

Camel Trypanosomosis (Surra) in Parts of Northern Nigeria

Presented at the

37th Meeting of the International Scientific Council for Trypanosomiasis Research and Control (ISCTRC)

[1]Mamman, A.S., [1]Ogbole, E., [1]Abongaby, G.C., [1]Nimyel, C.D, [1]Osuagwu, M.O., [2]Bot, M.H., [2]Akwaras, M and [3]Ajakaiye, J.J

NIGERIAN INSTITUTE FOR TRYPANOSOMIASIS AND RESEARCH

.

INTRODUCTION

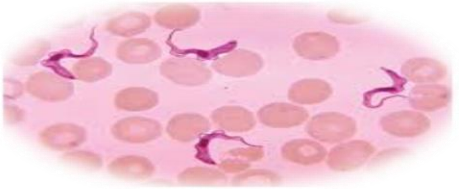
- **Camel Trypanosomosis (Surra)**
  - A neglected tropical disease
  - Affect livestock of which camels & horses are mostly infected
  - Prevalent in all countries where camels are present (Alarabi et al., 2019)

- **Camel Trypanosomosis (Surra) is mainly caused by Protozoan parasite called *Trypanosoma evansi***

- **Transmitted mechanically by biting flies such as *Tabanus, Stomoxys, Hippoboscids* (Aregawi et al., 2019)**

- **The epidemiology is driven by:**
  - **Vectors abundance**
  - **Host availability** (Onyekwelu *et al*.,2017)
  - **Level of parasite in host**

- **Surra constitutes a major threat to food security with an over agaric Economic impact amounting to about 4.5 billon US$ annually** (FAO,2019)



Trypanosoma evansi



Stomoxys spp



Tabanus spp

Introduction Cont'd

- In Nigeria, there are no documented data on the losses caused by the disease, but surra have ravaged northern ecological zones were camels are in abundance (Mamman et al., 2021)



Fig 1 Geographical distribution of Surra in Africa
Source: Aregawi et al (2019)

AIM

To Determine the Epidemiology of Camel Trypanosomosis (Surra) in some parts of North-west, Nigeria

OBJECTIVES

- To

- Determine the prevalence of camel Trypanosomosis using Parasitological, Serological and molecular diagnostic techniques in the study areas.

- Determine the sequence of some positive PCR Amplicons and carryout Phylogenetic analysis

STUDY AREAS

- **Sampling was carried out in central abattoirs of Kano and Katsina states located in the Northwestern region of Nigeria.**

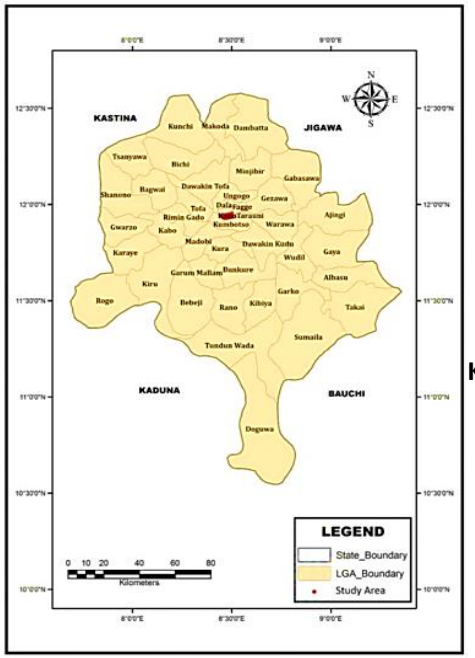
- **The co-ordinates**

  - **Katsina (latitudes 11˚08ˡN and 13˚22ˡN and longitude 6˚52ˡE and 9˚20ˡE) and**

