



**35TH GENERAL CONFERENCE OF
THE INTERNATIONAL SCIENTIFIC COUNCIL FOR
TRYPANOSOMIASIS RESEARCH AND CONTROL
(ISCTRC) AND
18TH PATTEC NATIONAL COORDINATORS MEETING**

PROGRAMME AND ABSTRACTS BOOK



**35TH GENERAL CONFERENCE OF
THE INTERNATIONAL SCIENTIFIC COUNCIL
FOR TRYPANOSOMIASIS RESEARCH AND
CONTROL (ISCTRC) AND 18TH PATTEC NATIONAL
COORDINATORS MEETING**

PROGRAMME AND ABSTRACTS BOOK

ABOUT THE CONFERENCE

Theme of the Conference

Impact of African Trypanosomiasis on Human and Animal Health, Sustainable Agriculture and Rural Development in the face of challenges to sustainable investment in AAT control and HAT elimination”Members of the Scientific Committee

The members of the 35th ISCTRC Scientific Committee that were appointed by the Director of AU-IBAR were drawn from various institutions working on Tsetse and Trypanosomiasis. The committee received and considered 140 abstracts addressing the various sub-themes of the conference.

Prof. Ahmed Elswalhy, Director of AU-IBAR, Chairperson
Dr. James Wabacha, ISCTRC Secretary, Member
Dr. Gift Wanda, Member
Dr. Daniel Masiga, Member
Dr. Jose Ramon Franco

Rapporteur and Moderators

Rapporteur General Grace Mulira
Deputy Rapporteur General Njelembo Mbewe

Moderators and rapporteurs for the various thematic sessions are as per the programme

Presentation guidelines

Allocated time for presentations:

Each presentation will be allocated 10 minutes and 5 minutes for discussion.

Viewing of posters

There will be continuous viewing of the posters. The presenters for the posters will be at the stands during the coffee/tea breaks. There will be general discussion on the posters in the plenary on Thursday, 26th September 2019.

Uploading of presentations in the conference computer
Presenters who will be making presentation during the first day are

requested to upload their presentation during registration on Sunday. The rest of the presentations will be uploaded in the conference computer on the eve of the presentation. The Rapporteurs will support you on this activity. The presenters for each session will take front seats in preparation for presentation and discussions.

Presentation by Organizations

Representatives of organizations will make their presentations on the first day of the conference during Session two.

Certificate awards for the best posters

There will be awards of Certificates for the best five (5) posters presented at the conference. A team of experts will evaluate the posters based on criteria that was shared with participants.

A summary of presentations that will be made during the conference

Thematic area	Oral	Poster	Total
PATTEC and Country reports	21	0	21
Human African Trypanosomiasis	25	6	31
Animal African trypanosomiasis	23	25	48
Glossina Biology, Control and Eradication	18	15	33
Land use, environment and Socio-economics	7	0	7
Total	94	46	140

NATIONAL COORDINATING COMMITTEE

Dr. Augustine C. Igweh	NITR, Kaduna	Chairman
Pharm. Abayomi Oguntunde	FMST, Abuja	Deputy Chairman
Dr. Peter M. Dede	NITR, Kaduna	Secretary
Dr. Joachim J. Ajakaiye	NITR, Kaduna	Assistant Secretary
DSI Yussuff O.A	Nig. Immigration	Service Member
Mal. Ahmed K. Zakari	NITR, Kaduna	Member
Mr. Hiver BOUSSINI	FAO, Nigeria	Member
Prof. Mohammed Mamman	ACENTDFB, ABU, Zaria	Member
Inemo Adaka	NAEC, Abuja	Member
Mal. Abdulmalik Ozigis	FMoE, Abuja	Member
Uduak Gideon	FMoH, Abuja	Member
Mr. Francis B. Kojah	FMARD, Abuja	Member
Mal. Ahmed Abdullahi	Natl. Park Service, Abuja	Member
Mr. Caleb Garba	NITR, Kaduna	Member

**35TH GENERAL CONFERENCE OF
THE INTERNATIONAL SCIENTIFIC COUNCIL
FOR TRYPANOSOMIASIS RESEARCH AND
CONTROL (ISCTRC) AND 18TH PATTEC NATIONAL
COORDINATORS MEETING**

PROVISIONAL PROGRAMME

TIME	ACTIVITY	PRESENTER
Sunday, 22nd September 2019		
08.15-18.00	Registration, Distribution of documents and display of posters	
Monday, 23rd September 2019		
08.00-0.900	Registration, Distribution of documents and display of posters	
SESSION 1		
09.00	OPENING CEREMONY Statements by officials	
	Keynote Address: Impact of African Trypanosomiasis on Human and Animal Health, Sustainable Agriculture and Rural Development in the face of challenges to sustainable investment in AAT control and HAT elimination”- AUC Commissioner of Rural Economy and Agriculture, H.E Josefa Leonel Correia Sacko	National Organizing Committee and AUC
11.10 - 11.30	Health Break and Viewing of Posters	
SESSION 2		
	Organisations	
	Moderator: Gift Wanda Rapporteur: Giuliano Cecchi	
11.30 -13.00	Presentations by Representatives of Organizations (FAO/PAAT, WHO, IAEA, ILRI, ICIPE, CIDRES, FIND, DNDi)	
13.00- 14.00	Lunch break	

TIME	ACTIVITY	PRESENTER
SESSION 3a		
	Theme 1 : PATTEC initiative and Country reports	
	Moderator: <i>Lisette Kohagne</i> Rapporteur: <i>Ndoutamia G. Anaclet</i>	
14.00-14.20	Key Note presentation Impact of PATTEC initiative and future perspectives–Gift Wanda	Gift Wanda
14.20-14.30	Discussions	
14.30 - 14.45	1.01 Report on AU-PATTEC coordination office from 2017 to 2019 <i>Wanda Gift and Girma Urgeacha</i>	Girma Urgeacha
14.45 - 15.00	1.02 Report and Recommendations of 17th PATTEC National Coordinators and Focal/ Points meeting <i>Wanda Gift, Girma Urgeacha</i>	Girma Urgeacha
15.00 - 15.10	1.03 Zambia Country Report for the period 2017-2019 <i>C. Chilongo K., Mbewe N. and Muyobela J.</i>	Chilongo K
15.10 - 15.20	1.04 Creation of sustainable tsetse and trypanosomiasis free areas in Nigeria through the PATTEC initiative – 2018-2019 progress Report <i>Dede, P.M., Ajakaiye, J.J. and Igweh A.C.</i>	Dede, P.M.
15.20 - 15.30	1.05 Progress Report on Research and Control of Tsetse and Trypanosomosis in South Sudan <i>Erneo B. Ochi</i>	Erneo B. Ochi
15.30 - 15.40	1.06 Country report for Chad 2017-2019 <i>M. Peka ; J. Darnas; S. MBainda; H. Mahamat ; G. Brahim; A. Picado; Rayaisse J.B; P.Solano; J.R.Franco;</i>	M. Peka
15.40 - 15.50	1.07 Tsetse and trypanosomiasis management in Tanzania during 2017 -2019 <i>Joyce Daffa</i>	Joyce Daffa
15.50 - 16.00	1.08 Country Report for Sudan <i>Mohammed Adam Hassan</i>	Mohammed Adam Hassan
16.00 - 16.30	Discussion	
16.30 - 16.45	Health Break and Viewing of Posters	

TIME	ACTIVITY	PRESENTER
SESSION 3b:		
16.45 - 16.55	1.09 Evaluation of situation of trypanosomiasis in the north of Congo razzaville <i>NINA Rock Aime</i>	NINA Rock Aime
16.55 - 17.05	1.10 Ghana report on progress made since 2018	
17.05 - 17.15	1.11 Kenya Tsetse and Trypanosomiasis Eradication Council (KENTTEC): Sustaining the Gains <i>Pamela Olet</i>	Pamela Olet
17.15 - 17.25	1.12 Country Report: Tsetse Control in Zimbabwe 2017-2019 <i>W. Shereni</i>	W. Shereni
17.25 - 17.35	1.13 Malawi tsetse and trypanosomosis control programme <i>Julius L.C. Chulu</i>	Julius L.C. Chulu
17.35 - 17.45	1.14 Tsetse control activities in Cameroon since November 2018 (132) <i>Abah Samuel</i>	Abah Samuel
17.45 – 18:15	Discussion	
Tuesday 24th September 2019		
SESSION 3c:		
Theme 1 : PATTEC initiative and Country reports Continued		
08.15 - 08.25	1.15 Tsetse Fly and Trypanosomosis Control in Niger <i>Abdoul Razak ISSA GARBA</i>	Abdoul Razak ISSA GARBA
08.25- 08.35	1.16 Country report for Uganda <i>Ambrose M. Gidudu and Fredrick Luyimbazi</i>	Ambrose M. Gidudu
08.35 - 08.45	1.17 Current Situation of Tsetse and Trypanosomiasis in Mozambique <i>Susana Jamal</i>	Susana Jamal
08.45- 08.55	1.18 Country report for Cote D'Ivoire <i>N'guessan Assanvo Lambert</i>	Dr N'GUESSAN Assanvo Lambert
08.55-09.05	1.19 The situation of tsetse and trypanosomosis in the Democratic Republic of Congo: Activities and results since September 2018. <i>Philemon Mansinsa Diabakana, Junior Kazadi Mulaja</i>	Philemon MANSINSA DIABAKANA

TIME	ACTIVITY	PRESENTER
09.05 - 09.15	1.20 Country Report on Tsetse and Trypanosomosis Surveillance in the Kingdom of Eswatini <i>Sihle Mdluli</i>	Sihle Mdluli
09.15 - 09.25	1.21 Consolidation of efforts for sustainable creation of tsetse and trypanosomosis free areas for livestock and crop production in Ethiopia. <i>Dagnachew Beyene</i>	Dagnachew Beyene
09.25 - 10.00	Discussions	
10.00 - 10.30	Health Break and Viewing of Posters	
SESSION 3d		
10.30 - 13.00	PATTEC Open Forum: Achieving the mandate of Heads of States and Governments on eradicating tsetse and trypanosomiasis from the African continent Moderators: Prof Ahmed Elsamaly and Dr. Rajinder Saini Rapporteur: Dia Lamine Mamadou	Panel Speakers William Shereni Issa Sidibe Lisette Kohagne Dagnachew Beyene Gift Wanda
13.00 - 14.00	Lunch break	
SESSION 4		
Theme 2: Human African Trypanosomiasis		
	Moderator: Charles Wamboga Rapporteur: Gerardo Priotto	
14.00 - 14.20	Key note Presentation Advances on HAT elimination. Moving to the sustainable elimination of gambiense HAT in 2030: Challenges and opportunities”	Franco Minguell
14.20 - 14.30	Discussions	
SESSION 4a: Diagnostic and treatment I		
14.30 - 14.40	2.01 Performance of diagnostic algorithms based on rapid diagnostic tests to detect sleeping sickness in the Democratic Republic of Congo (65) <i>Makabuzza Mukabela Jacques</i>	Makabuzza Mukabela Jacques
14.40 - 14.50	2.02 Difficulties conducting sensitive tests for the diagnosis of human African trypanosomiasis in the Democratic Republic of Congo <i>Jérémie Ilunga, Epco Hasker and Erick Mwamba Miaka</i>	Jérémie Ilunga

TIME	ACTIVITY	PRESENTER
14.50 - 15.00	2.03 Strengthening diagnostic documentation procedures in clinical trials to develop new therapeutic tools in human African trypanosomiasis <i>J. Dinanga, D. Tshimanga, D. Ngolo, M. Cire Thiam, W. Mutombo, S. Rembry, Ch. Perdrieu, A. Pretre, S. Delhomme, O. Valverde, A. Tarral; N. Strub-Wourgaft</i>	J. Dinanga
15.00 - 15.10	2.04 Description of a quality Assurance system for the biological diagnosis of HAT in the National Programme for the control of HAT in DRC <i>Mutangala W, Mwamba E, Kwete J, Basha M, Bawota J, Mumba D, Pyana P, Inocencio da Luz R, Büscher P, Boelaert M</i>	Mutangala W
15.10 - 15.20	2.05 Sensitivity of serological tests for Trypanosoma brucei gambiense in detecting antibodies in livestock, and correlate with tsetse fly infestation in a human african trypanosomiasis endemic foci in delta state, Nigeria <i>Dede, P.M.; Ajakaiye, J.J.; Wayo, B.; David, K.; Yusuf, A. B.; Baba, U.; Ezebuio, C.O.; Edache, C. I.; Ishaq, A.R.; N'dungu, J.</i>	Dede, P.M
15.20 - 15.30	2.06 Evolution of the nutritional status of children included in the DNDiHATFEX006 study in the Democratic Republic of Congo (DRC), between the time of diagnosis and the end of the 18-month follow-up. <i>Junior E. Mudji, Digas T. Ngolo, Wilfried K. Mutombo, Olaf Valverde Mordt</i>	Junior E. Mudji
15.30 - 16.00	Discussions	
16.00 - 16.30	Health Break and Viewing of Posters	
SESSION 4b: Diagnostics and treatment II		
Theme 2: Human African Trypanosomiasis		
16.30 - 16.40	2.07 An active search strategy for unconfirmed CATT positive suspects set up by a health zone team in the DRC <i>Nkieri Matthieu, Kavunga Papy, Nganzobo Pathou, Mafolo Titus, Basake JP, Selego Chalet, Kapalati Arnold, Mwamba Eric, Mbo Florent</i>	Nkieri Matthieu,

TIME	ACTIVITY	PRESENTER
16.40 - 16.50	2.08 Immune Trypanolysis Test as a diagnostic tool for a rational follow-up of serological suspects until the detection of <i>Trypanosoma brucei gambiense</i> <i>Bawota J, Miaka E, Kashama D, Kambale V, Lutandila B, Pyana P</i>	Bawota J
16.50 - 17.00	2.09 Identification of Novel Stage Diagnostic Bio-markers in plasma of <i>Trypanosoma brucei rhodesiense</i> Sleeping Sickness Patients in Uganda <i>Charles D. Kato, Vincent P. Alibu, Jean-Charles Sanchez, Claire M. Mugasa, Enock Matovu</i>	Charles D. Kato
17.00 - 17.10	2.10 The potential of cerebral spinal fluid interleukin-6 in discriminating between early and late stage sleeping sickness in northern Uganda <i>Asiimwe Immaculate, Kato Charles Drago</i>	Asiimwe Immaculate
17.10 - 17.20	2.11 Evaluation of the sensitivity of primers used for the PCR diagnosis of human African trypanosomiasis due to <i>Trypanosoma brucei gambiense</i> in guinea coastal foci <i>Hamidou Ilboudo, Oumou Camara, Mamadou Camara, Jacques Kaboré, Mohamed Bamba, Justin Kaboré, Philippe Solano, Bruno Bucheton, Vincent Jamonneau</i>	Hamidou Ilboudo
17.20 - 17.30	2.12 Evaluation of Trypanocidal Activity of compound isolated from <i>Vitellaria paradoxa</i> of Central African Republic <i>Nzoumbou-Boko R, Bairy G, Courtois P, Mérillon J.M, and Vincendeau P</i>	Nzoumbou-Boko R
17.30 - 18.00	Discussions	
Wednesday 25th September 2019		
SESSION 4c: Epidemiology and Control I		
08.15- 08.25	2.13 Risk of post-transfusion transmission of human african trypanosomiasis in the city of Mbuji-Mayi in the Democratic Republic of Congo (March 2003 - December 2017) <i>B. Milomba, J. Ilunga, M. Ilunga, D. Mpoyi, D. Kazumba, F.Tshimungu;</i>	B. Milomba

TIME	ACTIVITY	PRESENTER
08.25- 08.35	2.14 Risk of resurgence of HAT in low-prevalence conflict areas: Case of Eastern Kasai Province in the DRC from 2013 to 2018 <i>Rashidi Samuel; MBO Florent, Erick Miaka</i>	Rashidi Samuel
08.35 - 08.45	2.15 The HAT Atlas: a GIS-based system to plan control activities and monitor progress in HAT elimination <i>Grout Lise, Paone M, Priotto G, Cecchi G, Ebeja AK, Diarra A, Franco JR</i>	Grout Lise
08.45 - 08.55	2.16 Passive surveillance for sustainable elimination of Human African Trypanosomiasis in Central Kongo Province, DRC <i>Jacques Makabuza Mukabela</i>	Jacques Makabuza Mukabela
08.55 - 09.05	2.17 Enhanced passive screening for HAT in Angola - progress towards elimination. <i>Makana Don Paul, Amadeu Dala, Kayembe Simon, Bessell Paul, Joseando, Constantina Machado, Ndung'u Joseph;</i>	Makana Don Paul
09.05 - 09.15	2.18 Human african trypanosomiasis: constraints to effective reports in Nigeria <i>Olaleye O.O., Aluma L.A and Gbadamosi F.I., Abdulkadir A. D.</i>	Olaleye O.O
09.15 - 09.25	2.19 Human African trypanosomiasis (HAT): decreasing prevalence, increasing cost per case detected, the challenge of active case detection for disease elimination <i>Valverde Mordt Olaf</i>	Valverde Mordt Olaf
09.25 – 10.00	Discussion	
10.00 - 10.30	Health Break and Viewing of Posters	
10.30-10.40	2.20 Evaluation of the feasibility of integrating traditional healer in the detection of Human African trypanosomiasis in Central Africa, case of the DRC <i>Mutangala W, Mwamba E, Kakozi V, Fukinsia A, Kwedi N.S, Mpanya A, Wono P, Okoko A</i>	Mutangala W
10.40-10.50	2.21 Environment and Community Engagement for the Elimination of HAT in Guinea <i>Alpha Ahmadou Diallo</i>	Alpha Ahmadou Diallo

TIME	ACTIVITY	PRESENTER
10.50 - 11.00	2.22 Controlling African Trypanosomosis and tsetse flies in the sleeping sickness and AAT focus in (Chad) <i>B. Guihini; M. Peka; JB. Rayaisse; I. Tirados; J. Rouamba; Wilfrid Yoni; L. Sanogo; J. Darnas; F. Courtin ; G. Adoum; S. Torr; P. Solano;</i>	B. Guihini
11.00 - 11.10	2.23 Livestock and the epidemiology of sleeping sickness: mechanisms and implications <i>Julianne Meisner, Jon Wakefield, David M Pigott, Ali Rowhani-Rahbar, Jonathan D; Mayer, Caitlin A Bever, Peter M Rabinowitz</i>	Julianne Meisner
11.10 - 11.20	2.24 Use of the immune trypanolysis test to detect T.b. gambiense-specific antibodies in sera from domestic animals in silent and hypoendemic sleeping sickness foci in the Democratic Republic of the Congo (Foci of Boko-Kivulu and Boma in Kongo Central Province) <i>Pyana Pati , Mbo Florent, Bobo Lutandila, Kambale Vincent, Kabongo Jean-Baptiste, Badibanga Dieudonné, Natoro Cyprien, Phanzu Boniface, Ndongo Parfait, Lukusa Ipos, Kabamba Willy;</i>	Pyana Pati
11.20 - 11.30	2.25 Tanzania One Health Initiatives in the Control of Human African Trypanosomiasis <i>Joyce Daffa; Justine Assenga; Folorunso Fasina; Moses Ole-Neselle; Hezron Nonga;</i>	Joyce Daffa
11.30 - 12.00	Discussion	
SESSION 5		
Theme 3: Animal African Trypanosomiasis		
	Moderator: Rapporteur:	
12.00 - 12.20	Key Note Presentation Progress made in the past two years on the PCP for AAT and challenges towards sustainable control of AAT	Wenning Zhao
12.20 - 12.30	Discussion	

