are percentages.
BST = Blood smear technique.

Table 5: Comparison of blood smear technique results for detection of *Theileria annulata* infection in five age groups of cattle in the Sudan during the period 2001-2002.

Age group	Number examined	BST
< 1 year	659	77 (11.7)
1-2 years	488	89 (18.2)
2-3 years	348	51 (14.7)
3-4 years	286	32 (11.2)
> 4years	880	115 (13.1)
Total	2661	364 (13.8)

The values in parentheses are percentages.

Table 6: Comparison of blood smear technique results for detection of *Theileria annulata* infection among indigenous and cross breeds of cattle in the Sudan during the period 2001-2002.

Breed	No. examined	BST
Cross	1423	244 (17.1)
Indigenous	1238	120 (9.7)
Total	2661	364 (13.8)

The values in parentheses are percentages.

Table 7: Comparison of blood smear technique results for detection of *Theileria annulata* infection in farms with different management systems in the Sudan during the period 2001-2002.

Farm	No. examined	BST
Intensive	896	180 (20.1)
Semi-intensive	955	89 (9.3)
Extensive	810	95 (11.7)
Total	2661	364 (13.8)

The values in parentheses are percentages.

**Highest prevalence reported in
Northern and Central Sudan
(86.5%)**

Lowest in western Sudan

41.1% in crossbreeds

24.2% in indigenous breeds

Vectors

- *H. rufipes* and *H. dromedary* (under experimental conditions).
- *H. anatolicum* is the main vector.. abundant in N. Sudan
- Has now extended it's distribution to new areas (um Benin(B. Nile), Nyala, Kosti,...)
- Alternative vectors in areas where *H. anatolicum* does not exist should be investigated

Natural infection rates

High in several areas of the country
(8.6% in central Sudan to 49% in
northern Sudan)

Intensities of infection from 1.3 to
28.3 in these areas respectively

Economic impact

- T. theileriosis is believed to be one of the major hindrances to development of sound dairy industry in N. Sudan
- Losses in terms of weight loss, abortion, reduced fertility, reduced milk production, mortality, chemotherapy, acaricides for tick control.

Latif (1994) reported that in Khartoum State

- 85% of farms investigated experienced clinical disease
- Deaths were estimated to be 22% in calves, 30% in heifers
- Losses amounted to between 4 – 6 million dollars

- **Gamal and El Hassenin (2003).**
Estimated 1.5 milion Sudanese dinars loss in one dairy farm (29% loss in profitability)

See article – get figures

Disease Control

- No clear policy on disease control in Sudan
- Owners depend heavily on use of antihelminthic drugs and acaricides
- Raise indigenous chickens in farms to eat ticks on and off host
- Practice of injecting newborn calves with long acting tetracyclines to prevent clinical disease
- High grade pure exotic breeds are under intensive acaricide cover + biosecurity (restricted access, clean Hay ...)
- 2 strains of Vaccine has been developed

Ready for mass production and use

**In exotic breeds protection is against death
(50% - 100%)**

**In cross breed protection is against clinical
disease (100%)**

- **Because of high tick challenge a booster dose may be required. This why we developed 2 strains.**
- **Limited pilot application in the field proved to be successful**
- **Lack of funds, need to convince farmers of its usefulness.**

Conclusions

- Tropical theileriosis is prevalent in Sudan
- Heavy expenditure by the owners on acaricides and chemotherapy (public and veterinary health problems)
- More sustainable control strategies must be developed (vaccines against parasite and ticks, Biological control of tick)
- Control must depend on an integrated approach.
- More studies on epidemiology must be carried out especially in newly infested areas.