  - **Kano (latitude 12˚40ˡN and 10˚31ˡN and longitude 7˚40ˡE and 9˚30ˡE) states**

Katsina State





Kano State

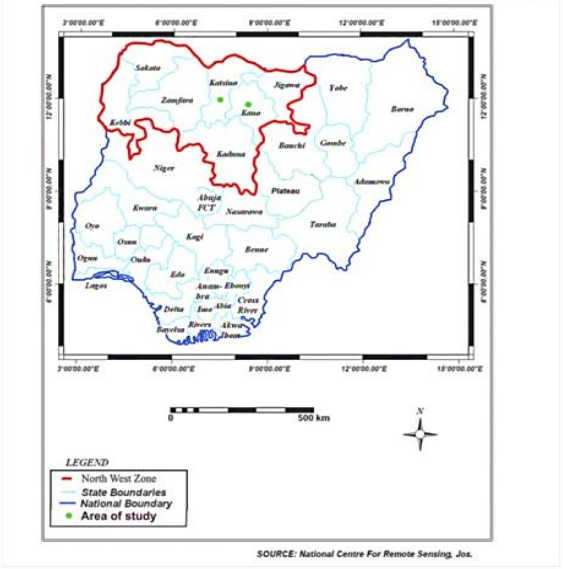
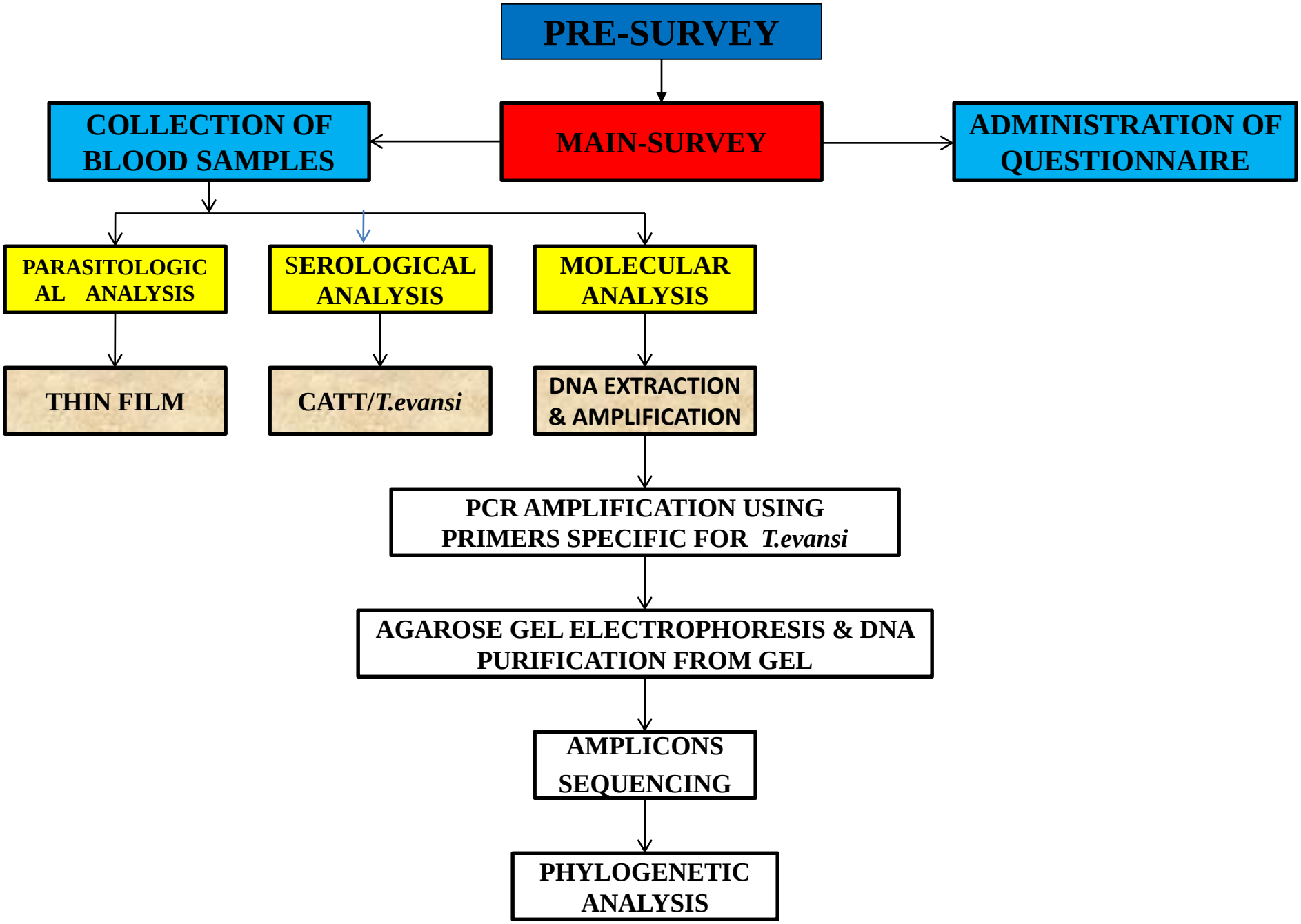


Fig 2 Map of Nigeria showing the north-west Geopolitical Zone

EXPERIMENTAL DESIGN



OBJECTIVE ONE

To Determine the Prevalence of Camel Trypanosomosis Using Parasitological, Serological And Molecular Diagnostic Techniques in the Study Areas.