TIME	ACTIVITY	PRESENTER
SESSION 5a: Epidemiology		
12.30 - 12.40	3.01 An Atlas to Support the Progressive Control of Tsetse-Transmitted Animal Trypanosomosis in Kenya <i>Nancy N. Ngari, Daniel O. Gamba, Pamela A. Olet, Weining Zhao, Massimo Paone, Giuliano Cecchi</i>	Nancy N. Ngari
12.40 - 12.50	3.02 A national atlas of tsetse and african animal trypanosomosis in Mali <i>Boucader Diarra, Modibo Diarra, Oumar Diall, Boubacar Bass, Youssouf Sanogo, Etienne Coulibaly, Mahamadou Sylla, Weining Zhao, Massimo Paone, Giuliano Cecchi</i>	Boucader Diarra
12.50 - 13.00	3.03 Trypanosomosis and multiple bovine infections in the wildlife-livestock interface of Lambwe Valley, Western Kenya <i>Michael Nyanganga Okal, Shewit Kalayou I, Kawira Mathenge, Brenda Kisia Odhiambo, Francis Mcodimba, Dan Masiga</i>	Michael Nyanganga Okal
13.00 - 14.00	Lunch break	
SESSION 5a: Epidemiology		
14.00 - 14.10	3.04 Preliminary Investigation of Trypanosoma equiperdum among Equus ferus caballus (Domestic Horse), in Kano State, Nigeria <i>Atikat, U., Maigari, A. K., Musayyiba, S., Abullahi, I. Z., Hafsat, M. and Sadiq, A. A.</i>	Atikat, U
14.10 - 14.20	3.05 African Animal trypanosomiasis outside tsetse belt <i>Merid N. Getahun; Joel L. Bargul; Abel Orone I; John Ngiela; Peter O. Ahuya I, Jackson M. Muema, Rajinder K. Saini, Baldwin Torto and Daniel K. Masiga</i>	Merid N. Getahun
14.20 - 14.30	3.06 Factors associated with persistence of Animal African Trypanosomiasis in Lango sub region, Northern Uganda <i>Robert Mandela Wangoola, Bardosh Kevin, Christine Amongi Acup, Susan Welburn, Charles Waiswa, James Bugeza</i>	Robert Mandela Wangoola

TIME	ACTIVITY	PRESENTER
14.30 - 14.40	3.07 Prevalence of trypanosomosis among camels examined by HCT, PCR and CATT/T .evansi in South Darfur, Sudan <i>Adam, M. E., Salih, D.A. and Abdelrhman, A.H.</i>	Adam, M. E.
14.40- 14.50	3.08 Incidence of trypanosomosis in some selected fulani settlements residing in northern part of Kano State, Nigeria (123) <i>Abdullahi, I. Z., Maigari, A. K., Hafsat, M., Sadiq A. A., Atikat, U. and Musayyiba, S.</i>	Abdullahi, I. Z
14.50- 15.00	3.09 Occurrence of trypanosome infections in cattle in relation to season, livestock movement and management practices of Maasai pastoralists in Northern Tanzania <i>Esther G. Kimaro, Jenny-Ann Toribioac, Paul Gwakisad, Siobhan M. Morac;</i>	Esther G. Kimaro
15.00- 15.10	3.10 Molecular prevalence of trypanosome species infection in cattle and tsetse flies in Idah, Ibaji and Igalamela local government area of Kogi State, Nigeria. <i>Musa Muhammed Shaibu, Inuwa H. Mairo and Sani Ibrahim</i>	Musa Muhammed Shaibu
15.10- 15.20	3.11 Epidemiology of Trypanosomes and Associated Lesions on Goats and Sheep in Kano State, Nigeria <i>Musayyiba, S., Maigari, A. K., Abdullahi, I. Z., Hafsat, M., Sadiq A. A. and Atikat, U.</i>	Musayyiba, S
15.20 – 16.00	Discussions	
16.00 - 16.30	Health Break	
SESSION 5b Diagnosis		
16.30 – 16.40	3.12 Testing new candidates to include in a combination of recombinant proteins for efficient diagnosis of African Animal Trypanosomosis <i>Tounkara M, Thonnus M, Bringaud F, Thévenon S, Berthier D, Boulangé A, Bengaly Z and Rivière L</i>	Tounkara M

TIME	ACTIVITY	PRESENTER
16.40 - 16.50	3.13 Cloning of amplified glycerol kinase gene of <i>Trypanosoma brucei brucei</i> and its in vitro expression in hepg2 cells (50) <i>Habila Amaya Jobin, NOK Andrew Jonathan, Gbem Thaddeus Thelumun, Deize Frank, Kelm Soerge, Balogun Emmanuel Oluwadare</i>	Habila Amaya Jobin
16.50 - 17.00	3.14 Phosphorylation Profiling of the Bovine Proteome: A basis for Biomarker Discovery in Trypanosomiasis Control <i>Oladeji Bamidele and Ofelia-Galman Omitogun</i>	Oladeji Bamidele
17.00 - 17.10	3.15 Molecular detection of human-infective trypanosomes in cattle and tsetse flies from Zambia and Malawi <i>Namangala Boniface, Hayashida Kyouko, Nakamura Yukiko, Chatanga Elisha, Musaya Jenelisa, Mweempwa Cornelius, Chilongo Kalinga, Chisi John, Sugimoto Chihiro</i>	NAMANGALA Boniface
17.10 - 17.20	3.16 Resilience of the African Grasscutter (<i>Thryonomys swinderianus</i> , Temminck) to <i>Trypanosoma</i> organisms <i>Maxwell N. Opara, Joy A. Maxwell and Benjamin O.Fagbemi</i>	Maxwell N. Opara
17.20 - 17.50	Discussions	
Thursday 26th September 2019		
SESSION 5c : Chemotherapy and drug resistance		
08.15 - 08.25	3.17 In vitro trypanocidal activities of fractions from the ethanolic stem bark extract of <i>Commiphora swynnertonii</i> against <i>Trypanosoma congolense</i> . <i>Yakob P Nagagia, Eliningaya J Kweka, Richard S Silayoa,</i>	Yakob P Nagagia
08.25 - 08.35	3.18 The evaluation of the antitrypanosomal potential of aqueous extract of <i>Adansonia digitata</i> in rats <i>Iliyasu, Ha; Jatau, I. da; Ogunleye, O.o</i>	Iliyasu, Ha

TIME	ACTIVITY	PRESENTER
08.35 - 08.45	3.19 Trypanosoma congolense versus phloroglucinol: in vivo studies and inhibitory effects against trypanosomal sialidase in vitro and in silico <i>Nasirudeen Idowu Abdurashida, Mohammed Auwal Ibrahim, Murtala Bindawa Isah, Isa Danladi Jatauc and Elewechi Onyikea</i>	Nasirudeen Idowu Abdurashida
08.45 - 08.55	3.20 Short- and long-term effects of orally administered azithromycin on Trypanosoma brucei brucei-infected mice <i>Peter S. Musinguzi, Nthatsi I. Molefe, Keisuke Suganuma</i>	Peter S. Musinguzi
08.55 - 09.05	3.21 Isolation and characterization of trypanocidal active component of echis ocellatus venom <i>Ilu, Ameh, Nasir Shuaibu M, Mohammed Mamman, Emmanuel O. Balogun</i>	Ilu, Ameh
09.05 - 09.15	3.22 Ameliorative and curative effects of selected anti-oxidants and trypanidium in wistar rats infected with trypanosoma brucei-bruce (Federe strain) <i>Shuaibu Y, Mohammed S.S.D</i>	Shuaibu Y
09.15 - 09.25	3.23 Influence of the administration of vitamins C and E on somatic and reproductive profiles in wistar rat infected with Trypanosoma brucei brucei <i>Ajakaiye, J. J., Ogwu, D. O., Bizi, R. L., Mohammad, B., Mohammed, A. A</i>	Ajakaiye, J
09.25 - 10.00	Discussion	
10.00 - 10.30	Health Break and Viewing of Posters	
SESSION 6 : Poster session		
10.30 - 11.30	Discussions in the conference hall Moderator: Lamine Dia Rapporteur:	
SESSION 7a:		
THEME 4: Glossina Biology, Control and Eradication		
11.30 - 11.50	Moderator: Baba Sall Rapporteur: Njelembo J. Mbewe	

TIME	ACTIVITY	PRESENTER
11.50 - 12.00	Key Note presentation Progress in using genomic approaches for control of vector and trypanosomiasis-	Grace Murilla and Serah Aksoy
12.00 - 12.10	Discussion	
12.10 - 12.20	4.01 Novel odor blend with enhanced attraction of savannah tsetse flies (28) <i>Benson M. Wachira, Joy M. Kabaka, Paul O. Mireji, Sylvance Okoth, Margaret M. Ng'ang'a, Robert Changasi, Patrick Obore, Charles Ochieng', Grace A. Murilla, Pierro Ngugi, Ahmed Hassanali</i>	Benson M.Wachira
12.20 - 12.30	4.02 Control of tsetse and trypanosomiasis using novel tsetse attractants and repellent in Kwale county, Kenya <i>Daniel Gamba, Benson M. Wachira, Imna Malele, Johnson O. Ouma, Richard Echodu, Sylvance Okoth, Ahmed Hassanali, Moses Cheruyot, Pamela Olet, Raymond Mdachi, Joanna Auma, Paul O. Mireji</i>	Daniel Gamba
12.30 - 12.40	4.03 Field evaluation of waterbuck repellent compounds against <i>Glossina morsitans morsitans</i> at stationary and mobile sampling tools in Zambia <i>Njelembo J. Mbewe; Micheal N. Okal; Kalinga Chilongo; Jackson Muyobela; Milner Mukumbwal and Daniel K. Masiga</i>	Njelembo J. Mbewe
12.40 - 13.00	4.04 Bioactivity of three aromatic plants' essential oil: repellent, anti-feedant and tsetse-cidal properties <i>Emmanuel, R.T., Ogar, M.U., Omolade, L.O., Odeyemi, S.O., Omotosho, K., Idowu, F.M., Benjamin, J.E., Anchau, R.G., Olanrewaju, T.O., Jonah, A., K. Ibrahim</i>	Emmanuel, R.T.,
13.00 - 14.00	Discussions	
13.00 - 14.00	Lunch break	
SESSION 7b		
14.00 - 14.10	4.05 Innovative tools in the control of <i>Palpalis</i> group tsetse: Plastic screens <i>Salou E., Rayaisse JB, Gimonneau G, Jacquiet PD, Solano P and Desquesnes M</i>	Salou E

TIME	ACTIVITY	PRESENTER
14.10 - 14.20	4.06 The Multi Targets Method (MTM): a proof of concept for the control of biting flies as vectors, using innovative toxic screens. <i>Desquesnes M, Bouhsira E, Chalermwong P, Drosne L, Duvallet G, Franc M, Gimonneau G, Grimaud Y, Guillet P, Himeidan Y, Jacquiet P, Jittapalapong S, Karanja W, Liénard E, Onju S, Ouma J, Rayaisse J-B, Masmeatathip R, Shah V, Shukri S, Thaisungnoen K, Thevenon S, Salou E</i>	Desquesnes M
14.20 - 14.30	4.07 Performance of odour-baited insecticide-treated targets mounted on small trees in the eradication of tsetse (<i>Glossina</i> species) in Zimbabwe. <i>A.Mhindurwa and D.Tsikire</i>	A.Mhindurwa
14.30 - 14.40	4.08 Genetic Diversity and phylogenetic relationships of some palpalis group tsetse fly in Congo Brazzaville based on mtDNA COI sequences. <i>Abraham Mayoke, Rosemary Bateta, Shadrack S. Muya, Paul O. Mireji, Sylvance Okoth, Samuel G. Onyonyo, Joanna E. Auma, Johnson O. Ouma</i>	Abraham Mayoke
14.40 - 14.50	4.09 Phylogeography and population structure of the tsetse fly <i>Glossina pallidipes</i> in Kenya and the serengeti ecosystem. <i>Bateta R, Saarman NP, Okeyo WA, Dion K, Mireji PO, Okoth S, Malele, Murilla G, Aksoy S and Caccone A</i>	Bateta R
14.50 - 15.00	4.10 Entomological baseline survey for a feasibility study on drone released sterile tsetse (Diptera: Glossinidae) in the Zambezi Valley, Zimbabwe. <i>W Shereni, D.Tsikire, L Nyakupinda, R.A. Herrero</i>	W Shereni
15.00 - 15.10	4.11 <i>Winnie A. Okeyo, Norah P. Saarman, Rosemary Bateta, Kirstin Dion, Michael Mengual, Paul O. Mireji, Collins Ouma, Sylvance Okoth, Grace Murilla, Serap Aksoy and Adalgisa Caccone</i>	Winnie A. Okeyo

TIME	ACTIVITY	PRESENTER
15.10 - 15.20	4.12 Competitiveness and survival of two strains of <i>Glossina palpalis gambiensis</i> in an urban area of Senegal. <i>Mireille Djimangali Bassène, Momar Talla Seck, Soumaila Pagabeleguem, Assane Gueye Fall, Baba Sall, Marc J. B. Vreysen, Geoffrey Gimonneau, Jérémy Bouyer</i>	Mireille Djimangali Bassène
15.20 - 15.30	4.13 Recovery rates of <i>G. m. morsitans</i> following a localized control operation in North eastern Zimbabwe: is Climate change influencing recovery? <i>TNC Mangwiro, Mr W. Shereni, Mr O.N. Nyirenda, Mr L. Mubvuta,</i>	TNC Mangwiro
15.30 - 16.00	Discussions	
16.00 - 16.30	Health Break	
	SESSION 7c	
16.30 - 16.40	4.14 Host location and intra-population fly size variation in male <i>Glossina morsitans morsitans</i> caught using stationary baits (36) <i>Njelembo J. Mbewe; Micheal N. Okal; Kalinga Chilongo; Jackson Muyobela; Milner Mukumbwali and Daniel K. Masiga</i>	Njelembo J. Mbewe
16.40-16.50	4.15 Identification of Trypanosome Species by Nested PCR from Kubacha Forest Using Generic and Species Specific Primers). <i>Attahir. A, Rukayya. G, Friday. I, Abdulraheem. S I, Ibrahim. I, Alice J, Jabiru, Isadu, H, G. Musa H. D and Machina, I. B</i>	Attahir.A
16.50-17.00	4.16 Integrated tsetse and trypanosomiasis control in Agro-Pastoral community of Pate island Lamu County: A case study 2009-2018 <i>Gamba D. O, Cheruyoit M, Olet, P.A.,</i>	Gamba D. O
17.00-17.10	4.17 Prospects of fabric panels impregnated with metarhizium anisopliae against vectors of sleeping sickness. <i>Riithi N. N., Njelembo J. M., Kokwaro E. D., Subramanian S, Masiga D. K., Okal M. N..</i>	Riithi N. N

TIME	ACTIVITY	PRESENTER
17.10 - 17.20	4.18 The effect of simple tsetse control technologies to reduce tsetse population in Assosa District of Benishangul-Gumuz region, Ethiopia. <i>Dereje Alemu, Senbeta Tasew and Dagnachew Beyene</i>	Dereje Alemu
17.20 - 17.45	Discussions	
Friday 27th September 2019		
SESSION 8		
Theme:5 Land Use Environment and Socio - economics		
	Moderator: Pamela Olet Rapporteur: Imna Malele	
08.15 - 08.35	Key Note Presentation Elimination of selected populations of tsetse using SIT: progress in the Niayes field project and latest research developments	Rafael Argiles Herrero and Baba Sall
08.35 - 08.45	Discussion	
08.45 - 08.55	5.01 Factors Affecting Farmers' Choice of Tsetse and Trypanosomiasis Control Methods in Lamu County, Kenya (20) <i>Seth Ooko Onyango, Sabina Mukoya-Wangia, Josiah Mwivandi Kinama , Pamela Akinyi Olet</i>	
08.55 - 09.05	5.02 Environmental impact of tsetse eradication in Senegal (37) <i>Mamadou Ciss, Mireille D. Bassène, Momar T. Seck, Abdou G. Mbaye, Baba Sall, Assane G. Fall, Marc J.B.Vreysen, Jérémy Bouyer</i>	
09.05 - 09.15	5.03 Cattle owners' perception of the impact of bovine trypanosomosis in East Darfur state- the Sudan (38) <i>Wisal Elnour M. Elhassan , Bannaga, M.A., Tyseer Elhadi, Elmalik, H. K. and A.H.A/Rahman I</i>	

TIME	ACTIVITY	PRESENTER
09.15 - 09.25	5.04 Assessment of Herdsmen's Knowledge, Attitude and Practices on Tsetse fly and Bovine Trypanosomosis in Bagudo and Kaoje Districts of Bagudo LGA, Northwestern Nigeria <i>Aminu B. Yusuf, Ahmed Kabiru Maigari, Abdulkadir Abubakar, Usman Baba Musa, Mohammed Kabiru Haruna, Hamza Adamu Garba, Abdulkarim Isah Zubair, Idris Baba Machina, Abubakar Shehu Alhaji, Umar Sunusi Galadima, Amina Adamu, Diggi Sani</i>	
09.25 - 09.35	5.05 Evaluation of the socio-economic and environmental impacts of the project to create sustainable tsetse fly-free and trypanosomosis-free zones four years after it ended (80) <i>Percoma L, Dipama A. R, Pooda S. H, Pagabeleguem S, Belem A. M. G, Bouyer J, I Sidibé.</i>	
09.35 - 09.45	5.06 Animal health steps away from antibiotics-the herbal solutions (104). <i>Osunderu Oluwakemi Abosede</i>	
09.45 - 09.55	5.07 Assessment of knowledge, attitudes and practices of the local community surrounding Arabuko Sokoke National Reserve, Kilifi County, Kenya towards tsetse flies and trypanosomiasis <i>Serem E.K, Abdullahi, O.A, Bargul, J. L., and Mburu D. K.</i>	
09.55 - 10.30	Discussions	
10.30 - 11.00	Health Break	
SESSION 9		
CLOSING CEREMONY		
	Moderator: Chairman, ISCTRC, Boniface Namangala Rapporteur: Grace Murilla	
11.00 - 12.00	Recommendations	
12.00 - 13.00	Awards of the ISCTRC in commemoration of the 70th anniversary and the Closing Ceremony	