Table 1

Prevalence of Trypanosomosis (Surra) in Camels in Relation to Different Body Conditions Score in Katsina State, Nigeria

Season	Body condition	No. examined	No (%) Infected (MC)	No (%) Infected (SE)	No (%) Infected (MO)	Chi-Square	P-value
	POOR	29	3 (10.3)	6 (20.7)	24(82.8)	MC 0.17	3.538
WET	FAIR	85	7 (8.2)	14(16.5)	18(21.2)	SE 0.763	0.540
	GOOD	36	0(0.0)	5(13.9)	4(11.1)	MO 20.2	0.000
	TOTAL	150	10(6.6)	25(16.7)	46(30.7)		
	POOR	103	6 (5.8)	14 (13.6)	15(14.6)	MC 0.91	0.187
DRY	FAIR	26	1 (3.8)	2 (7.7)	18(69.2)	SE 0.413	1.768
	GOOD	21	1 (4.8)	1 (4.8)	1(4.8)	MO 39.8	0.000
	TOTAL	150	8(5.3)	17(11.3)	34(22.7)		

Table 2
Age Related Prevalence of Camel Trypanosomosis (Surra) in Katsina State

Season	Age Group (Years)	No. examined	No (%) Infected (MC)	No (%) Infected (SE)	No (%) Infected (MO)	Chi-Square	P-value
	1-3	62	4(6.5)	12 (19.4)	26(41.9)	MC 0.860	0.757
WET	4-6	79	6(7.6)	11 (13.9)	19(24.1)	SE 0.835	0.776
	7-9	8	0(0.0)	2 (25.0)	1(12.5)	MO 6.57	0.087
	10-12	1	0 (0.0)	0 (0.0)	0(0.0)		
	TOTAL	150	10(6.6)	25 (16.7)	46(30.7)		
	1-3	47	2(4.3)	4(8.5)	10(21.3)	MC 0.952	0.341
DRY	4-6	78	5 (6.4)	9 (11.5)	20(25.6)	SE 0.895	0.604
	7-9	22	1 (4.5)	3 (13.6)	4(18.2)	MO 1.21	0.751
	10-12	3	0 (0.0)	0 (0.0)	0(0.0)		
	TOTAL	150	8 (5.3)	16 (10.7)	34(22.7)		

Table 3
Gender Related Prevalence of Camel Trypanosomosis (Surra) in Katsina State

Season	Gender	No. examined	No (%) Infected (MC)	No (%) Infected (SE)	No (%) Infected (MO)	Chi-Square	P-value
	MALE	54	5 (9.3)	7(13.0)	11(20.4)	MC 0.34	0.911
WET	FEMALE	96	5(5.2)	18 (18.8)	35(36.5)	SE 0.361	0.833
	TOTAL	150	10 (6.6)	25 (16.7)	46(30.7)	MO 4.21	0.400
	MALE	49	2 (4.1)	4 (8.16)	9(18.4)	MC 0.74	0.108
DRY	FEMALE	101	6(5.9)	12 (11.9)	25(24.8)	SE 0.806	0.060
	TOTAL	150	8 (5.3)	16 (11.3)	34(22.7)	MO 0.77	0.381

Table 4
Prevalence of Trypanosomosis (Surra) in Camels in Relation to Different Body Conditions Score in Kano State, Nigeria

Season	Body condition	No. examined	No (%) Infected (MC)	No (%) Infected (SE)	No (%) Infected (MO)	Chi-Square	P-value
	POOR	85	1 (1.2)	5 (5.9)	12(14.1)	MC 0.06	5.484
WET	FAIR	17	0 (0.0)	1(5.9)	1(5.9)	SE 0.659	0.835
	GOOD	48	4(8.3)	4(8.3)	9(18.8)	MO 1.41	0.494
	TOTAL	150	5(3.3)	10(6.6)	22(14.6)		
	POOR	103	8(7.8)	16(15.5)	20(19.4)	MC 0.11	4.369
DRY	FAIR	34	1(3.8)	2 (7.7)	5(14.7)	SE 0.123	4.196
	GOOD	13	0(0.0)	0(0.0)	2(15.4)	MO 3.73	0.155
	TOTAL	150	9(6.0)	18(12.0)	27(18.0)		

Table 5
Age Related Prevalence of Camel Trypanosomosis (Surra) in Kano State

Season	Age Group (Years)	No. examined	No (%) Infected (MC)	No (%) Infected (SE)	No (%) Infected (MO)	Chi-Square	P-value
	1-3	65	1(1.5)	4(6.2)	8 (12.3)	MC 0.53	1.268
WET	4-6	84	4(4.8)	6 (7.1)	14(16.7)	SE 0.937	0.130
	7-9	1	0(0.0)	0 (0.0)	0(0.0)	MO 0.63	0.729
	10-12	0	0 (0.0)	0 (0.0)	0(0.0)		
	TOTAL	150	5(3.3)	10 (6.7)	22(14.6)		
	1-3	58	3(5.2)	10(17.2)	13(22.4)	MC 0.59	1.877
DRY	4-6	86	6 (6.9)	8(9.3)	13(15.1)	SE 0.367	3.162
	7-9	5	0 (0.0)	0 (0.0)	1(20.0)	MO 1.31	0.728
	10-12	1	0 (0.0)	0 (0.0)	0(0.0)		
	TOTAL	150	9 (6.0)	18 (12.0)	27(18.0)		