TABLE OF CONTENTS

I.01	REPORT ON AU - PATTEC COORDINATION OFFICE FROM 2015 TO 2017 Wanda Gift and Girma Urgeacha	1
I.02	REPORT AND RECOMMENDATIONS OF 17TH PATTEC NATIONAL COORDINATORS AND FOCAL/ POINTS MEETING Wanda Gift and Girma Urgeacha	2
I.03	ZAMBIA: COUNTRY REPORT FOR THE PERIOD 2017 TO 2019 Chilongo K., Mbewe N. and Muyobela J.	4
I.04	CREATION OF SUSTAINABLE TSETSE AND TRYPANOSOMIASIS FREE AREAS IN NIGERIA THROUGH THE PATTEC INITIATIVE - 2018/2019 PROGRESS REPORT Dede, P.M., Ajakaiye, J.J. and Igweh A.C.	5
I.05	PROGRESS REPORT ON RESEARCH AND CONTROL OF TSETSE AND TRYPANOSOMOSIS IN SOUTH SUDAN Erneo B. Ochi	7
I.06	COUNTRY REPORT 2017-2019 M. Peka; J. Darnas; S. Mbainda; H.mahamat; G. Brahim; A. Picado; Rayaisse J.b; P.solano; J.r.franco;	8
I.07	TSETSE AND TRYPANOSOMIASIS MANAGEMENT IN TANZANIA DURING 2017 -2019 Joyce Daffa	9
I.08	COUNTRY REPORT FOR SUDAN MINISTRY OF LIVESTOCK, FISHERIES & RANGELAND ANIMAL RESOURCES RESEARCH CORPORATION CENTRAL VETERINARY RESEARCH LABORATORIES TSETSE & TRYPANOSOMOSIS CONTROL DEPT. COUNTRY REPORT/ SUDAN ISCTRC/PATTEC ABUJA, NIGERIA 23-27 SEP 2019 Mohammed Adam Hassan	10

I.09	EVALUATION OF SITUATION OF TRYPANOSOMIS IN THE NORTH OF CONGO BRAZZAVILLE Nina Rock Aime	12
I.10	GHANA REPORT ON PROGRESS MADE SINCE 2018	13
I.11	KENYA TSETSE AND TRYPANOSOMIASIS ERADICATION COUNCIL (KENTTEC): SUSTAINING THE GAINS	14
I.12	COUNTRY REPORT:TSETSE CONTROL IN ZIMBABWE 2017-2019 W. Shereni	15
I.13	MALAWI ABSTRACT FOR MALAWI TSETSE AND TRYPANOSOMOSIS CONTROL PROGRAMME Dr Julius L.C. Chulu (Ph.D., MSc, BVM, CVSc)	16
I.14	TSETSE CONTROL ACTIVITIES IN CAMEROON SINCE NOVEMBER 2018 Abah Samuel	17
I.15	TSETSE FLY AND TRYPANOSOMOSIS CONTROL IN NIGER Dr.Abdoul Razak Issa Garba	18
I.16	COUNTRY REPORT FOR UGANDA Ambrose M. Gidudu and Fredrick Luyimbazi	19
I.17	CURRENT SITUATION OF TSETSE AND TRIPANOSOMOSES IN MOZAMBIQUE Susana Jamal	22
I.18	COUNTRY REPORT FOR COTE D'IVORE N'guessan Assanvo Lambert	23
I.19	THE SITUATION OF TSETSE AND TRYPANOSOMOSIS IN THE DEMOCRATIC REPUBLIC OF CONGO. ACTIVITIES AND RESULTS SINCE SEPTEMBER 2018 Philemon Mansinsa Diabakana and Junior Kazadi Mulaja	25
I.20	COUNTRY REPORT ON TSETSE AND TRYPANOSOMOSIS SURVEILLANCE IN THE KINGDOM OF ESWATINI Dr Sihle Mdluli	26

- 1.21 CONSOLIDATION OF EFFORTS FOR SUSTAINABLE
CREATION OF TSETSE AND TRYPANOSOMOSIS FREE
AREAS FOR LIVESTOCK AND CROP PRODUCTION
IN ETHIOPIA.
Dagnachew Beyene (Dr.) 27

HUMAN AFRICAN TRYPANOSOMIASIS (HAT)

- 2.01 PERFORMANCE OF DIAGNOSTIC ALGORITHMS
BASED ON RAPID DIAGNOSTIC TESTS TO DETECT
SLEEPING SICKNESS IN THE DEMOCRATIC REPUBLIC
OF CONGO
Makabuza Mukabela Jacquies 31
- 2.02 DIFFICULTIES CONDUCTING SENSITIVE TESTS
FOR THE DIAGNOSIS OF HUMAN AFRICAN
TRYPANOSOMIASIS IN THE DEMOCRATIC REPUBLIC
OF CONGO
Jérémie Ilunga, Epco Hasker and Erick Mwamba Miaka 32
- 2.03 STRENGTHENING DIAGNOSTIC DOCUMENTATION
PROCEDURES IN CLINICAL TRIALS TO DEVELOP
NEW THERAPEUTIC TOOLS IN HUMAN AFRICAN
TRYPANOSOMIASIS
J. Dinanga, D.Tshimanga, D. Ngolo, M. Cire Thiam,
W. Mutombo, S. Rembry, Ch. Perdrieu, A. Pretre, S.
Delhomme, O.Valverde, A.Tarral, N. Strub-Wourgaft 33
- 2.04 DESCRIPTION OF A QUALITY ASSURANCE SYSTEM
FOR THE BIOLOGICAL DIAGNOSIS OF HAT IN THE
NATIONAL PROGRAMME FOR THE CONTROL OF
HAT IN DRC
Mutangala W, Mwamba E, Kwete J, Basha M, Bawota
J, Mumba D, Pyana P, Inocencio da Luz R, Büscher P,
Boelaert M 34

2.05	<p>SENSITIVITY OF SEROLOGICAL TESTS FOR TRYPANOSOMA BRUCEI GAMBIENSE IN DETECTING ANTIBODIES IN LIVESTOCK, AND CORRELATE WITH TSETSE FLY INFESTATION IN A HUMAN AFRICAN TRYPANOSOMIASIS ENDEMIC FOCI IN DELTA STATE, NIGERIA</p> <p>Dede PM; Ajakaiye Jj; Wayo B; David K; Yusuf AB; Baba U; Ezebuiri CO; Edache C I; Ishaq AR; N'dungu J.</p>	36
2.06	<p>EVOLUTION OF THE NUTRITIONAL STATUS OF CHILDREN INCLUDED IN THE DNDIHATFEX006 STUDY IN THE DEMOCRATIC REPUBLIC OF CONGO (DRC), BETWEEN THE TIME OF DIAGNOSIS AND THE END OF THE 18-MONTH FOLLOW-UP.</p> <p>*Junior E. Mudji, Digas T. Ngolo, Wilfried K. Mutombo, Olaf Valverde Mordt</p>	38
2.07	<p>AN ACTIVE SEARCH STRATEGY FOR UNCONFIRMED CATT POSITIVE SUSPECTS SET UP BY A HEALTH ZONE TEAM IN THE DRC</p> <p>Nkieri Matthieu, Kavunga Papy, Nganzobo Pathou, Mafolo Titus, Basake JP, Selego Chalet, Kapalati Arnold, Mwamba Eric, Mbo Florent</p>	39
2.08	<p>IMMUNE TRYPANOLYSIS TEST AS A DIAGNOSTIC TOOL FOR A RATIONAL FOLLOW-UP OF SEROLOGICAL SUSPECTS UNTIL THE DETECTION OF TRYPANOSOMA BRUCEI GAMBIENSE</p> <p>Bawota J, Miaka E, Kashama D KambaleV, Lutandila B, Pyana P</p>	41
2.09	<p>IDENTIFICATION OF NOVEL STAGE DIAGNOSTIC BIO-MARKERS IN PLASMA OF TRYPANOSOMA BRUCEI RHODESIENSE SLEEPING SICKNESS PATIENTS IN UGANDA</p> <p>Charles D. Kato, Vincent P. Alibu, Jean-Charles Sanchez, Claire M. Mugasa, Enock Matovu</p>	42
2.10	<p>THE POTENTIAL OF CELEBRAL SPINAL FLUID INTERLUIKIN-6 IN DISCRIMINATING BETWEEN EARLY AND LATE STAGE SLEEPING SICKNESS IN NORTHERN UGANDA</p> <p>Asiimwe Immaculate, Kato Charles Drago</p>	44

2.11	EVALUATION OF THE SENSITIVITY OF PRIMERS USED FOR THE PCR DIAGNOSIS OF HUMAN AFRICAN TRYPANOSOMIASIS DUE TO TRYPANOSOMA BRUCEI GAMBIENSE IN GUINEA COSTAL FOCI. Hamidou Ilboudo, Oumou Camara, Mamadou Camara, Jacques Kaboré, Mohamed Bamba, Justin Kaboré, Philippe Solano, Bruno Bucheton, Vincent Jamonneau	46
2.12	EVALUATION OF TRYPANOCIDAL ACTIVITY OF COMPOUND ISOLATED FROM VITELLARIA PARADOXA OF CENTRAL AFRICAN REPUBLIC Nzoumbou-Boko R, Bairy G, Courtois P, Mérillon J M, and Vincendeau P	48
2.13	RISK OF POST-TRANSFUSION TRANSMISSION OF HUMAN AFRICAN TRYPANOSOMIASIS IN THE CITY OF MBUJI-MAYI IN THE DEMOCRATIC REPUBLIC OF CONGO (MARCH 2003 - DECEMBER 2017)	50
2.14	RISK OF RESURGENCE OF HAT IN LOW- PREVALENCE CONFLICT AREAS: CASE OF EASTERN KASAI PROVINCE IN THE DRC FROM 2013 TO 2018 Rashidi Samuel, MBO Florent, Erick Miaka	51
2.15	THE HAT ATLAS: A GIS-BASED SYSTEM TO PLAN CONTROL ACTIVITIES AND MONITOR PROGRESS IN HAT ELIMINATION Grout Lise, Paone M, Priotto G, Cecchi G, Ebeja AK, Diarra A, Franco JR	53
2.16	PASSIVE SURVEILLANCE FOR SUSTAINABLE ELIMINATION OF HUMAN AFRICAN TRYPANOSOMIASIS IN CENTRAL KONGO PROVINCE, DRC Jacquies Makabuza Mukabela	55
2.17	ENHANCED PASSIVE SCREENING FOR HAT IN ANGOLA - PROGRESS TOWARDS ELIMINATION. Makana Don Paul, Amadeu Dala, Kayembe Simon, Bessell Paul, Josenando, Constantina Machado E Ndung'u Joseph	56

2.18	HUMAN AFRICAN TRYPANOSOMIASIS: CONSTRAINTS TO EFFECTIVE REPORTS IN NIGERIA Olaleye O O,Aluma L.A and Gbadamosi F I,Abdulkadir A D	57
2.19	HUMAN AFRICAN TRYPANOSOMIASIS (HAT): DECREASING PREVALENCE, INCREASING COST PER CASE DETECTED,THE CHALLENGE OF ACTIVE CASE DETECTION FOR DISEASE ELIMINATION Valverde Mordt, O;	58
2.20	EVALUATION OF THE FEASIBILITY OF INTEGRATING TRADITIONAL HEALER IN THE DETECTION OF HUMAN AFRICAN TRYPANOSOMIASIS IN CENTRAL AFRICA, CASE OF THE DRC Mutangala W*, Mwamba E*, Kakozi V*, Fukinsia A*, Kwedi N.S**, Mpanya A*, wono P**, Okoko A**	60
2.21	ENVIRONMENT AND COMMUNITY ENGAGEMENT FOR THE ELIMINATION OF HAT IN GUINEA Alpha Ahmadou Diallo	62
2.22	CONTROLLING AFRICAN TRYPANOSOMOSIS AND TSETSE FLIES IN THE SLEEPING SICKNESS AND AAT FOCUS IN (CHAD) B. Guihini; M. Peka; JB. Rayaisse; I. Tirados; J. Rouamba; Wilfrid Yoni; L. Sanogo; J. Darnas; F. Courtin; G.Adoum; S. Torr; P. Solano;	64
2.23	LIVESTOCK AND THE EPIDEMIOLOGY OF SLEEPING SICKNESS: MECHANISMS AND IMPLICATIONS Julianne Meisner, Jon Wakefield, David M Pigott, Ali Rowhani-Rahbar, Jonathan D Mayer, Caitlin A Bever, Peter M Rabinowitz	66
2.24	GENETIC DIVERSITY AND PHYLOGENETIC RELATIONSHIPS OF SOME PALPALIS GROUP TSETSE FLY IN CONGO BRAZZAVILLE BASED ON MTDNA COI SEQUENCES Abraham Mayoke, Rosemary Bateta,Shadrack S. Muya, Paul O. Mireji, Sylvance Okoth, Samuel G. Onyonyo,	68

2.25	TANZANIA ONE HEALTH INITIATIVES IN THE CONTROL OF HUMAN AFRICAN TRYPANOSOMIASIS Joyce Daffa; Justine Assenga; Folorunso Fasina; Moses Ole-Neselle; Hezron Nonga	70
2.26	NOVEL DIAGNOSTIC TOOLS FOR TRYPANOSOMIASIS – A REVIEW Popoola, T.O., Akinseye, R.O., Adelabu, M.A, Otunla, M.O	71
2.27	EPIDEMIOLOGY AND INTERVENTIONS TOWARDS THE ELIMINATION OF HAT IN GUINEA: SYNERGY OF ACTORS, COMMITMENTS AND CHALLENGES	72
2.28	BIOCHEMICAL INDICATORS IN TRYPANOSOMIASIS INFECTIONS Olanrewaju Roland Akinseye,* Adelabu Mustapha, Otunla Moses	74
2.29	CO-EXISTENCE OF NCDS AND NTDS – TRYPANOSOMIASIS AS A TYPICAL EXAMPLE Olanrewaju Roland Akinseye*, Poopola Temitope	75
2.30	THE LAST MILE IN ACHIEVING ELIMINATION OF HUMAN AFRICAN TRYPANOSOMIASIS IN NIGERIA Enwezor, F.N.C, Anyaike, C, Ntuen, U.G, Igweh, A.C, Dede, P.M and Elhassan, Elizabeth.	76
2.31	SURVEY OF HUMAN AFRICAN TRYPANOSOMIASIS IN UKWUANI AND ETHIOPE EAST LOCAL GOVERNMENT AREAS, DELTA STATE, NIGERIA D. Musa, A. O. Fajinmi, R. Abdullahi, A. E. Irhue, I. M. Toma, F. Sambo, M.A. Kugama, M.A. Kassim, M. T. Ormaga. S. S Shaida, F. N. C. Enwezor, J. O. Kalejaiye, P. M. Dede, M. Mamman, M. B. Alhassan, I. Anagbogu, and E. Cephas.	77

ANIMAL AFRICAN TRYPANOSOMIASIS (AAT)

ORAL EPIDEMIOLOGY

- 3.01 AN ATLAS TO SUPPORT THE PROGRESSIVE CONTROL OF TSETSE-TRANSMITTED ANIMAL TRYPANOSOMOSIS IN KENYA
Nancy N. Ngari, Daniel O. Gamba, Pamela A. Olet, Weining Zhao, Massimo Paone, Giuliano Cecchi 81
- 3.02 A NATIONAL ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMOSIS IN MALI
Boucader Diarra, Modibo Diarra, Oumar Diall, Boubacar Bass, Youssouf Sanogo, Etienne Coulibaly, Mahamadou Sylla, Weining Zhao, Massimo Paone, Giuliano Cecchi 82
- 3.03 TRYPANOSOMOSIS AND MULTIPLE BOVINE INFECTIONS IN THE WILDLIFE-LIVESTOCK INTERFACE OF LAMBWE VALLEY, WESTERN KENYA
Michael Nyanganga Okal, Shewit Kalayou, Kawira Mathenge, Brenda Kisia Odhiambo, Francis Mcodimba, Dan Masiga. 83
- 3.04 Atikat U, Maigari A K, Musayyiba S, Abullahi I Z, Hafsat M and Sadiq A A 85
- 3.05 AFRICAN ANIMAL TRYPANOSOMIASIS OUTSIDE TSETSE BELT
Merid N. Getahun; Joel L. Bargu; Abel Orone; John Ngiela; Peter O. Ahuya, Jackson M. Muema, Rajinder K. Saini, Baldwin Torto and Daniel K. Masiga 86
- 3.06 FACTORS ASSOCIATED WITH PERSISTENCE OF ANIMAL AFRICAN TRYPANOSOMIASIS IN LANGO SUB REGION, NORTHERN UGANDA
Robert Mandela Wangoola, Bardosh Kevin, Christine Amongi Acup, Susan Welburn, Charles Waiswa, James Bugeza 87
- 3.07 PREVALENCE OF TRYPANOSOMOSIS AMONG CAMELS EXAMINED BY HCT, PCR AND CATT/T .EVANSI IN SOUTH DARFUR, SUDAN
Adam M E, Salih, D A and Abdelrhman A H 88

3.08	INCIDENCE OF TRYPANOSOMOSIS IN SOME SELECTED FULANI SETTLEMENTS RESIDING IN NORTHERN PART OF KANO STATE, NIGERIA Abdullahi I Z, Maigari A K, Hafsat M, Sadiq A A, Atikat U and Musayyiba S	89
3.09	OCCURRENCE OF TRYPANOSOME INFECTIONS IN CATTLE IN RELATION TO SEASON, LIVESTOCK MOVEMENT AND MANAGEMENT PRACTICES OF MAASAI PASTORALISTS IN NORTHERN TANZANIA Esther G. Kimaro, Jenny-Ann Toribioa, Paul Gwakisa, Siobhan M. Mora	90
3.10	MOLECULAR PREVALENCE OF TRYPANOSOME SPECIES INFECTION IN CATTLE AND TSETSE FLIES IN IDAH, IBAJI AND IGALAMELA LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA. Musa Muhammed Shaibu, Inuwa H. Mairo and Sani Ibrahim	92
3.11	EPIDEMIOLOGY OF TRYPANOSOMES AND ASSOCIATED LESIONS ON GOATS AND SHEEP IN KANO STATE, NIGERIA Musayyiba S, Maigari A K, Abdullahi I Z, Hafsat M, Sadiq A A and Atikat U	93
3.12	TESTING NEW CANDIDATES TO INCLUDE IN A COMBINATION OF RECOMBINANT PROTEINS FOR EFFICIENT DIAGNOSIS OF AFRICAN ANIMAL TRYPANOSOMOSIS Tounkara M, Thonnus M, Bringaud F, Thévenon S, Berthier D, Boulangé A, Bengaly Z and Rivière L	94
3.13	CLONING OF AMPLIFIED GLYCEROL KINASE GENE OF TRYPANOSOMA BRUCEI BRUCEI AND ITS IN VITRO EXPRESSION IN HepG2 CELLS Habiba, Amaya Jobin, Nok Andrew Jonathan, Gbem Thaddeus Thelumun, Deize Frank Kelm Soerge, Balogun Emmanuel Oluwadare	95

3.14	PHOSPHORYLATION PROFILING OF THE BOVINE PROTEOME: A BASIS FOR BIOMARKER DISCOVERY IN TRYPANOSOMOSIS CONTROL Oladeji Bamidele ⁺ and Ofelia-Galman Omitogun	96
3.15	MOLECULAR DETECTION OF HUMAN-INFECTIVE TRYPANOSOMES IN CATTLE AND TSETSE FLIES FROM ZAMBIA AND MALAWI Namangala Boniface, Hayashida Kyouko, Nakamura Yukiko, Chatanga Elisha, Musaya Jenelisa, Mweempwa Cornelius, Chilongo Kalinga, Chisi John, Sugimoto Chihiro	97
3.16	RESILIENCE OF THE AFRICAN GRASSCUTTER (THRYONOMYS SWINDERIANUS, TEMMINCK) TO TRYPANOSOMA ORGANISMS Maxwell N. Opara, Joy A. Maxwell and Benjamin O.Fagbemi	98
3.17	IN VITRO TRYPANOCIDAL ACTIVITIES OF FRACTIONS FROM THE ETHANOLIC STEM BARK EXTRACT OF COMMIPHORA SWYNNERTONII AGAINST TRYPANOSOMA CONGOLENSE. Yakob P Nagagia, Eliningaya J Kweka, Richard S Silayo	99
3.18	THE EVALUATION OF THE ANTITRYPANOSOMAL POTENTIAL OF AQUEOUS EXTRACT OF ADANSONIA DIGITATA IN RATS Iliyasu, H; Jatau, I.D; Ogunleye, O.O ^b	101
3.19	TRYPANOSOMA CONGOLENSE VERSUS PHLOROGLUCINOL: IN VIVO STUDIES AND INHIBITORY EFFECTS AGAINST TRYPANOSOMAL SIALIDASE IN VITRO AND IN SILICO Nasirudeen Idowu Abdulrashid, Mohammed Auwal Ibrahim, Murtala Bindawa Isah, Isa Danladi Jatau and Elewechi Onyike	102
3.20	SHORT- AND LONG-TERM EFFECTS OF ORALLY ADMINISTERED AZITHROMYCIN ON TRYPANOSOMA BRUCEI BRUCEI-INFECTED MICE Peter S. Musinguzi, Nthatisi I. Molefe, Keisuke Suganuma	104

3.21	ISOLATION AND CHARACTERIZATION OF TRYPANOCIDAL ACTIVE COMPONENT OF ECHIS OCELLATUS VENOM Ilu, Ameh, Nasir Shuaibu M, Mohammed Mamman, Emmanuel O. Balogun	105
3.22	AMELIORATIC AND CURATIVE EFFECTS OF SALECTED ANTI-OXIDANTS AND TRYPAMIDIUM IN WISTAR RATS INFECTED WITH TRYPANOSOMA BRUCEI-BRUCE (FEDERE STRAIN) Shuaibu Y and Mohammed S S D	106
3.23	INFLUENCE OF THE ADMINISTRATION OF VITAMINS C AND E ON SOMATIC AND REPRODUCTIVE PROFILES IN WISTAR RAT INFECTED WITH TRYPANOSOMA BRUCEI BRUCEI Ajakaiye J J, Ogwu D O, Bizi R L, Mohammad B, Mohammed A A and Mazadu M R	107
3.24	INVITRO ANTITRYPANOSOMAL ACTIVITY IN EXTRACTS OF FOUR CYANOBACTERIA Agee Jerry Tersoo, Chia Ahii Mathias, Garba Auwalu, Mohammed Mamman, Balogun and Emmanuel Oluwadare	109
3.25	PATHOGENICITY OF LOCAL ISOLATE OF TRYPANOSOMA BRUCEI SPECIES IN RATS AND THE EFFECTS ON THE BRAIN, PITUITARY AND GONADS Davinson Chuka Anyogu, Jacinta Omeke and Aloysius Chukwuebuka Eze	110
3.26	HAEMATOLOGICAL INDICES ASSOCIATED WITH TRYPANOSOMES IN TRADE CATTLE (BOS INDICUS) AT KANO, NORTHWESTERN NIGERIA Hafsat, M., Maigari, A. K., Atikat, U., Musayyiba, S. and Abdullahi, I. Z.	112
3.27	SOME ASPECTS OF THE EPIDEMIOLOGY OF TRYPANOSOMOSIS IN CATTLE (BOS INDICUS) FOUND IN THE GRAZING RESERVES OF KURA LOCAL GOVERNMENT AREA, KANO STATE, NIGERIA Muhammad, A. A., Maigari, A. K., Idris, H. Y., Aminu, A., Malami, A. I., Umar, I., Machina, I. B., Garba, R., Ladan, I. I., Zubair, A. I. and Baura, M. S.	113

- 3.28 IN VITRO EVALUATION OF ANTITRYPANOSOMAL EFFECTS OF CRUDE METHANOL EXTRACTS OF ANOGEISUS LEIOCARPUS, KHAYA SENEGALENSIS AND POTASH AGAINST TRYPANOSOMA CONGOLENSE
Tauheed AM, Mamman M, Balogun E O, Ahmed A4 and Suleiman, MM 115
- 3.29 SURVEY OF AFRICAN ANIMAL TRYPANOSOMIASIS IN JOS SOUTH AND NORTH LOCAL GOVERNMENT OF PLATEAU STATE NORTH-CENTRAL NIGERIA.
Olaolu O.S., Ogbu, K.I., Alanza, A, J and Iliyasu, B 116
- 3.30 AN ATLAS TO SUPPORT THE PROGRESSIVE CONTROL OF TSETSE TRANSMITTED ANIMAL TRYPANOSOMIASIS AND HISTORICAL IMPACTS OF TSETSE CONTROL IN ZIMBABWE
W. Shereni, L. Neves, G.A Vale, L. Nyakupinda, G. Cecchi 117
- 3.31 AN ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMIASIS IN BURKINA FASO
L. Percoma, J. B. Rayaissé H. S. Pooda, S. Pagabeleguem, R. Ganaba, A. Sow, Rafael Argilles, Weining Zhao, Massimo Paone, I. Sidibé, G. Cecchi 118
- 3.32 TRYPANOCIDAL ACTIVITY AND ITS DERIVATIVES FORMITOPSIS PINICOLA AGAINST TRYPANOSOMA BRUCEI BRUCEI IN VIVO AND IN VITRO Abedo, A.J'., Abdulmalik, U., Abdullahi, R.S., Muhammed, H., Shettima, F, Muhammed, I.S., Enoh, E. E., Tasie, C.P., Tamba, Z and Ogar, M.U. 120
- 3.33 OPTIMIZATION OF ANTITRYPANOSOMAL POTENTIALS OF TRACE METAL SALTS IN T.BBRUCEI INFECTED RATS
U.O. Adamu, R.P. Ovbagbedia, O. Mabel, J. Tijani and A. Mann 121
- 3.34 EVALUATION OF TRYPANOCIDAL POTENTIALS OF ANDROGRAPHIS PANICULATA AGAINST TRYPANOSOMA BRUCEI BRUCEI
D. B. Maikaje, Z. Ladan, T. O. Olanrewaju, R. Emmanuel, L. Apinega, T. Jock, N, Isaiah, P.Waziri 122

3.35	SURVEILLANCE OF TRYPANOSOMOSIS IN SOME SELECTED FULANI SETTLEMENTS IN KIRU LOCAL GOVERNMENT AREA OF KANO STATE, NIGERIA Machina, I. B., Maigari, A. K., Zubair, A. I., Garba, R., Mohammed, A. A., Idris, H. Y., Aminu, A., Malami, A. I., Umar, I., Baura, M., Ladan, I. and Yusuf, A. B.	123
3.36	ANTI TRYPANOSOMAL ACTIVITY OF CRUDE EXTRACTS OF ENDOPHYTIC FUNGI (FUSARIUM MONILIFORME) ISOLATED FROM GUEIRA SENEGALENSES LEAF Malala, A. U. Umar, K. M. Machina, I. B. Bashir, A. K	124
3.37	SOURCE DISTRIBUTION OF TRYPANOSOMES DETECTED IN CAMELS AND CATTLE BROUGHT TO KANO STATE, NIGERIA Maigari, A. K. and Dabo, N. T.	125
3.38	ENQUÊTE SUR LES TRYPANOSOMOSES ANIMALES DANS DEUX LOCALITÉS D'ÉLEVAGES BOVINS SOMBA DANS LA SAVANE GUINÉENNE AU TOGO S. Boma ^{1*} , T. N'Feidé ¹ , E. Talaki ² , B. Bonfoh ¹ , B. Dao ¹	126
3.39	SPOT CHECK ON ANIMAL TRYPANOSOMIASIS IN CATTLE FROM THREE (3) FARMS AT KIRU AND BUNKURE LOCAL GOVERNMENT AREAS OF KANO STATE Abdullahi, M. A., Osue, H. O., Umar, A. D.	127
3.40	IN VITRO ANTITRYPANOSOMAL ACTIVITY OF ADANSONIA DIGITATA (BAOBAB) LEAVES Agbadoronye, P. C., Maigari, A. K. and Irehue, A. E.	128
3.41	LUTTE CONTRE LA TRYPANOSOMOSE ANIMALE DANS LA PLAINE DE MÔ AU TOGO : IMPACT ZOO-SANITAIRE DANS LES ÉLEVAGES DE BOVINS S. Boma, T. N'Feidé, E. Talaki, B. Bonfoh and B. Dao	130
3.42	CLINICOPATHOLOGICAL EFFECT AND EFFICACY OF QUINAPYRAMINE AND HOMIDIUM BROMIDE INTERACTION IN GOATS INFECTED WITH T. VIVAX OR T. EVANSI F. M. Youssif, O. S. A. Mohammed, K. H. Elmalik and T. Hassan	131

3.43	SITUATION OF TRYPANSOMA EVANSI IN CAMELS AND CATTLE IN EGYPT Mohamed Ibrahim Eisa	133
3.44	CLINICOPATHOLOGICAL EFFECT AND EFFICACY OF CYMELARSAN AND OXYTETRACYCLINE INTERACTION IN CAMELS AND NUBIAN GOATS INFECTED WITH T.EVANSI F. M.Youssif, A. A. Jameel and T. Hassan	134
3.45	THE POOR REPORTING OF AFRICAN ANIMAL TRYPANOSOMIASIS IN THE LIVESTOCK SECTORS IN NIGERIA Michael Adedotun Oke	136
3.46	AFRICAN ANIMAL TRYPANOSOMOSIS (TAA) IN THE KADIOLO CIRCLE: RESULTS OF THE APPLICATION OF A PROPHYLAXIS PROTOCOL ON BEEFS OF LABOR Modibo Diarra, Zakaria Bocoum, Boucader Diarra, Youssouf Sanogo, Hamidou M Maiga, Mahamadou. S.M.Sylla, Ahamadou Haidara	137
3.47	THE IMPLICATIONS OF AFRICAN ANIMAL TRYPANOSOMIASIS IN THE LIVESTOCK SECTORS IN NIGERIA. Michael Adedotun Oke	139
3.48	NEW INSIGHT INTO RBC MEMBRANE AND TRYPANOSOME INFECTION Olanrewaju Roland Akinseye, Adelabu Mustapha, Otunla Moses	140

GLOSSINA BIOLOGY, CONTROL AND ERADICATION ORAL BIOLOGY

- 4.01 NOVEL ODOR BLEND WITH ENHANCED
ATTRACTION OF SAVANNAH TSETSE FLIES
Benson M. Wachira, Joy M. Kabaka, Paul O. Mireji, Sylvance
Okoth, Margaret M. Ng'ang'a, Robert Changasi, Patrick
Obore, Charles Ochieng', Grace A. Murilla, Pierro Ngugi,
Ahmed Hassanali 143
- 4.02 CONTROL OF TSETSE AND TRYPANOSOMIASIS
USING NOVEL TSETSE ATTRACTANTS AND
REPELLENT IN KWALE COUNTY, KENYA
Daniel Gamba, Benson M. Wachira, Imna Malele, Johnson
O. Ouma, Richard Echodu, Sylvance Okoth, Ahmed
Hassanali, Moses Cheruyot, Pamela Olet, Raymond
Mdachi, Joanna Auma and Paul O. Mireji 145
- 4.03 FIELD EVALUATION OF WATERBUCK REPELLENT
COMPOUNDS AGAINST GLOSSINA MORSITANS
MORSITANS AT STATIONARY AND MOBILE
SAMPLING TOOLS IN ZAMBIA
Njelembo J. Mbewe; Micheal N. Okal; Kalinga Chilongo;
Jackson Muyobela; Milner Mukumbwali and Daniel K.
Masiga 146
- 4.04 BIOACTIVITY OF THREE AROMATIC PLANTS'
ESSENTIAL OIL: REPELLENT, ANTI-FEEDANT AND
TSETSE-CIDAL PROPERTIES.
Emmanuel, R.T., Ogar, M.U., Omolade, L.O. Odeyemi, S.O.,
Omotosho, K., Idowu, F.M., Benjamin, J.E., Anchau, R.G.,
Olanrewaju, T.O., Jonah, A. and K. Ibrahim 147
- 4.05 INNOVATIVE TOOLS IN THE CONTROL OF PALPALIS
GROUP TSETSE: PLASTIC SCREENS
Salou E, Rayaisse JB, Gimonneau GC, Jacquiet P, Solano P
et Desquesnes M 148

4.06	THE MULTI TARGETS METHOD (MTM):A PROOF OF CONCEPT FOR THE CONTROL OF BITING FLIES AS VECTORS, USING INNOVATIVE TOXIC SCREENS Desquesnes M, Bouhsira E, Chalermwong P, Drosne L, Duvallet G, Franc M, Gimonneau G, Grimaud Y, Guillet P, Himeidan Y, Jacquiet P, Jittapalapong S, Karanja W, Liénard E, Onju S, Ouma J, Rayaisse J-B, Masméatathip R, Shah V, Shukri S, Thaisungnoen K, Thevenon and S, Salou E	150
4.07	PERFORMANCE OF ODOUR-BAITED INSECTICIDE-TREATED TARGETS MOUNTED ON SMALL TREES IN THE ERADICATION OF TSETSE (GLOSSINA SPECIES) IN ZIMBABWE Mhindurwa and D. Tsikire	152
4.08	GENETIC DIVERSITY AND PHYLOGENETIC RELATIONSHIPS OF SOME PALPALIS GROUP TSETSE FLY IN CONGO BRAZZAVILLE BASED ON MTDNA COI SEQUENCES Abraham Mayoke, Rosemary Bateta, Shadrack S. Muya, Paul O. Mireji, Sylvance Okoth, Samuel G. Onyonyo, Joanna E. Auma and Johnson O. Ouma	153
4.09	PHYLOGEOGRAPHY AND POPULATION STRUCTURE OF THE TSETSE FLY <i>Glossina pallidipes</i> IN KENYA AND THE SERENGETI ECOSYSTEM Bateta R, Saarman NP, Okeyo WA, Dion K, Mireji PO, Okoth S, Malele I, Murilla G, Aksoy S and Caccone A	155
4.10	ENTOMOLOGICAL BASELINE SURVEY FOR A FEASIBILITY STUDY ON DRONE RELEASED STERILE TSETSE (DIPTERA: GLOSSINIDAE) IN THE ZAMBEZI VALLEY, ZIMBABWE W Shereni, D. Tsikire, L Nyakupinda, R.A. Herrero	157
4.11	Winnie A. Okeyo, Norah P. Saarman, Rosemary Bateta, Kirstin Dion, Michael Mengual, Paul O. Mireji, Collins Ouma, Sylvance Okoth, Grace Murilla, Serap Aksoy and Adalgisa Caccone	158

4.12	<p>COMPETITIVENESS AND SURVIVAL OF TWO STRAINS OF GLOSSINA PALPALIS GAMBIENSIS IN AN URBAN AREA OF SENEGAL</p> <p>Mireille Djimangali Bassène, Momar Talla Seck, Soumaïla Pagabeleguem, Assane Gueye Fall, Baba Sall, Marc J. B. Vreysen, Geoffrey Gimonneau and Jérémy Bouyer</p>	159
4.13	<p>RECOVERY RATES OF G. M. MORSITANS FOLLOWING A LOCALIZED CONTROL OPERATION IN NORTH EASTERN ZIMBABWE: IS CLIMATE CHANGE INFLUENCING RECOVERY?</p> <p>Mr TNC Mangwiro, Mr W. Shereni, Mr O.N. Nyirenda and Mr L Mubvuta</p>	161
4.14	<p>HOST LOCATION AND INTRA-POPULATION FLY SIZE VARIATION IN MALE GLOSSINA MORSITANS MORSITANS CAUGHT USING STATIONARY BAITS</p> <p>Njelembo J. Mbewe; Micheal N. Okal; Kalinga Chilongo; Jackson Muyobela; Milner Mukumbwali and Daniel K. Masiga</p>	162
4.15	<p>IDENTIFICATION OF TRYPANOSOME SPECIES BY NESTED PCR FROM KUBACHA FOREST USING GENERIC AND SPECIES SPECIFIC PRIMERS.</p> <p>Attahir. A, Rukayya. G, Friday. I, Abdulraheem. S, Ibrahim. I, Alice J, Jabiru, Isadu, H, G. Musa H. D and Machina, I. B</p>	163
4.16	<p>INTEGRATED TSETSE AND TRYPANOSOMIASIS CONTROL IN AGRO-PASTORAL COMMUNITY OF PATE ISLAND LAMU COUNTY: A CASE STUDY 2009-2018</p> <p>Gamba D. O, Cheruyoit M I, Olet, P.A.,</p>	165
4.17	<p>PROSPECTS OF FABRIC PANELS IMPREGNATED WITH METARHIZIUM ANISOPLIAE AGAINST VECTORS OF SLEEPING SICKNESS</p> <p>Riithi N. N., Njelembo J. M., Kokwaro E. D., Subramanian S., Masiga D. K. and Okal M. N.¹.</p>	166
4.18	<p>THE EFFECT OF SIMPLE TSETSE CONTROL TECHNOLOGIES TO REDUCE TSETSE POPULATION IN ASSOSA DISTRICT OF BENISHANGUL-GUMUZ REGION, ETHIOPIA</p> <p>Dereje Alemu, Senbeta Tasew and Dagnachew Beyene</p>	167