Table 6
Gender Related Prevalence of Camel Trypanosomosis (Surra) in Kano State

Season	Gender	No. examined	No (%) Infected (MC)	No (%) Infected (SE)	No (%) Infected (MO)	Chi-Square	P-value
	MALE	65	2 (3.1)	3(4.6)	8(12.3)	MC 0.53	1.268
WET	FEMALE	85	3(3.5)	7 (8.2)	14(16.5)	SE 0.378	0.776
	TOTAL	150	5 (3.3)	10 (6.7)	22(14.6)	MO 0.51	0.475
	MALE	70	4(5.7)	8 (11.4)	10(14.3)	MC 0.59	1.877
DRY	FEMALE	80	5(6.3)	10 (12.5)	17(21.3)	SE 0.840	0.041
	TOTAL	150	9 (6.0)	18 (12.0)	27(18.0)	MO 1.40	0.237

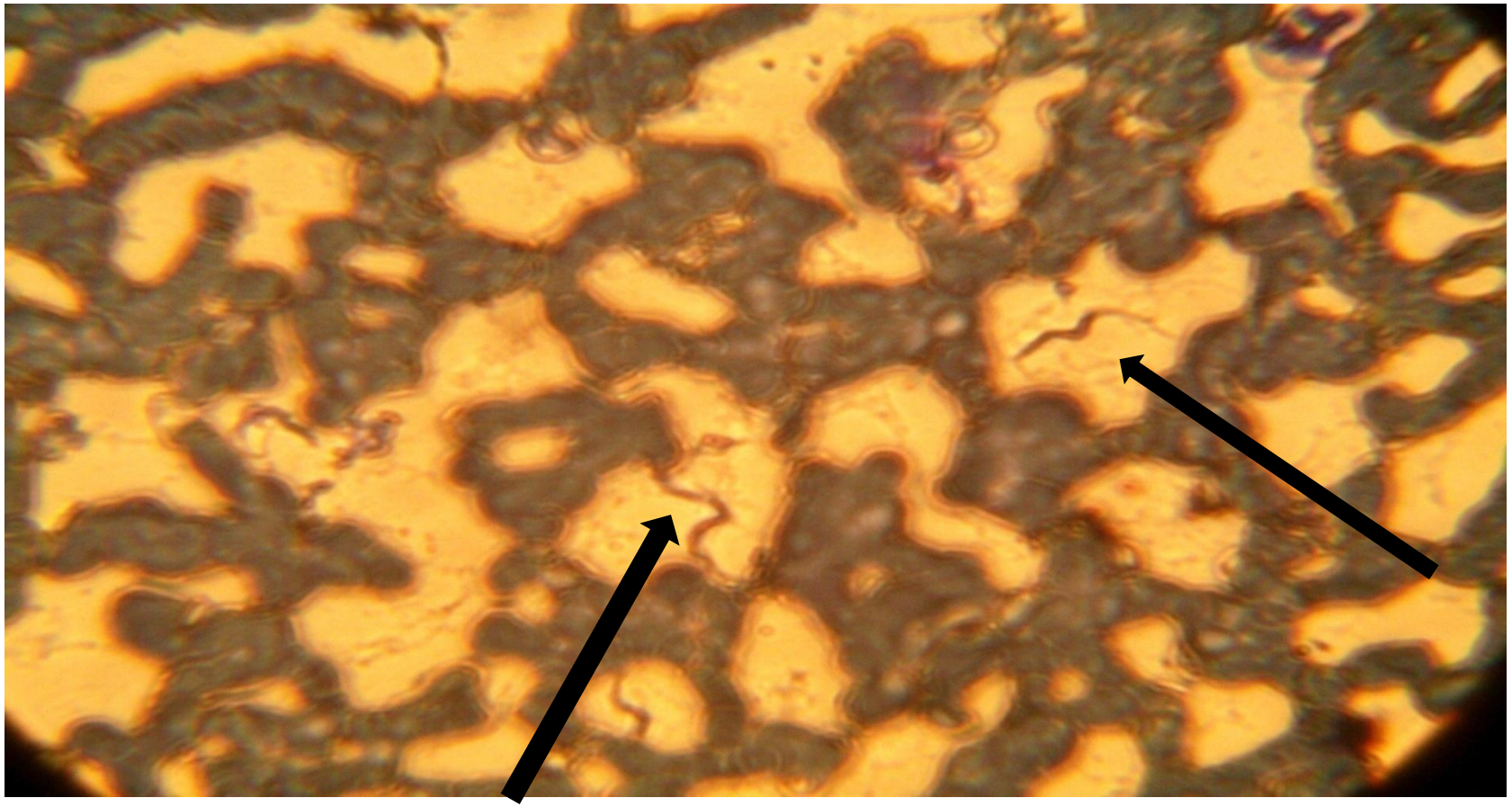


Plate 1 With Arrows Showing *T. evansi* From a Stained Giemsa Thin Smear

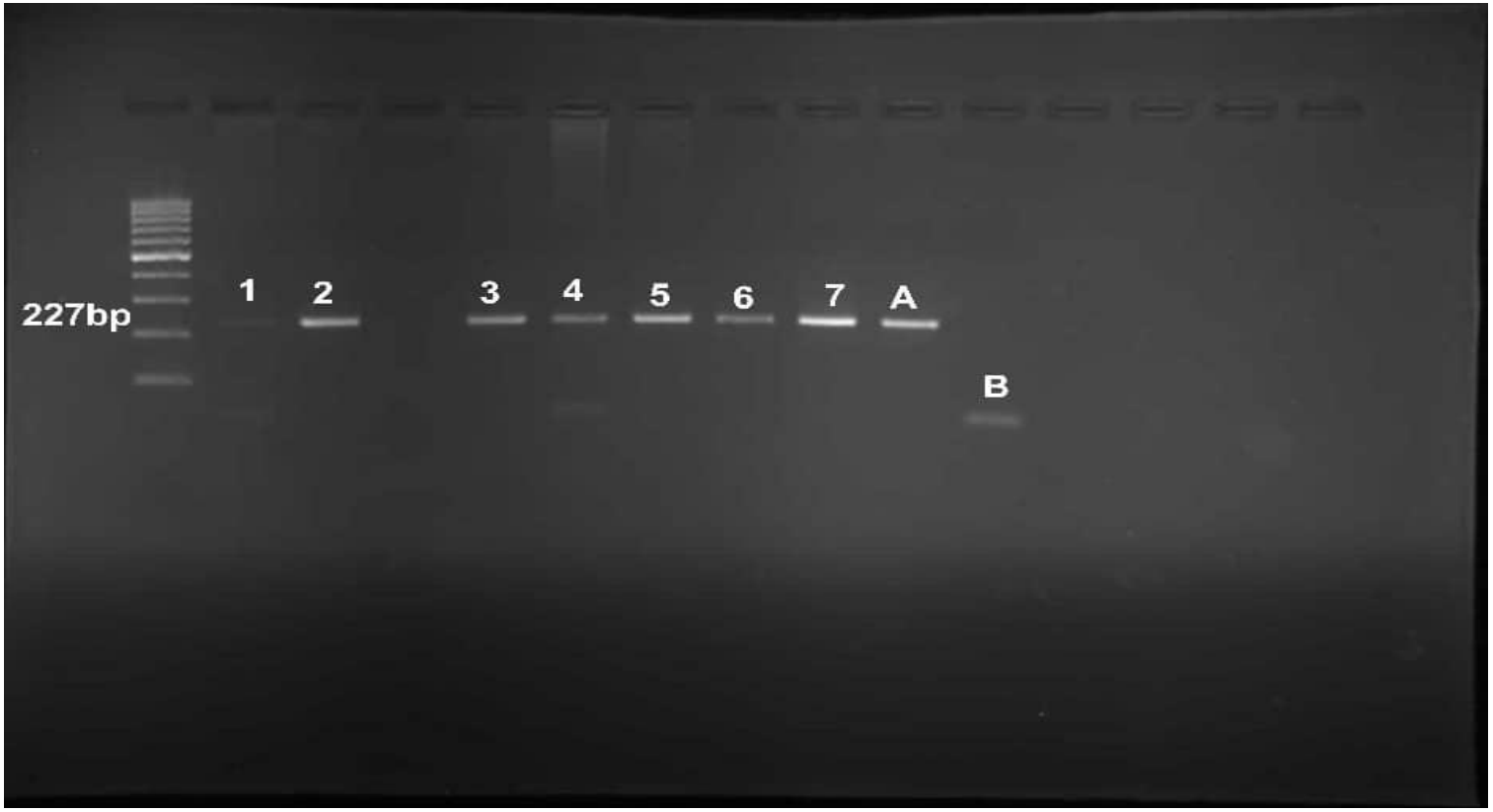


Plate 2 PCR Amplification of 227bp of *T . evansi* of Camels from Kano State (Lane M: 100 Base Pairs (Bp); Lane 1 - Lane 7: Positive Samples; Lane A: Positive Control; Lane B: Negative Control)