POSTERS

- 4.19 NON-CYCLICAL HAEMATOPHAGOUS ARTHROPODS MAY BE INVOLVED IN THE MECHANICAL TRANSMISSION OF AFRICAN TRYPANOSOMIASIS
Bizi, R. L., Nock, I. H, Ndams, I. S, Ajakaiye, J. J, Dede, P. M. 169
- 4.20 SPECIES DIVERSITY AND PHYLOGENETIC ANALYSIS REVEAL DUAL MATERNAL LINEAGES OF GLOSSINA POPULATIONS IN NIGERIA
S. S. Shaida, J. Waber, C. Ngomtcho, U. B. Musa, T.T. Gbem, I. S. Ndams, M. Mamman, A. J. Nok M. D. Achukwi and S. Kelm 171
- 4.21 NATIONALWIDE CAMPAIGN FOR DIPPING USING PYRETHROIDS PREPARATIONS IN TANZANIA: AN OPPORTUNITY FOR THE CONTROL OF TSESE AND TRYPANOSOMIASIS
Justine Assenga¹; Joyce Daffa¹; Folorunso Fasina²; Moses Ole-Neselle² and Hezron Nonga 173
- 4.22 TRYPANOSOME PREVALENCE IN TSETSE FLIES IN AREAS OF NO DOCUMENTED HISTORY OF TRYPANOSOME INFECTION.
Onyekwelu Kenechukwu C., Edeh Godknows C., Alanza Anthony J. 174
- 4.23 TOWARDS CONTROL: PRELIMINARY INVESTIGATION INTO TSETSE FLIES SPECIES COMPOSITION IN SOUTH-EASTERN NIGERIA
Dalla, C.V., and Uzoka N.B 175
- 4.24 THE INTERNATIONAL JOINT LABORATORY ON VECTOR-BORNE DISEASES (LAMIVECT): A POLE OF EXPERTISE ONE HEALTH ON VECTOR-TRANSMITTED PATHOLOGIES IN THE IVORIO-BURKINABÈ SPACE
Courtin Fabrice, Kaba Dramane, Bengaly Zakaria, Gimonneau Geoffrey, Boulangé Alain, Fournet Florence, Moiroux Nicolas, Belem Adrien, Kadjo Kouame and Dabiré Roch 176

4.25	PICTORIAL ILLUSTRATION OF THE TSETSE FLIES CONTROL TECHNOLOGIES PRACTICED OVER THE LAST 10 DECADES IN KENYA Kamau S.Kabochi, Onyango I and Awino, Njagi Obadiah	178
4.26	BACTERIAL DIVERSITY IN THE GUT OF GLOSSINA PALLIDIPES AND ITS IMPLICATION FOR THE EPIDEMIOLOGY OF SLEEPING SICKNESS IN TANZANIA	179
4.27	MOLECULAR EVALUATION OF WOLBACHIA SPP FROM FIELD CAPTURED GLOSSINA PALPALIS PALPALIS FROM IJA-GWARI VILLAGE OF NIGER STATE, NORTHCENTRAL NIGERIA AND LABORATORY BRED GLOSSINA MORSITANS SUBMORSITANS FROM INSECTARY OF THE NIGERIAN INSTITUTE FOR TRYPANOSOMIASIS RESEARCH (NITR), KADUNA. Onotu, Christopher Sunny, Ojekale AO and Gbem TT	181
4.28	ENTOMOLOGICAL SURVEYS ON TSETSE IN LIVESTOCK PRODUCTION AREAS, CENTRAL AFRICAN REPUBLIC Dr Etienne Nguertoum, Jean Charles Kounda Mboumbi and Pr Ayao Acapovi	183
4.29	ANIMAL TRYPANOSOMOSIS CONTROL IN MÔ PLAIN, TOGO: ZOO-SANITARY IMPACT IN CATTLE REARING S. Boma, T. N'Feidé, E. Talaki, B. Bonfoh and B. Dao	185
4.30	NATIONAL REPORT ON THE PROGRESS MADE BY BOBO DIOULASSO INSECTARIUM SINCE SEPTEMBER 2018	186
4.31	IMPACT OF TRYPANOSOMOSIS VECTOR CONTROL IN FORÉCARIAH FOCUS, GUINEA M. Kagbadouno, A. Dansy Camara, O. Camara, I. Camara, P. Solano, B. Bucheton and M. Camara	188
4.32	A NATIONAL ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMOSIS IN MALI Boucader Diarra, Modibo Diarra, Oumar Diall, Boubacar Bass, Youssouf Sanogo, Etienne Coulibaly, Mahamadou Sylla, Weining Zhao, Massimo Paone, Giuliano Cecchi	190

LAND USE, ENVIRONMENT AND SOCIO-ECONOMICS

ORAL

- 5.01 FACTORS AFFECTING FARMERS' CHOICE OF TSETSE AND TRYPANOSOMIASIS CONTROL METHODS IN LAMU COUNTY, KENYA
Seth Ooko Onyango, Sabina Mukoya-Wangia, Josiah Mwivandi Kinama, Pamela Akinyi Olet 193
- 5.02 ENVIRONMENTAL IMPACT OF TSETSE ERADICATION IN SENEGAL
Mamadou Ciss, Mireille D. Bassène, Momar T. Seck, Abdou G. Mbaye, Baba Sall, Assane G. Fall, Marc J.B. Vreysen, Jérémy Bouyer 194
- 5.03 CATTLE OWNERS' PERCEPTION OF THE IMPACT OF BOVINE TRYPANOSOMOSIS IN EAST DARFUR STATE- THE SUDAN
Wisal Elnour M. Elhassan, Bannaga, M. A., Tyseer Elhadi, Elmalik, H. K. and A.H.A Rahman 195
- 5.04 ASSESSMENT OF HERDSMEN'S KNOWLEDGE, ATTITUDE AND PRACTICES ON TSETSE FLY AND BOVINE TRYPANOSOMOSIS IN BAGUDO AND KAOJE DISTRICTS OF BAGUDO LGA, NORTHWESTERN NIGERIA
Aminu B. Yusuf, Ahmed Kabiru Maigari, Abdulkadir Abubakar, Usman Baba Musa, Mohammed Kabiru Haruna, Hamza Adamu Garba, Abdulkarim Isah Zubair, Idris Baba Machina, Abubakar Shehu Alhaji, Umar Sunusi Galadima, Amina Adamu and Diggi Sani 197
- 5.05 EVALUATION OF THE SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF THE PROJECT TO CREATE SUSTAINABLE TSETSE FLY-FREE AND TRYPANOSOMOSIS-FREE ZONES FOUR YEARS AFTER IT ENDED
Percoma L, Dipama A. R, Pooda S. H, Pagabeleguem S, Belem A. M. G, Bouyer J and I Sidibé 199
- 5.06 ANIMAL HEALTH STEPS AWAY FROM ANTIBIOTICS- THE HERBAL SOLUTIONS.
Osunderu Oluwakemi Abosede 200

5.07 ASSESSMENT OF KNOWLEDGE, ATTITUDES
AND PRACTICES OF THE LOCAL COMMUNITY
SURROUNDING ARABUKO SOKOKE NATIONAL
RESERVE, KILIFI COUNTY, KENYA TOWARDS TSETSE
FLIES AND TRYPANOSOMIASIS.

Serem E.K, Abdullahi, O.A, Bargul, J. L., and Mburu D. K. 201

I.01

REPORT ON AU - PATTEC COORDINATION OFFICE

*Wanda Gift and Girma Urgeacha
AU-PATTEC Coordination Office
Roosevelt Str, PO Box 3243
Addis Ababa, Ethiopia*

I.02

REPORT AND RECOMMENDATIONS OF 17TH PATTEC NATIONAL COORDINATORS AND FOCAL/POINTS MEETING

*Wanda Gift and Girma Urgeacha
AU-PATTEC Coordination Office
Roosevelt Str, PO Box 3243
Addis Ababa, Ethiopia*

I.03

ZAMBIA: COUNTRY REPORT FOR THE PERIOD 2017 TO 2019

Chilongo K., Mbewe N. and Muyobela J.*

Ministry of Fisheries and Livestock, Department of Veterinary Services, Tsetse & Trypanosomiasis Control Unit

** kchilongo@yahoo.co.uk*

SUMMARY

In Zambia, an estimated 280,000 km² (38%) of the land area is tsetse-infested, and the country is affected by both the animal (AAT) and human (HAT) forms of trypanosomiasis. However, AAT has been and remains the main basis for the major interventions against the disease in the country – largely due to the relatively small number of reported cases of HAT, compared to reported/confirmed cases of AAT and its impact, annually. AAT affects mostly the Southern, Western Central and Eastern provinces, such that these provinces have historically had the largest proportion of cattle exposed to the risk of infection with the disease – and consequently the focus with regard to interventions has been and remains largely been these provinces. Since the end of 2017, the major activities undertaken against the problem were, a tsetse and trypanosomiasis survey and a socio-economic survey in the 6,300km² subjected to aerial spraying in 2014 under the Kwando-Zambezi Regional Project, and also a set of baseline survey assignments in a 9,200km² portion of the Eastern Tsetse belt that was earmarked for a similar (aerial spraying) operation in 2019 – i.e. for the status with regard to tsetse & trypanosomiasis, Environmental Impact Assessment, and socio-economic situation. The report largely presents the outcome of these activities, and also key findings from activities on HAT undertaken by the University of Zambia (UNZA)/JICA project, and, outcomes from support and other interactions/involvements from/with local and international institutions/organisations. The major challenges, and proposed ways forward, are highlighted.

CREATION OF SUSTAINABLE TSETSE AND TRYPANOSOMIASIS FREE AREAS IN NIGERIA THROUGH THE PATTEC INITIATIVE - 2018/2019 PROGRESS REPORT

Dede, P.M., Ajakaiye, J.J. and Igweh A.C.

PATTEC-Nigeria, Nigerian Institute for Trypanosomiasis Research, UI/Rimi Kaduna, Kaduna State, Nigeria.

ABSTRACT

In Nigeria, T&T control operations are being implemented as outlined in the PATTEC plan of action and proposals. For ease of operation, the country was demarcated along its 6 geo-political zones, with the carpet roll-up approach adopted, starting simultaneously from the North-west and North-east geopolitical zones. In Jigawa State (North-west), with an area of 21,543km² was declared tsetse free in 2017. Field activities have begun in Katsina State (North-west) where project area delineation and mapping have been completed with maps of operational blocks produced. It's obvious that we may have a walkover in Katsina State due to absence of vegetation that could support tsetse population. The on-going tsetse suppression in Yankari Game Reserve (YGR), Bauchi State using insecticides impregnated screens and targets was monitored and evaluated for seven consecutive years, except in 2017. The results showed progressive reduction in the apparent density (AD) of *Glossina tachinoides* and *G. morsitans submorsitans* from initial ADs of 110.02 and 121.14 in 2012 to 15.31 and 18.04 flies/trap/day (F/T/D) respectively in July, 2019. However, in 2018 there was increase in AD to 27.21 and 31.32 due to failure to undertake impact assessment and re-enforcement of the existing control tools in 2017. However, after re-enforcement with 753 new screens and targets and the insecticide re-impregnation and re-mounting of 572 screens and targets in 2018, an impact assessment showed decline in AD to 15.31 and 18.04 (F/T/D) in July, 2019. Other projects being implemented in line with the overall objective of PATTEC include 1) Collaborative T&T survey and control in IFDC/WAMCO operational Area in Oyo State, a joint intervention project through a Public and Private Partnership (PPP) initiative. Phase I activities undertaken include a) Pre-survey visit b) Advocacy, sensitisation and awareness creation. c) Delineation and mapping of the areas into operational blocks d) Entomological, parasitological and socio-economic

baseline data collection e) Tsetse suppression using insecticides impregnated screens and targets and treatment of infected livestock f) Entomological, parasitological and socio-economic impact assessment that showed progressive decline in population density of *Glossina p. palpalis* in all the river systems monitored, with AD ranging from 0.72 to 10.2 F/T/D. Altogether 721 screens and 197 targets were re-impregnated with deltamethrin at 0.65ai, while evaluation of trypanosomes infections in livestock showed a decline in prevalence from 12.10 to 8.46%. Field activities undertaken in the IFDC phase II operational area a) Pre-survey visit b) Delineation and mapping into operational blocks in Saki west, Saki east and Atisbo LGAs of Oyo State 2) NITR/FIND Human African Trypanosomiasis (HAT) Intensified surveillance and control in Delta State, Nigeria has ended. Through a second collaborative project with FIND, efforts were made to establish the sensitivity of serological tests for gHAT in detecting antibodies in livestock in correlation with tsetse fly infestation in HAT endemic foci in Delta State, Nigeria, following research questions emanating from the just concluded passive surveillance of gHAT in Delta State, where Subjects who were screened with RDT positive latter became RDT negative when retested after 2-3months from the first test. Thirteen (13) blood samples were detected to be infected with either *T. vivax* (7), *T. simiae* (1) or *T. brucei* (3) or mixed infections, with *T. vivax* responsible for 54% of the infections. Three (3) tsetse flies were found to be infected with *T. brucei* (2) and a mixed infection of *T. vivax/T. godfreyi/unknown spp.* Similarly, four (4) stomoxys were detected to be infected with *T. brucei*, unknown spp and two (2) mixed infection of *T. vivax/T. grayi* and *T. vivax/T. simiae*. 3) Impact assessment of Porcine trypanosomiasis on BOYD farm in Onifade, Ibadan, Oyo State, had continued to show absence of *G. p. palpalis* and zero prevalence of the disease in pigs with a great improvement in the health of pigs and reproduction with several healthy piglets being added to the stock daily. 4) Construction work on the multimillion naira modern tsetse mass rearing facility has begun in Vom, Plateau State. The facility when completed will have holding capacity of 5-6 million stock females. In the midst of dwindling annual budgetary allocation to PATTEC-Nigeria, the financial assistance of the AfDB, BADEA, ECOWAS and other partners is dearly needed. Insecurity remained a major concern and constraint in the implementation of PATTEC activities in Nigeria.

I.05

PROGRESS REPORT ON RESEARCH AND CONTROL OF TSETSE AND TRYPANOSOMOSIS IN SOUTH SUDAN

Erneo B. Ochi

PATTEC National Coordinator

P.O. Box 82 Juba South Sudan

ABSTRACT

Tsetse and trypanosomiasis (T&T) remain a hindrance to sustainable development of livestock and a stigma to public health in South Sudan. Progress made in the control of T&T in the affected areas was reported. Deployment of targets and biconical traps revealed a significant reduction ($P < 0.05$) in tsetse population in some accessible area. A total of 2,382 vulnerable individuals to Human African Trypanosomiasis (HAT) were actively screened in greater Eastern and Central Equatoria States using rapid diagnostic tests (RDTs) and light-emitting diodes (LEDs) microscopy. The prevalence of 5.63% (134 of human cases) was revealed. Of these cases ≥ 125 (93.28%) were treated with Nifurtimox–Eflornithine Combination Therapy (NECT) and no death cases reported. Further research and control measures against T&T using effective and inexpensive trypanocides, and more easily deployed targets are needed. Keywords: Tsetse; Trypanosomiasis; Active Screening; Control; South Sudan

COUNTRY REPORT 2017-2019

M. Peka^{1*}; J. Darnas¹; S. Mbainda¹; H.mahamat²; G. Brahim²; A. Picado³;
Rayaisse J.b⁴ P.solano⁵; J.r.franco⁶;

¹Programme National de Lutte contre la Trypanosomiase Humaine Africaine (PNLTHA), ²Institut de Recherche en Elevage pour le Développement (IRED)

³Fondation pour les Innovations des Nouveaux outils de Diagnostics en abrégée (FIND) ⁴Centre International de Recherche – Développement sur l'Elevage en zone Subhumide (CIRDES) ⁵UMR Intertryp IRD-Institut de recherche pour le développement (IRD) ⁶Organisation Mondiale de la Santé (OMS)

* Auteur pour correspondance : peka.mallaye@gmail.com

ABSTRACT

Human African Trypanosomiasis (HAT) occurs in the far south of Chad along the border with the Central African Republic. The distribution of the disease is focused in five (5) well-known historical foci, namely the Mandoul, Moissala, Maro, Tapol and Goré. Through the multi-faceted support of partners, the control strategy put in place in Chad is essentially based on the sanitation of the human reservoir by conducting screening and treatment of diagnosed cases and vector control in order to contribute to the elimination of HAT as a public health problem. Passive and active case-detection was intensified in the 5 foci, while vector control was introduced since 2014, only in the Mandoul and Maro foci, which are recognised as the highest transmission areas in Chad. This control approach has significantly reduced the number of new cases from about 200 cases/year until 2013 to 28, 12 and 7 cases in 2017, 2018 and June 2019 respectively for the whole country, with an examined population that remained significantly stable at approximately 40,000 people per year.

Although the results achieved with the strong support of the partners are encouraging, there are still concerns about the target of eliminating HAT as a public health problem, which is strongly linked to the ability to consolidate the achievements and the sustainability of the control approaches put in place.

Key words: HAT, strategy, elimination, sustainability, Chad

**TSETSE AND TRYPANOSOMIASIS MANAGEMENT IN
TANZANIA DURING 2017 -2019**

Joyce Daffa

Tsetse transmitted Animal African Trypanosomiasis (AAT) surveillance is done by 8 Veterinary Investigation Centres. In the reporting period animal at risk of AAT were 342,467 of which 1014 cattle are confirmed cases and suspected cases were 1690 cattle, 25 goats and 4 donkeys from 19 regions. Human African Trypanosomiasis (HAT) is on the decrease (<10) as reported by National Institute for Medical Research. However HAT is among the six priority zoonotic diseases for control through One Health approach and the guideline is in place. In 2018 a dipping campaign was launch for 1,489 dips with an average of 3-4 dip per district to control tsetse and ticks using pyrethroids. An intensified use of live bait include 32, 037,131 animals. Insecticide treated animals were 19,792,708 cattle, 2,821,774 sheep, 8,882,165 goats, 224 donkeys and 229,326 dogs. Research undertaken were to examine the dynamics of Glossina and trypanosome populations along wildlife-livestock interface in Serengeti ecosystem; Car mounted trap fly rounds and mitigating effects of climate change on disease through improved knowledge of vector and parasite population dynamics. Results will contribute to guide on tsetse, AAT, HAT management in wilderness. On-going activities include community sensitization on tsetse and trypanosomiasis control and the development of improved semio-chemical prototypes with integrated 'push-pull' deployment for tsetse control in Eastern Africa. This report highlights control interventions undertaken and an overview of Progressive Tsetse and Trypanosomiasis control strategy 2019 -2024 in line with One Health approach.

**COUNTRY REPORT FOR SUDAN MINISTRY OF
LIVESTOCK, FISHERIES & RANGELAND ANIMAL
RESOURCES RESEARCH CORPORATION CENTRAL
VETERINARY RESEARCH LABORATORIES TSETSE &
TRYPANOSOMOSIS CONTROL DEPT. COUNTRY REPORT/
SUDAN ISCTRC/PATTEC ABUJA, NIGERIA 23-27 SEP 2019**

Mohammed Adam Hassan

Introduction: Tsetse flies infest less than 4% of the total surface area of the country and affected areas include two locations which fall within major migratory routes. Other biting flies occur throughout most of the country.

General information: Objectives: To enhance food security and alleviate rural poverty through controlling tsetse and reclaiming new land for livestock and crop production which, additionally, could minimize tribal frictions and conflicts over land.

Components: Training at all levels (technical staff and community members)/ Field surveys using qualitative and quantitative methods/ Research studies directed at the parasite and vector/ Fly control requirements/ Socio-economic surveys to assess the implications of tsetse and Trypanosomosis/ Environmental assessment/ Extension and public awareness among rural communities.

Main activities: Identification of participants/Procurement of laboratory equipment, trapping material, reagents, supplies and vehicles/Purchase of veterinary drugs, insecticides and vaccines/Questionnaire design to generate relevant information/Advocacy and support.

Current activities:

- A. Cattle trypanosomosis: Overall prevalence of non-tsetse transmitted trypanosomosis in one state 0.7%, further studies using molecular techniques, addressing risk factors influencing disease transmission.
- B. Camel trypanosomosis: Overall prevalence in 4 states 1.17%, further studies on molecular identification of vectors.

- C. Socio-economic survey conducted in one state to assess trypanocidal use in cattle, among other practices. Results revealed sharp increase in treatment coinciding with high relapse rates.

Challenges: Insecurity/ Sustained governmental funds/ Recruitment of fresh technical staff.

Way Forward: Addressing drug resistance issues/ Options for control of non-tsetse transmitted Trypanosomosis/ Discussion of bilateral agreements/Environmental impact study.

EVALUATION DES TRYPANOSOMOSES AU NORD DU CONGO BRAZZAVILLE

*Nina Rock Aime
Ministry of Agriculture Livestock And Fisheries
Head Of Epizootics Department
Address: 88 Rue Konda Ouenze
Tel: 00242 069179484
E.mail: Nrockaime@Gmail.com
Nrockaime@Hotmail.com*

RÉSUMÉ :

La maladie du sommeil ou Trypanosomiase humaine africaine (THA) continue d'être un problème de santé publique au Congo malgré la régularité des activités de dépistage et de traitement des malades effectué par le programme de lutte contre la trypanosomiase humaine (PNLTHA). Un total de 4 756 nouveaux cas ont été diagnostiqués de 2000 à 2009 (Simarro et al. 2010) essentiellement dans trois grands foyers : Vallée du Niari, Cuvette et Couloir. Dans ces foyers, environ 400 000 personnes sont quotidiennement exposées au risque de contracter la maladie dans cinq départements. L'endémicité de la maladie est entretenue par la présence continue du vecteur *Glossina* sp ou mouche tsé-tsé dont les espèces *G. fuscipes*, *G. pallicera* et *G. palpalis* sont fortement incriminées dans la transmission de la maladie chez l'homme. Les glossines du groupe *palpalis* (sous-genre *Nemorhina*) ne sont pas les seules espèces retrouvées au Congo. Au total, 11 espèces et sous-espèces de glossines appartenant aux groupes *palpalis* et *fusca* (sous-genre *Austenina*) y ont été identifiées. Outre la transmission de la maladie du sommeil, ces glossines assurent et maintiennent également la transmission des trypanosomoses animales qui contrecarrent sévèrement le développement de l'élevage au Congo. La lutte contre les trypanosomoses se fait essentiellement par la réduction du réservoir de parasites, à la fois chez l'hôte et chez le vecteur. Mais, compte tenu de l'insuffisance en moyens financiers et techniques, seules des activités de dépistage et traitement des malades en vue de la réduction du réservoir de parasite humain sont opérationnelles.

GHANA REPORT ON PROGRESS MADE SINCE 2018

The Tsetse Control Unit is one of several management units of the Veterinary Services Directorate of the Ministry of Food and Agriculture with the mandate: To controlling tsetse and trypanosomiasis across the Country and To implementing the AU-PATTEC initiative of cross border collaboration between neighbouring tsetse infested African Countries. The objective of the Unit is to reducing the burden of trypanosomiasis related problems in both human and livestock production systems across the Country. To improving food security and living standards of the rural poor by the progressive control of tsetse-transmitted trypanosomiasis in Ghana. The UWR remains the only Region in Ghana with a recorded tsetse suppression rate of 98%. The UWR is under continuous protection from reinvasion pressure from untreated surroundings. While maintaining/improving gains made in the UWR the Tsetse Control Unit has been scaling up control activities to the Upper East ; North Eastern and Northern Regions. As part of collaborative activities with Development Partners the Tsetse Control Unit in Ghana has been in talks with the IAEA to develop and employ the Drone technology for the control of Tsetse flies at the Mole National Park and other pockets of tsetse infestations. The IAEA is also in talks with the TCU/VSD to organise a Regional Training Course on Tsetse Dissection in Ghana. It is worth mentioning at this stage the historic mission to Ghana by The AU-PATTEC Coordinating Unit to evaluate the implementation of tsetse and trypanosomiasis control interventions and to drum-up support from the Government of Ghana through the Hon. Minister of State for Livestock and the Ministry of Finance; the FAO and WHO. The Mission received positive responses with pledges to continue/increase support for tsetse and trypanosomiasis interventions and capacity building of the TCU in Ghana.

I.11

KENYA TSETSE AND TRYPANOSOMIASIS ERADICATION COUNCIL (KENTTEC): SUSTAINING THE GAINS

The Kenya Tsetse and Trypanosomiasis Eradication Council (KENTTEC) has managed to maintain a zero status report of Human African Trypanosomiasis (HAT) since 2009. The Country has been selected by the World Health Organization (WHO) as those among targeted to attain elimination status. Kenya is currently preparing a dossier that will be submitted to the WHO for evaluation. In its intervention areas KENTTEC has achieved significant reduction in tsetse population and prevalence of African Animal Trypanosomiasis through continuous animal spraying, targets deployment, monitoring and evaluation. In Mwea Game Reserve zero tsetse fly catches have been recorded.

This has subsequently resulted in introduction of exotic dairy animals thus improved livestock and crop productivity, increased incomes and food security in the intervention areas. The Council is promoting the use of sexed semen to increase dairy production in tsetse controlled areas. KENTTEC has successfully piloted the use of tiny targets as a cost saving intervention; the tiny targets technology is now being used across intervention areas.

KENTTEC has successfully developed collaborations with FAO and ICIPE and collectively implemented projects in various areas. The collaborations have helped in addressing inadequate resources challenge. The Council is working with neighbouring countries to implement joint interventions across borders.

The main challenge has been reduction in government funding which makes it difficult to safeguard the gains made in intervention areas. Inadequate integration of milk value chain in tsetse controlled areas is also emerging as a challenge. To address this the KENTTEC has developed and submitted a number of funding proposals to various development partners.

**COUNTRY REPORT: TSETSE CONTROL IN ZIMBABWE
2017-2019***W. Shereni***ABSTRACT**

The successful implementation of tsetse control strategies in Zimbabwe over the years has reduced the area under tsetse infestation from 50% at the peak of infestation to the current less than 8 % of the country (31 500 km²). During the past two years, efforts were directed at containing the spread of tsetse by instituting appropriate tsetse control measures to protect, suppress and where possible eradicate tsetse flies. During the same period, tsetse surveys were conducted in approximately 6 000 km² along entire length of the tsetse belt using 1 100 odour-baited epsilon traps, 32 tsetse bait-oxen/screen fly-rounds. The distribution of Animal African trypanosomiasis (AAT) closely followed the distribution of tsetse flies. These surveys confirmed that tsetse had advanced into previously cleared areas over 1 500 km² in the Mola communal area in north-western Zimbabwe. To arrest further deterioration of this situation, 1 280 odour-baited insecticide-treated targets were deployed at 4 targets /km². Tsetse invasion was also observed in the northern districts of Hurungwe where 10 trypanosomiasis cases were recorded in a sentinel herd located outside the tsetse-infested area. Areas in north east and south east, bordering Mozambique, remained tsetse-free. The rhodesiense-human African trypanosomiasis (r-HAT) situation improved drastically following the deployment of 1 200 insecticide-treated targets in section of Hurungwe district endemic to the disease. No r-HAT cases were recorded in 2018 while a single case has been recorded in 2019. Along the tsetse front, 500 000 cattle were dipped with deltamethrin to prevent the southerly dispersion of tsetse and to reduce the risk of exposure to the disease. Tsetse research focused on assessing the feasibility of using drones to release sterile male tsetse, studies on mobile Geo-referenced flyrounds to sample populations of savannah tsetse flies and studies on the impacts of climate change on the dynamic changes of the tsetse populations in the Zambezi Valley.

I.13

MALAWI ABSTRACT FOR MALAWI TSETSE AND TRYPANOSOMOSIS CONTROL PROGRAMME

*Dr Julius L.C. Chulu (Ph.D., MSc, BVM, CVSc)
Deputy Director of Veterinary Research and Investigations
PATTEC Coordinator Malawi
P.O. Box 2096 Lilongwe Malawi*

The knowledge of existence of tsetse flies and the disease, trypanosomosis, in Malawi dates back to the early 20th century. In large parts of Malawi, tsetse flies, the vectors of African human or animal trypanosomosis, are, confined to protected areas such as game reserves or national parks. Challenge of people and livestock is likely to occur at the game/livestock/people interface of such infested areas. Since tsetse control in protected areas is difficult, management of trypanosomosis in people and/or livestock requires a good understanding of tsetse population dynamics along such interfaces. The Kasungu National Park, Vwaza Game Reserve and Nkhhotakota Game Reserve, are important focus of human trypanosomosis in Malawi. Trypanosomosis impacts on production and productivity of livestock, price and market, trade both domestic and international, food security and nutrition, health and environment and is a zoonosis. Malawi is currently planning to carry out active surveillance and come up with a current atlas of the status of tsetse in the country learning from examples of work done in neighboring countries. A regional approach would be the most feasible way forward since some of the infected areas crossing national boundaries. In 1985/86 Malawi joined Zimbabwe, Zambia and Mozambique to form the Regional Tsetse and Trypanosomosis Control Programme (RTTCP) whose initial goal was to eradicate tsetse flies from their common fly belt. Similar efforts will definitely build on the success learnt from that regional approach.

I.14

TSETSE CONTROL ACTIVITIES IN CAMEROON SINCE NOVEMBER 2018

Abah Samuel

*Head of the Special Mission for Tsetse fly Eradication,
BOP 263 Ngaoundéré-Cameroun
Email: abadadaaba@yahoo.fr*

RÉSUMÉ

Le Cameroun créa en 1974 La Mission Spéciale d'Eradication des Glossines, une structure spécialisée du Ministère de l'Élevage. Elle fut créée à la suite de l'infestation de l'Adamaoua par les glossines vectrices de la trypanosomose animale africaine qui y a décimé des milliers de bovins. Les premiers cas de TAA au Cameroun furent déclarés en 1943 dans la région de l'Adamaoua ; des traitements de masse à base de trypanocide effectués jusqu'en 1967 restaient insuffisants. Considérant les résultats positifs de la lutte conjointe avec le Tchad dans le Logone Birni en 1961, la MSEG de 1974 à ce jour, a employée plusieurs méthodes de lutte anti vectorielle conduisant à l'assainissement de 5 000 000 hectares de pâturages où vivent les deux-tiers du cheptel bovin. Pour la période de référence ; : 407 acteurs de la LAV ont été sensibilisés, 11 étudiants sont encadrés, 12 techniciens ont reçu des formations sur la collecte des données entomologiques, parasitologiques, l'utilisation des logiciels GPS Essentials et QGIS ; ce renforcement a permis de mener une évaluation vectorielle et sérologique dans 5 régions ayant orienté la mise en place de 4250 écrans dans les zones à risque; 2000 mètres de Livestock Fence ont été installés dans 18 exploitations et 500 000 bovins ont été traités aux insecticides, ces activités permettent de contrôler 8 000 000 ha. Dans le cadre du Parcours de Contrôle Progressif pour la TAA, le Cameroun est au niveau 1 ; toutefois l'Adamaoua serait au niveau 2 et l'extrême-nord au niveau 3.

I.15

CONTROLE DES MOUCHES TSE-TSE ET TRYPANOSOMOSES AU NIGER

*Dr. Abdoul Razak Issa Garba
Veterinary Doctor / Epidemiologist
Directorate of Animal Health
General Directorate for Veterinary Services
Ministry of Agriculture and Livestock
razakissa2001@yahoo.fr*

Au Niger dans le cadre la lutte et le contrôle des mouches tsé-tsé et trypanosomoses, l'activité majeure à laquelle se consacrée le bureau de la coordination PATTEC-Niger, était basée essentiellement au contrôle par l'utilisation des pour-on durant l'année 2018 jusqu'en Mai 2019.

Il faut noter que cette activité était couplée avec la campagne de vaccination annuelle de la PPR (Peste des petits ruminants) et PPCB (Péripneumonie contagieuse Bovine) financée par le MCA-Niger (Millennium Challenge Account), elle s'est déroulée dans tout le territoire national durant la période de Décembre 2018 à Mars 2019.

Et aussi la région sud-est du Niger (Tahoua) qui ne fait pas parti de la zone d'intervention à fait l'objet d'une enquête qui a révélé la présence des trypanosomoses sur des dromadaires.

Les zones infestées de glossines à savoir : la zone de Tillabéry (Département de Say), la zone de Dosso: (Département de Gaya : Gaya), ainsi que la zone de Diffa ont été touchées par le traitement. Bien que d'autres produits ont été utilisé à savoir Ivermectine.

Toutes les activités cadrent avec la Politique de développement rural et domaines prioritaires pour le Niger avec son axe I qui est l'Amélioration durable de la santé animale et de l'hygiène des produits d'origine animale.

1.16

COUNTRY REPORT FOR UGANDA

Ambrose M. Gidudu and Fredrick Luyimbazi

Uganda covering a total area of 241,038 sq km with a population estimated at 40 million people has 70% (140,000 sq kms) of its land mass tsetse infested, presenting health risks to both livestock and humans. The country depends on agriculture for food self-sufficiency and food security.

The livestock sector contributes about 17 percent of the Agricultural GDP. Livestock products in Uganda play important roles in many families, including raising household incomes and providing protein. The national livestock population amounts to 11.4 million cattle, 12.5 million goats, 3.4 million sheep, 3.2 million pigs and 37.4 million chickens (UBOS 2008). The greatest concentration of livestock is found in the “cattle corridor”, extending from South-Western to North Eastern Uganda.

One of the greatest constraints to livestock production in Uganda is the prevalence of tsetse transmitted human and animal Trypanosomiasis. Results from the Animal Trypanosomiasis prevalence surveys in some districts indicated prevalence rates as high as 35%.

Uganda has two forms of sleeping sickness(HAT), the acute form of the disease caused by *Trypanosoma brucei rhodesiense* is found in south-eastern, eastern and in mid North-Uganda; and the chronic form caused by *Trypanosome brucei gambiense* found mainly in North-western and some parts of Northern Uganda.

The tsetse species of major economic importance in Uganda include: a) *Glossina fuscipes fuscipes*, dotted with a few pockets of *Glossina pallidipes* in South Eastern Uganda and *Glossina morsitans sub morsitans* in North Eastern Uganda (Karamoja region).

The Department of Entomology undertaking control interventions using an Integrated Area-Wide Pest Management (AW-IPM) approach is guided by the National Strategies/Frameworks related to Agriculture; and Regional/International Collaborative Commitments and Obligations including:

i) Ministry of Agriculture Animal Industry and Fisheries (MAAIF) five years Sector Strategic Plan (ASSP) 2015/16-2020/21, ii) National Development Plan NDP II and iii) National Agriculture policy. b).i) The African Union (AU) Heads of States decision AGH/DEC. 156 XXXVI which was passed in Lome Togo (2000) establishing the Pan African Tsetse and Trypanosomiasis Eradication campaign, PATTEC and which urged member states to act collectively to rise to the challenge of eliminating the T & T problem through concerted efforts in mobilizing the necessary resources.

The main interventions undertaken during the period include: a) Entomological Surveys to establish the trends of tsetse populations in approximately 30,000 sq. km covering the districts of Kalangala, Buvuma, Arua, Maracha, Moyo Yumbe, Masindi, Nwoya, Karenga, Kotido and Kaabong; b) Building local government capacity to undertake interventions through training of 120 Local government staff and Community Animal Health Workers (CAHWs) in essential skills in Vector Control; c) provision and deployment of tsetse suppression tools including 30,000 pyramidal tsetse traps, 1000 tsetse targets, insecticides, trypanocides, and procurement of Remotely Piloted Aircraft RPA by IAEA, for aerial application of Insecticide, d) Technical support to local governments during application of Deltamethrin on livestock for tsetse suppression and mass treatment of livestock with Isometamidium chloride to cleanse them of trypanosomes, e) active screening, treatment of human populations and maintenance of a functional sleeping sickness surveillance system at all levels; f) Entomological Monitoring in Geo-referenced Fixed Sites g) Community awareness raising activities and h) SIT supportive Research activities,

Tsetse surveys, recorded an average 5-19 flies per trap per day for *Glossina fuscipes fuscipes*. in the districts of SE Uganda. In the NW Uganda the WHO elimination target of one case of HAT per 10,000 people has been attained and Dossier preparation process is underway. In North Eastern Uganda (Karamoja region) Tsetse catches higher than 350 flies/trap/day for *Glossina morsitans sub morsitans*, have been recorded

Key outstanding challenges and proposed appropriate recommendations to address the challenges

- The relocation of the National Livestock Resources Research Institute which was hosting the tsetse Mass rearing activities

disrupted the IAEA supported SIT based activities at the facility. Land has been allocated at Nakyesasa for establishment of the Tsetse mass rearing facility. A request for supplementary budget for construction of one module of the Tsetse mass rearing facility has been made by MAAIF to Ministry of Finance Planning and Economic Development (MoFPED). In the meantime a temporary tsetse mass rearing facility is being maintained in Kalangala Islands for SIT supportive studies

- High tsetse fly infestations in protected areas of Uganda eg the vast area of Kidepo National Park in the Karamoja region and Murchison Falls National Park, which constitute a source of re invasion and not easy to access for surveys and also for community based control approaches. 2Project proposals, Tsetse control, one for Interventions in Murchison Falls National Park and the other for Tsetse Suppression in the Karamoja region were finalized and submitted to the Sector Working Group for approval and also submitted to the EAC for integration into the Proposed Regional Tsetse and Trypanosomiasis Eradication Project for Kenya, South Sudan and Uganda.