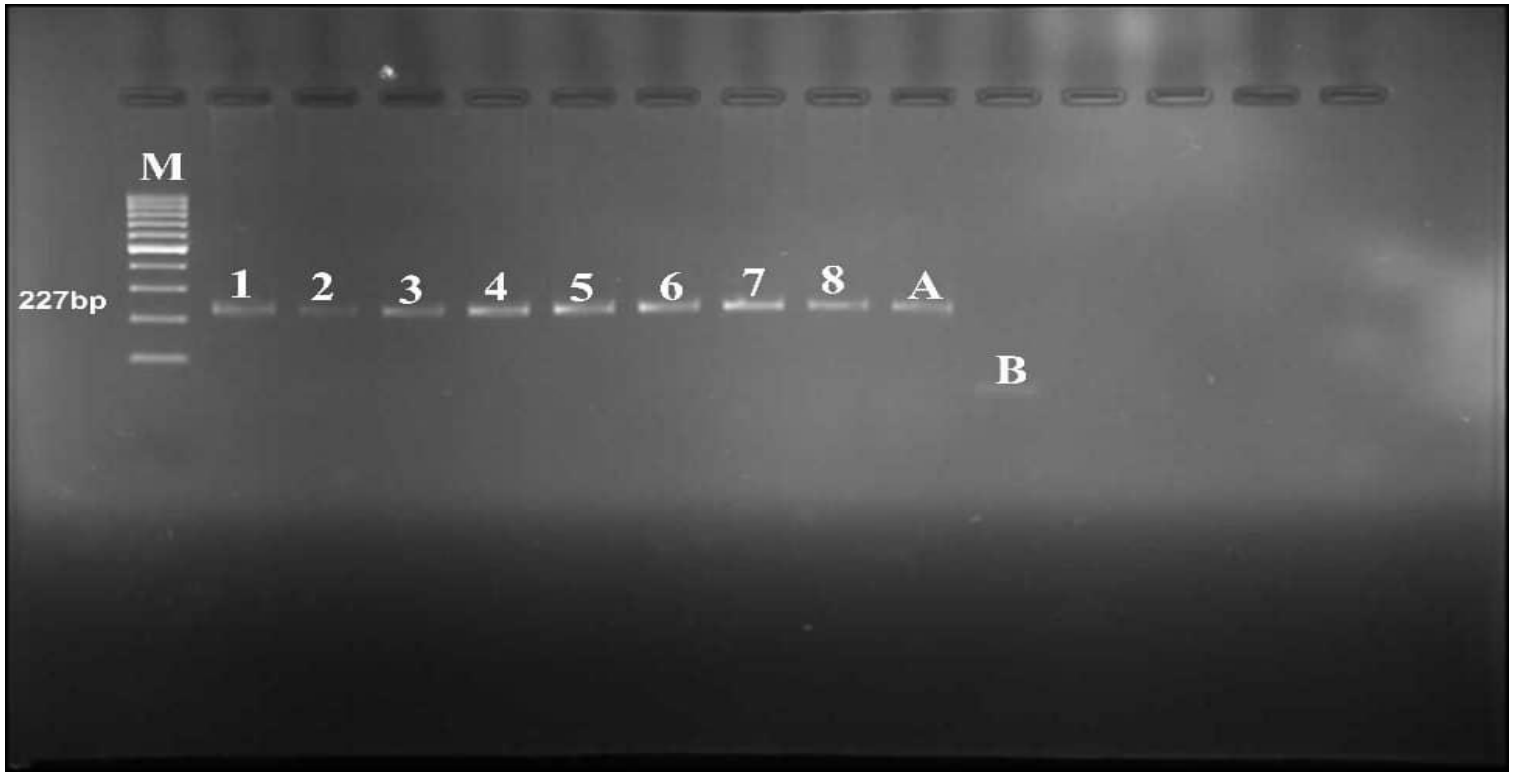


Plate 3 PCR Amplification of 227bp of *T.evansi* of Camels from Katsina State (Lane M: 100base Pairs (Bp) Lane1- Lane 8: Positive Samples; Lane A: Positive Control; Lane B: Negative Control)