I.17

CURRENT SITUATION OF TSETSE AND TRIPANOSOMOSIS IN MOZAMBIQUE

Susana Jamal
DVM, Msc in Veterinary Science

ABSTRACT

In Mozambique, about 75% of the land is infected by tsetse fly. There are *Glossina morsitans*, *G. pallipes*, *G. austeni* and *G. brevipalpis*. These four species of glossine inhabit in the area since the Rovuma river until the parallel 22. South of the parallel 22 there are small pockets of tsetse in Inhambane, Gaza and Maputo provinces, where there are only 2 species namely *G. austeni* and *G. brevipalpis*.

The control of African Animal Trypanosomosis (AAT) has been done with use of trypanocidal drugs, namely Diminazene aceturate and Isometamidium Chloride. Control of Tsetse is not been done. Resistance to trypanocidal drugs in cattle was identified in Zambezia Province in 2005 and 2017.

The baseline data collection in Matutuine district as a part of the Feasibility study for creation Tsetse free zone in South Africa and in Southern part of Mozambique was done but not concluded.

Mozambique has identified the priority areas for Tsetse intervention, however needs to enhanced technical capacity and stable financial sources to ensure creation Tsetse and Trypanosomosis free areas.

Key words: tsetse fly, trypanosomosis

COUNTRY REPORT FOR COTE D'IVOIRE

N'guessan Assanvo Lambert

ABSTRACT

Ivory Coast is one of the African countries south of the Sahara where the two forms of trypanosomosis: African Animal Trypanosomosis (AAT) and African Human Trypanosomiasis (AHR) persist. It is nevertheless a country with an agricultural vocation where since 1973, breeding has been listed as a national priority. Since 1978, the combined efforts of the Ivorian state and its national and international partners have allowed the control of this disease and its vectors on nearly half of the national soil. However, the socio-economic crisis that has crossed the country has undermined more than a decade of struggle against TAA in Côte d'Ivoire.

Animal trypanosomosis control activities have dropped dramatically after the political crisis. The last activities carried out date from 2017-2018 as part of the implementation of the project "Action to continue the revival of harness culture in the cotton basin" funded by the EU. These activities, carried out over an area of approximately 40,000 km², made it possible to set up and train 200 members of the Comité Villageois de Lutte (CVL) in tsetse control issues and methods, the laying of 5,000 VAVOUA mono conical traps, capacity building of 40 agents of the cotton companies and the National Agency for Rural Development Support (ANADER).

Today, acquiring funding for the implementation of the Trypanosomosis and Tsetse Eradication Program in Côte d'Ivoire (PETT-CI), remains the priority of the Ministry of Animal and Fisheries Resources (MIRAH). It is the national component of the African Union's Pan African Tsetse and Trypanosomiasis Eradication Campaign (AU-PATTEC), the main objective of which is to eliminate trypanosomosis in order to contribute to the reduction of trypanosomiasis. Poverty, improved food security and the well-being of people in the Program area.

This program, which takes into account the Progressive Control Pathway (PCP), and which takes into account the integrated approach in the fight against Trypanosomoses, will have six (06) antennas covering the entire national territory for the operationalization of the strategy. .

Eventually, the program will impact several sectors including the livestock production sub-sector through the improvement of the productivity of the national livestock, the sub-sector of cotton production through the optimal use of harnessed oxen and the sector: health by improving the living environment and the health status of the population.

I.19

THE SITUATION OF TSETSE AND TRYPANOSOMOSIS IN THE DEMOCRATIC REPUBLIC OF CONGO. ACTIVITIES AND RESULTS SINCE SEPTEMBER 2018

*Philemon Mansinsa Diabakana *, Junior Kazadi Mulaja**
* FOCAL POINT PATTEC DRC , **PATH DRC.*

The Democratic Republic of Congo (DRC) is infested by 19 species and sub species of tsetse flies, the most important of which are: *Glossina palpalis palpalis*, *Glossina fuscipes quanzensis*, *Gf fuscipes* and *G.f.martinii*.

HAT risk population is 35 000 000 inhabitants. Bovine estimated at nearly 600,000 which half is constituted by N'dama and found at western and southern of the DRC.

Trypanosomes weren't found among N'dama Bovine at Kolo in Kongo Central whereas they are found at Mushie in the Maindombe, with the predominance of *Trypanosoma vivax*. In Kinshasa's pigs , a lot of trypanosoma species were identified. In Kongo central trypanosoma was found in goats. Isomethanidium and diminazene aceturate are used to treat AAT in DRC.

Since September 2018 PNLTHA's scientific advisory committee meeting (CCS) and the cross-border fighting were among DRC, Angola and the Republic of Congo were organized. Fexinidazole, effective oral medications to treat THA has been accepted among the DRC's essential drugs. The 2019-22 strategic plan of controlling HAT was developed and a module for the training in the management of HAT were developed too.

DRC celebrated its National Hat day and an advocacy regional forum on HAT were held in Kinshasa.

For 2020, PATTEC DRC wishes to have a coordination office in Kinshasa, and would like to develop normative documents .

I.20

COUNTRY REPORT ON TSETSE AND TRYPANOSOMOSIS SURVEILLANCE IN THE KINGDOM OF ESWATINI

*Dr Sihle Mdluli
Veterinary Epidemiology Unit
P.O.Box 4192 Manzini, Eswatini
Mdlulisihle8@gmail.com*

Trypanosomiasis and Tsetse fly have not been a priority of the Veterinary Services since the 50s. The flies were eradicated in most of the areas infested in the 40s with the exception of two pockets remaining in the Mhlumeni and Palata areas adjacent to Mozambique. A survey conducted in 2008 showed that, only the Mhlumeni pocket remained and this is in the Mlawula Nature Reserve and consists of *Glossina austeni*. Since 2008, the Veterinary Services has been working towards eradication of the fly under a regional initiative involving the Kingdom and its neighbours, Mozambique and South Africa. Entomological surveys with genetic analysis were conducted in Mlawula Game Reserve to assess the degree of genetic isolation of the Eswatini colony from those of South Mozambique and South Africa. The Eswatini population was found not genetically related to the South Mozambique and South African flies. Parasitological surveys using Buffy Coat Smears were also conducted along the country's eastern frontier in areas suitable for tsetse infestation with negative results. The genetic results indicated that the Eswatini colony is isolated from the South Mozambique and South African populations and the parasitology results suggested an absence of trypanosomiasis disease in the national herd. It can therefore be concluded that the flies are restricted to Mlawula Nature Reserve and localized control is possible and can be sustainable.

1.21

CONSOLIDATION OF EFFORTS FOR SUSTAINABLE CREATION OF TSETSE AND TRYPANOSOMOSIS FREE AREAS FOR LIVESTOCK AND CROP PRODUCTION IN ETHIOPIA.

Dagnachew Beyene (Dr.)

*National Institute for control of tsetse and trypanosomosis, email be_
dagnachew@yahoo.com*

ABSTRACT

The institute works to create tsetse and trypanosomosis free areas to enhance livestock and crop production and productivity and contribute to ensuring livelihoods and food security in Ethiopia. Integrated insecticide treated cattle (ITC), insecticide treated targets (ITT), ground spray (GS), sterile insect technique (SIT) and treatment of sick animals, where feasible and applicable, were used for the operation. Nine hundred forty four thousand two hundred forty (944, 240) ITC, 3270 ITT and 640 400 sterile males (313,300 *G.fuscipes* and 327 100 *G.pallidipes*) as well as 32,655 trypanocidal drugs treated animals were used for the control of tsetse and trypanosomosis. The entomological and parasitological monitoring made in localized areas showed encouraging reduction of tsetse flies and trypanosomosis prevalence. In this regard, the contribution of community and stakeholders participation was highly important for the achievement. However, areas that were not adequately covered remain with high tsetse fly density and disease prevalence due to various reasons consisting of lack of strategic intervention, inadequate technical capacity and staffing, resource, logistics, and staff motivation, which needs further strengthening. Thus, more attention and effort is required to address the gaps through strategic intervention and expansion of efforts, strengthened community and stakeholders participation and coordination, enhanced technical capacity and staffing, staff commitment and motivation, diversified and stable financial sources and logistics to ensure creation of sustainable tsetse and trypanosomosis free areas in Ethiopia.

Key words; tsetse fly, trypanosomosis, community, stakeholders, monitoring

**HUMAN AFRICAN TRYPANOSOMIASIS
(HAT)**

2.01

PERFORMANCE OF DIAGNOSTIC ALGORITHMS BASED ON RAPID DIAGNOSTIC TESTS TO DETECT SLEEPING SICKNESS IN THE DEMOCRATIC REPUBLIC OF CONGO

Makabuza Mukabela Jacquies

ABSTRACT

The integration of African Human Trypanosomiasis (HAT) in peripheral health facilities (FOSAs) is crucial for its elimination. It requires effective and easy-to-use diagnostic tools. We conducted a prospective study* to evaluate the performance of recently developed rapid diagnostic tests (RDTs), followed by reference tests (RTs) (ELISA, Trypanolysis, LAMP and real-time PCR).

Clinical suspects recruited from 26 peripheral health facilities in the DRC were tested using three different RDTs (HAT Sero-K-set, rHAT Sero Strip and SD Bioline HAT 1.0). The RDT+(s) were referred to the diagnostic centres (DCs) for parasitological confirmation examinations and blood collection on filter paper subjected to RTs at the INRB (Kinshasa). Any unconfirmed suspected RDT+(s) and RT +(s) were again invited to the DCs for parasitological examinations.

From October 2017 to May 2019, 1,345 clinical suspects were enrolled, 205 found RDT+, including 44 confirmed cases of HAT (two during follow-up after positive RT results). The sensitivities were 100% (95% CI: 92-100), 65% (95% CI: 48.3-79.4), 88.6% (95% CI: 75.4-96.2) and 95.3% (95% CI: 84.2-99.4) respectively for each of the 3 RDTs and the rHAT Sero Strip and SD Bioline HAT 1.0 combination. Specificities were 89.3% (95% CI: 87.5-90.9), 97.8% (95% CI: 96.8-98.5), 92.4% (95% CI: 90.8-93.8) and 88.4% (95% CI: 86.5-90.1).

The strategy designed is feasible, but the referral system of suspects and samples needs to be improved.

*Grant number DRIA-2014-DiTECT-HAT, supported by the EU (EDCTP2)

2.02

DIFFICULTIES CONDUCTING SENSITIVE TESTS FOR THE DIAGNOSIS OF HUMAN AFRICAN TRYPANOSOMIASIS IN THE DEMOCRATIC REPUBLIC OF CONGO

*Jérémie Ilunga*¹, Epcó Hasker² and Erick Mwamba Miaka¹*

¹National Human African Trypanosomiasis Control Programme, Kinshasa, Democratic Republic of Congo

*²Institute of Tropical Medicine, Department of Public Health, Antwerp, Belgium
Junction of Avenue de la libération et boulevard triomphal N° 1, Kinshasa, Democratic Republic of Congo
jeremilunga@gmail.com*

ABSTRACT

In recent years, the transmission of African Human Trypanosomiasis (HAT) has been declining and cases are becoming rare. In this regard, diagnostic procedures in routine practice are losing their quality. To avoid reporting false positives and false negatives, capacity building among laboratory providers is imperative. The study seeks to demonstrate the difficulties faced in the conducting sensitive tests for the diagnosis of HAT by integrated health-care facilities (FOSA) and the programme's mobile units (MUs). According to the clinical trial protocols for FEXINIDAZOLE and OXABOROLE, a total of 32 subjects (22 cases of HAT and 10 serological suspects) were referred to the Dipumba Centre between 2016 and 2018, either by the health facility or the MU, for confirmation and inclusion in clinical trials. Percentage calculations of false positives and false negatives indicate that the real challenge is lack of specificity, 45% (10/22) of false positives (95% CI 25-66%) and lack of sensitivity, 40% (4/10) of false negatives, (95% CI 10 - 70%) due to the quality of the diagnosis. With the decreased prevalence of HAT, the detection of trypanosomes during diagnosis using the standard microscope is problematic and requires continuous capacity building, visits to the structures concerned by laboratory supervision and the establishment of a control tool capable of ensuring reliable results.

2.03

STRENGTHENING DIAGNOSTIC DOCUMENTATION PROCEDURES IN CLINICAL TRIALS TO DEVELOP NEW THERAPEUTIC TOOLS IN HUMAN AFRICAN TRYPANOSOMIASIS

*J. Dinanga*¹, D. Tshimanga¹, D. Ngolo², M. Cire Thiam³, W. Mutombo⁴, S. Rembry⁵, Ch. Perdrieu⁵, A. Pretre⁵, S. Delhomme⁵, O. Valverde⁵, A. Tarraf⁵; N. Strub-Wourgaft⁵*

¹INRB DRC; ²NSSCP DRC; ³NSSCP Guinea, ⁴DNDi Kinshasa, ⁵DNDI Geneva

Since 2009, DNDi in collaboration with the national NSSCP has been conducting clinical trials to develop new therapeutic tools for gambiense human African trypanosomiasis (g-HAT) in the Democratic Republic of the Congo (DRC), Central African Republic (CAR) and Guinea.

To increase quality assurance of clinical trials, since 2012 DNDi has put in place in each clinical trial site of the last ongoing clinical trials (DNDI-FEX-09-HAT and DNDI-OXA-02-HAT) the systematic recording of pictures of the counting of the number of white blood cells in CSF and videos of the parasites in any body fluid explored for each patient included in the clinical trial and at the follow-up visits. Thus, digital images are available for each participant in the clinical trial to warrant its stage and parasitological status.

Each site was equipped with a Zeiss microscope Primo star mounted with a camera. Three laboratory technicians were trained on its use and to record images. An additional staff was trained to manage the electronic software where the images were anonymized and stored. The electronic database was then made accessible to authorized laboratory supervisor of the clinical trial. Regular quality monitoring of the stored files was done by the supervisor and, if necessary, refreshing courses were organized. In parallel, efforts were done to ensure for each clinical trial site access to internet.

Details on the set up and SoP of such digital recording of images and results with regards to diagnosis in clinical trials to develop new tools for g-HAT are presented

2.04

DESCRIPTION OF A QUALITY ASSURANCE SYSTEM FOR THE BIOLOGICAL DIAGNOSIS OF HAT IN THE NATIONAL PROGRAMME FOR THE CONTROL OF HAT IN DRC

Mutangala W, Mwamba E*, Kwete J*, Basha M*, Bawota J*, Mumba D**,
Pyana P**, Inocencio da Luz R***, Büscher P***, Boelaert M****

**National Programme for the control of human African trypanosomiasis:
PNLTHA*

***National Institute for Biomedical Research: INRB*

****Antwerp Institute of Tropical Medicine: IMTA*

ABSTRACT

The WHO advocates the elimination of HAT by 2020, the eradication by 2030 and the DRC government has made a firm commitment to eliminate HAT as a public health problem by declaring on 30 January HAT National Day. This commitment implies a quality diagnosis which remains a challenge for the PNLTHA. In the Face of the decrease in the prevalence of sleep disease in a limited resource context, in addition to the cost-effectiveness of active screening, which is no longer justified, the loss of the technical skills of the providers is noted. The rarity of HAT with the immediate effect of the inability to recognize the trypanosome. The demotivation of staff from multi-purpose structures due to the lack of specific tools and bonuses and the disengagement of some donors are all factors that can jeopardize this process of elimination.

In this context, we have launched within the PNLTHA a quality assurance system for the biological diagnosis of HAT to ensure the quality and reliability of the monitoring system. Positive cases must actually be cases and the negative ones should be really negative.

To achieve this, a comprehensive and systemic approach is adopted, with three pillars, namely equipment, reagents and personnel. While the PNLTHA will focus on internal quality control, the National Institute for Biomedical Research (INRB) as a national reference laboratory shall ensure external quality control. The ITM in Antwerp, Belgium, will provide technical support to both institutions and take charge of quality control at the international level. It is planned to renew the technical training of

personnel using live non-infective trypanosomes from the INRB. For the monitoring of the skills of the staff, a specific application on tablet will serve as a tool of quality control by the imaging of diagnostic tests.

Thirteen mobile teams, and some fixed structures in the provinces of Kwilu and Mai-Ndombe have been selected as pilot sites for this program.

We will report the preliminary results of this pilot program. The PNLTHA together with the INRB and IMT intend to take up this challenge towards the elimination and eradication of HAT.

2.05

SENSITIVITY OF SEROLOGICAL TESTS FOR TRYPANOSOMA BRUCEI GAMBIENSE IN DETECTING ANTIBODIES IN LIVESTOCK, AND CORRELATE WITH TSETSE FLY INFESTATION IN A HUMAN AFRICAN TRYPANOSOMIASIS ENDEMIC FOCI IN DELTA STATE, NIGERIA

Dede, P.M.¹; Ajakaiye, J.J.¹; Wayo, B.¹; David, K.¹; Yusuf, A. B.¹; Baba, U.; Ezebuio, C.O.¹; Edache, C. I.¹; Ishaq, A.R.¹; N'dungu, J.²

¹Nigerian Institute for Trypanosomiasis Research (NITR), P.M.B. 2077 Kaduna, Kaduna State, Nigeria

²Foundation for Innovative New Diagnosis (FIND) Av. Budé 16 1202 Geneva, Switzerland

In an attempt to establish the sensitivity of serological tests for gHAT in detecting antibodies in livestock in correlation with tsetse fly infestation in HAT endemic foci in Delta State, Nigeria, following research questions emanating from the just concluded passive surveillance of gHAT in Delta State, where Subjects who were screened with RDT positive latter became RDT negative when retested after 2-3months from the first test. Consequently, blood samples were collected from jugular and ear veins of cattle, pigs and small ruminants and were immediately screened using RDTs and mHCT. Also blood samples were preserved on filter paper for further molecular studies. Approximately 2mls of blood from each sample was stored in specimen bottles and were preserved in Liquid Nitrogen. *Stomoxys* spp. and *Glossina* spp were trapped from the surveyed area. All were subjected to screening using parasitological and molecular techniques to reveal the true identity of the infecting trypanosome species. Polymerase Chain Reaction-based (PCR) and molecular technique were used to detect the presence and identity of trypanosome species in blood (34), *Stomoxys* (11) and tsetse (7) flies. Genomic DNA was extracted from whole blood and whole flies using commercial DNA extraction kit and phenol-chloroform method. Nested PCR using ITS-I generic primers was employed to amplify intra-transcribed region of ribosomal DNA (rDNA) specific for each *Trypanosoma* specie. DNA amplicons were resolved in 1% agarose gel electrophoresis. Agarose gel electrophoresis preceded PCR analysis where four (4) samples were selected based on the bands sizes, excised and sent for sequencing to confirm their correct

specie identity predicted by the band size. The consensus nucleotide sequences obtained for each query were then subjected to sequence alignment analysis. Thirteen (13) blood samples were infected with either *T. vivax* (7), *T. simiae* (1) or *T. brucei* (3) or mixed infections, with *T. vivax* responsible for 54% of the infections. Three (3) tsetse flies were found to be infected with *T. brucei* (2) and a mixed infection of *T. vivax/T. godfreyi*/ unknown spp. Similarly, four (4) stomoxys were detected to be infected with *T. brucei*, unknown spp and two (2) mixed infection of *T. vivax/T. grayi* and *T. vivax/T. simiae*. The results of this investigation that demonstrated the presence of *T. brucei* by molecular techniques and the presence of *T. b. gambiense* by trypanolysis has far reaching health implications on the epidemiology of human African Trypanosomiasis (HAT), as the source of these samples could be humans, more especially that the study area is known to be an old endemic focus for the gHAT.