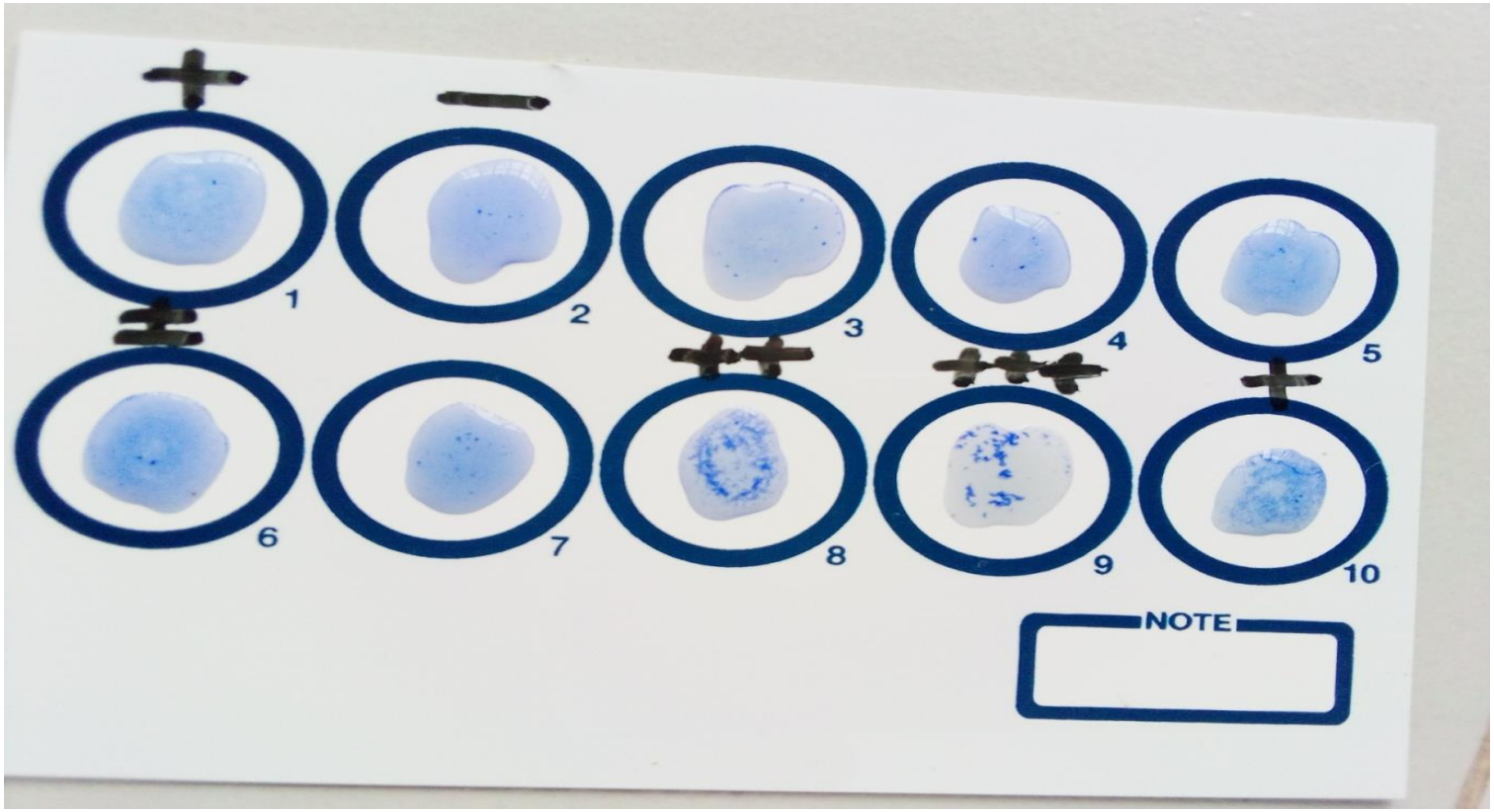


Plate 4 Number 1 Positive Control; Number 2: Negative Control; Samples 3, 4, 5&7 :(-) Negative Agglutination; Sample6: (±) Weak Agglutination: Sample 10: (+) Moderate Agglutination; Sample 8: (++) Strong Agglutination; Sample 9: (+++) Very Strong Agglutination.

OBJECTIVE TWO

To Determine the Sequence of Some Positive PCR Amplicons and Carryout Phylogenetic Analysis

RESULTS

❖Four (4) Positive samples were selected at random from the Sixthy four (64) amplicons and were sent to Macrogen Europe in Netherlands for Sequencing

❖Sequences obtained were manually edited and compared with the sequences available in the GenBank database using the Basic Local Alignment Sequence Techniques (BLASTn) (www. blast. ncbi. nlm. nih.gov/ blast. cgi)

❖ The sequences obtained in this study were deposited in the GenBank with the accession number (MZ394795 and MZ394796) for *T. evansi* from Katsina and MZ394797 for *T. evansi* from Kano State

❖Phylogenetic analysis was performed to compare the relationship between nucleotide sequences detected in this study with those in GenBank database..

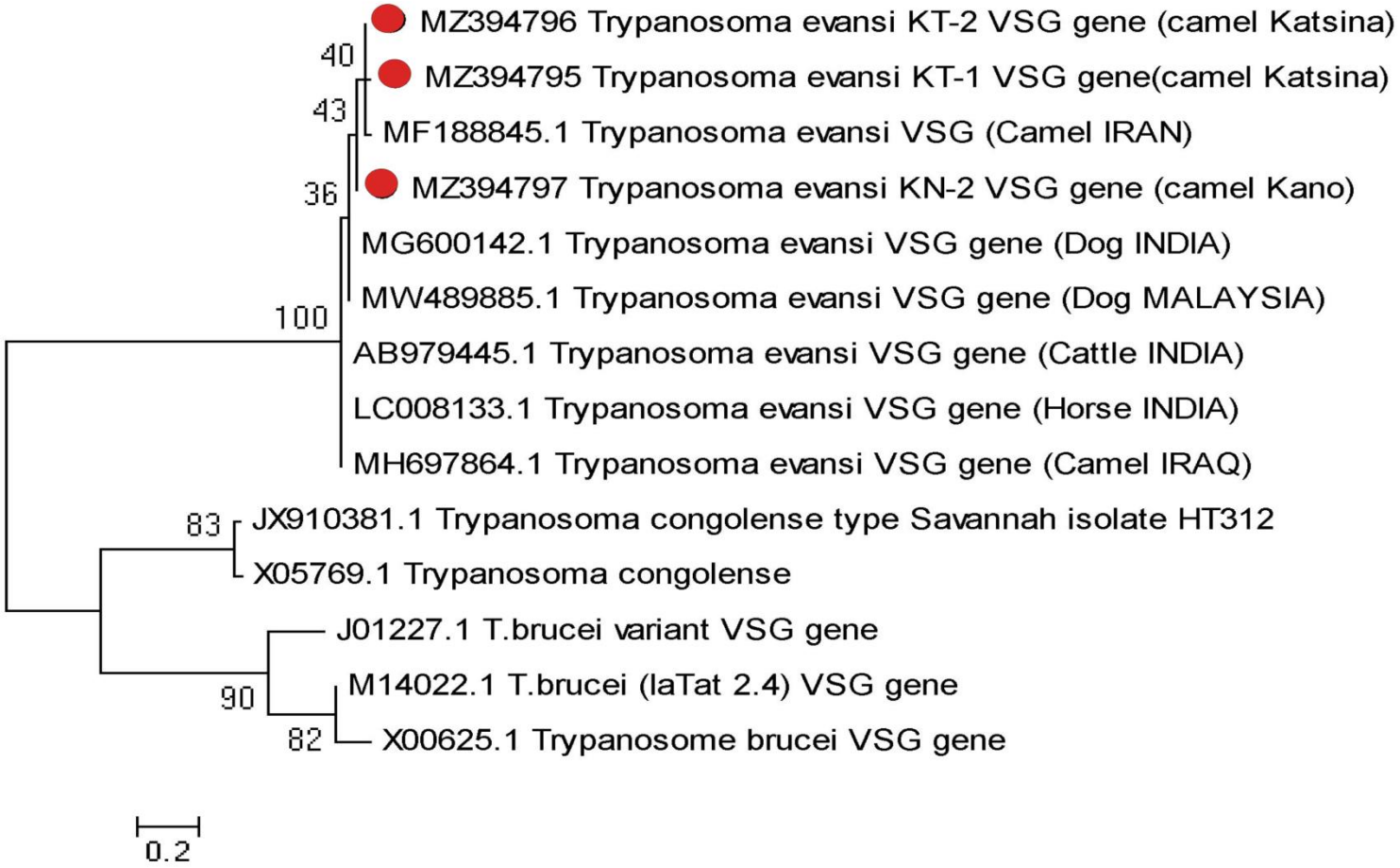


Figure 8 Phylogenetic relationships of *T.evansi* detected in this study with other *T.evansi* sequences from different parts of the world in GenBank.

CONCLUSION

❖The Phylogenetic analysis confirms that *T.evansi* isolates from the two study areas in Nigeria have the same homology with others in the gene bank

❖There is therefore no new strain of *Trypanosoma evansi* parasite identified in this study.

❖ Also the Phylogenetic analysis showed that the nucleotide sequences of *T. evansi* from Nigerian camels formed a monophyletic cluster with sequences in GenBank.

❖As these parasite aligned with those from camels, dogs and horses in Iran, Iraq, India and Malaysia. The clustering pattern observed in this study is similar to a recent report from Palestine (Ereqat et al., 2020). This is a strong indication of the monomorphic nature of *T. evansi*.

THANK

YOU