2.06

EVOLUTION OF THE NUTRITIONAL STATUS OF CHILDREN INCLUDED IN THE DNDiHATFEX006 STUDY IN THE DEMOCRATIC REPUBLIC OF CONGO (DRC), BETWEEN THE TIME OF DIAGNOSIS AND THE END OF THE 18-MONTH FOLLOW-UP.

**Junior E. Mudji^{1,2}, Digas T. Ngolo³, Wilfried K. Mutombo, ⁴ Olaf Valverde Mordt⁴*

¹Department of Family Medicine, Protestant University of Congo, Kinshasa, DRC

²Evangelical Hospital of Vanga, Kwilu, DRC

³National Program for the Control of African Human Trypanosomiasis (PNLTHA), DRC

⁴Drug for Neglected Diseases initiative

African Human trypanosomiasis (HAT) with *Tb gambiense* is a chronic parasitic disease and patients regularly show nutritional deficiencies. The analysis of selected data collected during the DNDiHATFEX006 clinical study: “Efficacy and Safety of Fexinidazole in Children at Least 6 Years of Age and Weighing Over 20 kg with Human African Trypanosomiasis (HAT): a prospective, multicentre, open-label study, plug-in to the pivotal study», aims to describe the nutritional status of children with HAT disease at all stages, before treatment, at the end of hospitalization and at the end of the 18-months follow-up period. The DNDiHATFEX006 clinical study was conducted in the DRC from 2014 to 2017 in eight reference hospitals. The nutritional parameters collected were: age, sex, weight, height, as well as various biochemical parameters. A total amount of 125 children with HAT were included. Their ages ranged from 6 to 14 years and a majority were boys (67; 53.6%). At the screening visit, the average weight was 28 kg and the average BMI was 15.9. These same parameters were 33 kg and BMI 17 at the end of the 18-months follow-up. At the time of inclusion in the study, the mean albuminemia level was 3.36 g/dL; hemoglobin 11.85 g/dL, BUN 6.87 mg/dL and alkaline phosphatase 151.5 IU/L. These parameters improved as well until the end of the follow-up period. In conclusion, HAT management in children should integrate the nutritional component, as it is the case with some chronic infectious diseases such as tuberculosis and AIDS.

AN ACTIVE SEARCH STRATEGY FOR UNCONFIRMED CATT POSITIVE SUSPECTS SET UP BY A HEALTH ZONE TEAM IN THE DRC

Nkieri Matthieu¹, Kavunga Papy¹, Nganzobo Pathou², Mafolo Titus³, Basake JP³, Selego Chalet³, Kapalati Arnold³, Mwamba Eric², Mbo Florent⁴

¹Health zone of Bagata, Kwilu province, Democratic Republic of Congo

²Sleeping sickness control program, DRC

³Provincial Health Ministry of Kwilu, DRC

⁴HAT platform, DRC

INTRODUCTION

WHO has set the goal of eliminating HAT as a public health problem in 2020 and eradication in 2030. However, this elimination also means integrating control activities at the level of endemic health areas for sustainability of activities at the level of multipurpose health services. One of the activities that can be monitored is the tracking of unconfirmed CATT positive suspects. The goal is to share an active search strategy by the health zone team of CATT positive suspects unconfirmed passively by the multipurpose health services.

METHODOLOGY

The Bagata health zone team in the DRC has identified seventy four CATT positive suspects from January 2017 to April 2019 in five health centers that have integrated CATT-based serological screening and HAT diagnosis. These suspects were found and sensitized to perform a parasitological confirmation examination at the reference general hospital.

RESULTS AND DISCUSSION

Only eighteen people answered the confirmation exam, of which Eight were confirmed

Prior to the use of this strategy, no patients were diagnosed in health zone structures over a 3-month period.

CONCLUSION

In this period of low prevalence, targeting CATT-positive or RDT-positive suspects by a health district team would be one of the long-term avenues to exploit to find the latest cases of HAT and speed up elimination

IMMUNE TRYPANOLYSIS TEST AS A DIAGNOSTIC TOOL FOR A RATIONAL FOLLOW-UP OF SEROLOGICAL SUSPECTS UNTIL THE DETECTION OF TRYPANOSOMA BRUCEI GAMBIENSE

Bawota J¹, Miaka E¹, Kashama D³ KambaleV², Lutandila B², Pyana P²

*¹National Human African Trypanosomiasis Control Programme, NHATCP, n° 1
Junction Blvd.Triomphale, Av. de Libération – Kasa-Vubu, Kinshasa, DR Congo.*

*²Department of Parasitology, Trypanolysis Laboratory, National Biomedical
Research Institute (INRB), Av. De la Démocratie, ex-des huileries BP:1197,
Kinshasa-Gombe , DR Congo.*

*³Provincial Coordination of South Bandundu, National Human African
Trypanosomiasis Control Programme, NHATCP, Kwilu Province, DR Congo.*

WHO and its partners are targeting the elimination of sleeping sickness by 2020. In view of this objective, concerted efforts are being made by the actors involved in the fight for the effective elimination of this disease. Approaches to addressing the disease include diagnosis, treatment and vector control. Regarding diagnosis, the immune trypanolysis (TL) test, considered superior to CATT given its specificity and sensitivity, would appear to predispose to the detection of the parasite in the individual if its initial sample were CATT + and confirmed (TL +). In this study, we investigated samples from serological suspects (CATT +) with detectable parasitaemia (P +) for future rationalisation of follow-up of CATT+/(TL +) individuals. Thanks to the roving 4 mobile units from the former province of Bandundu, 200 blood specimens were taken on filter paper (PF) and tested in LiTat 1.3 and 1.5 using the immune trypanolysis (TL) test. Of these 200 (PF), 200 were CATT + and distributed as follows: 30 (positive) vs 170 (negative). The results of 200 CATT + are as follows: out of 30 (PF) (P +), 30 were found to be TL + (100%) and of the 170 (PF) (P-), 68 are TL+ (40%) and 102 TL- -. In view of these results, any unconfirmed CATT + that is parasitologically positive, but positive for trypanolysis would be a potential case of parasitological confirmation for the threshold of specific antibodies synthesized by the individual to lyse the trypanosomes. A CATT +/(TL +) monitoring algorithm would increase the number of new cases.

Key words: Immune trypanolysis, filter paper, specific antibodies, algorithm.

2.09

IDENTIFICATION OF NOVEL STAGE DIAGNOSTIC BIO-MARKERS IN PLASMA OF TRYPANOSOMA BRUCEI RHODESIENSE SLEEPING SICKNESS PATIENTS IN UGANDA

Charles D. Kato¹, Vincent P. Alibu², Jean-Charles Sanchez³, Claire M. Mugasa¹,
Enock Matovu¹

¹*School of Bio-security, Biotechnical & Laboratory Sciences, Makerere
University*

²*College of Natural Sciences, Makerere University*

³*Department of Human Protein Sciences University of Geneva, Switzerland*

Objectives: Human African trypanosomiasis (HAT) progresses in two stages, the early stage with parasites in blood and the late stage in which parasite invade the central nervous system (CNS). Drug treatment for both early and late stage disease differs. Therefore, before treatment it is mandatory to determine the disease stage. However, the current staging criterion using cerebrospinal fluid (CSF) relies on an invasive lumbar puncture that is also required to monitor treatment efficacy. Since initial disease diagnosis is done using whole blood, a disease staging technique done at the same time utilizing plasma would be more desirable. We have for the first time evaluated plasma of *T. b. rhodesiense* HAT patients to identify potential biomarkers to discriminate late stage from early stage patients using proteomics methods.

Methods: Plasma samples from both early and late stage patients were prepared following resin deprivation of plasma proteins. This was followed by a reduction and alkylation step prior to digestion into peptides with trypsin. Digested samples were labelled with the TMT® 10-plex tagging reagent and fractionated using off-gel electrophoresis into 12 fractions followed by injection into an Orbitrap mass spectrometer. Protein identification was done by searching peptide spectral matches against the Swiss-Prot/UniProt database using proteome discoverer software version 2.2. Proteins with significant p-Values regarding protein ratios were considered unique to a given stage.

Results: A total of 438 proteins were identified each with two unique peptides. Among these, four were differential expressed between stages.

Three (3) proteins were elevated among late stage patients, Apolipoprotein LI (ratio 2.7, $P < 0.03$), EGF-containing fibulin-like extracellular matrix protein I (ratio 2.6, $P < 0.003$) and Fructose-bisphosphate aldolase C (ratio 2.1, $P < 0.02$). one protein, Carboxypeptidase N subunit 2 (ratio 0.52, $P < 0.00$) was associated with early stage patients. These proteins are associated with immunological functions with some having an origin in the central nervous system.

Conclusion: We have herein identified and validated novel plasma biomarkers with the potential to discriminate late stage from early stage patients using proteomics methods. However, before these markers could be carried forward, clinical studies to evaluate their field utility are paramount.

Keywords: Human African trypanosomiasis, Sleeping sickness, Proteomics, Biomarkers

2.10

THE POTENTIAL OF CELEBRAL SPINAL FLUID INTERLUKIN-6 IN DISCRIMINATING BETWEEN EARLY AND LATE STAGE SLEEPING SICKNESS IN NORTHERN UGANDA

Asiimwe Immaculate, Kato Charles Drago
MAKERERE UNIVERSITY

INTRODUCTION

Sleeping sickness is a protozoan disease that affects rural communities in sub-Saharan Africa (Sabrina et al, Nov 2017). The progression of the disease from the early hemolymphatic stage to the late meningo-encephalitic stage is of critical diagnostic importance as it determines the choice of potentially toxic drug regimens (PGE et al, 2008). Recent diagnostic criteria involving analysis of cerebrospinal fluid for parasites and/or pleocytosis are sensitive, but suggest that specificity may be poor (Natalia et al, July 2012). Patients with stage one HAT are treated with highly toxic chemotherapeutics of stage two and the reverse is true for stage two patients who are under treated with stage one drugs hence minimizing their chances of surviving. Improved staging is desirable and so is the elimination of the need for lumbar puncture.

METHODS

Human CSF samples were collected from patients with suspected HAT. A CSF sample was obtained by a physician via lumbar puncture in the L3-L4 region and the samples obtained were run with ELISA and data analysis was done using IBM SPSS version 22 and GraphPad Prism version 6.0.

RESULTS

A high staging accuracy for IL-6 was obtained by using a cutoff of > 23.3 pg/ml with a sensitivity of 66.67% (95% CI, 46.04%-83.48%) and a specificity of 76.92% (95% CI, 46.19%-94.96%).

CONCLUSIONS

Despite the high staging accuracy shown, IL-6 cannot be used on its own as a clear cut stage marker since other CNS infections and disorders other than HAT can lead to such elevations. The possibility of its translation into point-of-care tests for stage determination has obvious

draw backs and still lacks because of the sensitivity and specificity are not as desired. The first concern is that the marker is not 100% sensitive and as a result some late stage patients would be misled to wrong treatment choices that could fuel relapses. Secondly, sleeping sickness is present in areas endemic for other tropical diseases, in which case cytokine dysregulations and biomarker potential apply to other CNS disorders. Therefore, this analysis should be validated in a larger cohort of patients and further evaluated in other inflammatory diseases such as cerebral malaria and they should also be performed in combination.

REFERENCES

1. Kato CD, N. A. (2015). Clinical Profiles, Disease Outcome and Co-Morbidities among *T. b. rhodesiense* Sleeping Sickness Patients in Uganda. *PloS one*; 10: e0118370. pmid:25719539.
2. Sabrina D. Lamour, V. P. (Nov 2017). Metabolic Profiling of Central Nervous System Disease in trypanosomabruceirhodesiense infection.
3. PG., K. (2008). The continuing problem of human African trypanosomiasis (sleeping sickness). *Ann Neurol*; 64: 116–126. pmid:18756506.
4. Natalia Tibertil., A. H. (july 2012). Cerebrospinal Fluid Neopterin as Marker of the Meningo-Encephalitic Stage of Trypanosomabruceigambiense sleeping sickness.

2.11

EVALUATION OF THE SENSITIVITY OF PRIMERS USED FOR THE PCR DIAGNOSIS OF HUMAN AFRICAN TRYPANOSOMIASIS DUE TO TRYPANOSOMA BRUCEI GAMBIESE IN GUINEA COSTAL FOCI.

Hamidou Ilboudo¹, Oumou Camara², Mamadou Camara², Jacques Kaboré³, Mohamed Bamba³, Justin Kaboré³, Philippe Solano⁴, Bruno Bucheton^{2,4}, Vincent Jamonneau⁴

¹Institut de Recherche en Sciences de la Santé/Unité de Recherche Clinique de Nanoro, BP 218 Ouaga CMS 11

²Programme National de Lutte contre la THA, BP 851, Conakry, Guinea

³Centre International de Recherche-Développement sur l'Élevage en zone Subhumide (CIRDES), 01 BP 454, Bobo-Dioulasso 01, Burkina Faso

⁴Institut de Recherche pour le Développement (IRD), Unité Mixte de Recherche IRD-CIRAD 177, INTERTRYP, Campus International de Baillarguet, 34398 Montpellier Cedex 5, France

INTRODUCTION

Historically, the fight against human African trypanosomiasis (HAT) is essentially based on screening and treatment of patients. The patients screening is based on the serological diagnosis followed by parasitological confirmation but the methods used lack sensitivity and specificity. Several polymerase Chain Reaction (PCR) technics using different primer types was developed to improve the diagnosis algorithm. The objective of our study was to evaluate the sensitivity of several primers used in molecular diagnosis of *T. b. gambiense*.

MATERIALS AND METHODS

The study was carried out in three active HAT foci (Dubreka, Boffa, and Forecariah) located in mangrove areas of coastal Guinea. In total 204 patients were included and for each included patient blood was sampled for molecular analyzes with TBR, 18S, LiTaT 1.3, AnTaT 11.17, TgsGP, TgsGP Nested primers.

RESULTS

The sensitivity of the primers was 94.6% for the 18S primers; 93.1% for TBR; 89.2% for LiTaT 1.3; 86.3% for AnTAT 11.17; 78.4% for TgsGP and 85.8% for TgsGP Nested

CONCLUSION

This study confirms the sensitivity of the TBR and 18S primers compared to the other tested primers. The TgsGP primers although specific for *T. b. gambiense* have a lower sensitivity and this sensitivity increases with nested PCR. We show in this study that LiTAT 1.3 and AnTaT 11.17 primers can be also used for molecular diagnosis of *T. b. gambiense* but further studies are necessary to verify if these primers are only specific to *T. b. gambiense*.

2.12

EVALUATION OF TRYPANOCIDAL ACTIVITY OF COMPOUND ISOLATED FROM VITELLARIA PARADOXA OF CENTRAL AFRICAN REPUBLIC

Nzoumbou-Boko R^{1*}, Bairy G², Courtois P³, Mérillon J M⁴, and Vincendeau P³

¹Institut Pasteur de Bangui, Université de Bangui : nzoumbou2@yahoo.fr

²Département de Chimie, Université de Bangui : guerissonbairy@gmail.com

³Laboratoire de Parasitologie, Université de Bordeaux, pierrette.courtois@u-bordeaux.fr et philippe.vincendeau@u-bordeaux.fr

⁴Polyphenols Biotech, Université de Bordeaux : jean-michel.merillon@u-bordeaux.fr

ABSTRACT

Human African trypanosomiasis is a neglected tropical disease which remains a major public health primarily in the poorest regions of Sub-Saharan Africa. However, diagnosis and difficult treatments including safety and drug resistant parasites need to investigate new antitrypanosomal agents. Plants are potentially rich sources for new drugs against several parasites whose trypanosomiasis. The aim of this work is: i) a plant, ethnobotanical investigation used in the Central African Republic traditional treatment of trypanosomiasis; and ii) to assess the trypanocidal activity of the selected plant.

Vitellaria paradoxa was selected during the ethnobotanical investigation in Batangafo. Extracted by sonication successively with, hexane, ethyl acetate, acetone, methanol and water have been realized. Several technical for identification and characterization were used: column chromatography, TI chromatography, NMR Spectroscopy and MS. Purified trypanosoma from infected mice were incubated with varying concentrations of the extracts and compounds at 37° C in 5% CO₂ atmosphere for 6, 12, 21 and 24 hours. Parasite viability was observed by microscopy.

The in vitro screening results showed that ethyl acetate extract and the VP4 compounds had the trypanocidal activity against *Trypanosoma brucei brucei* with a minimum inhibitory concentration (MIC) of 12.7 and 5.2 µg/ml, respectively. The acetone extract also exhibited trypanocidal activity unfortunately this solvent is toxic to trypanosomes.

Vitellaria paradoxa and might complete the register of trypanocidal medicinal plants. The in vivo trypanocidal activity and toxicity should be tested. The VP4 compound might complete the list of other trypanocidal compounds that candidate for the new therapeutic approach.

KEYWORDS: Trypanocidal activity, biomolecule, Vitellaria paradoxa, medicinal plants.

2.13

RISK OF POST-TRANSFUSION TRANSMISSION OF HUMAN AFRICAN TRYPANOSOMIASIS IN THE CITY OF MBUJI-MAYI IN THE DEMOCRATIC REPUBLIC OF CONGO (MARCH 2003 - DECEMBER 2017)

Background : The National Program for the Control of African Human Trypanosomiasis (HAT) strategies to reduce the spread are based on the reduction of human contact, early diagnosis of cases and correct treatment of patients. However, transmission by blood transfusion seems to be neglected or even ignored. The number of diagnosed cases with a history of transfusion has become remarkable. The purpose of this study is to describe the demographic characteristics of trypanosomally diagnosed children at the Dipumba Trypanosomiasis Reference Center in Mbuji-Mayi and to evaluate the risk of transfusion due to HAT. Method and population: this is a historical case-control cohort study (1/2). 636 subjects were recruited (212 cases of HAT and 424 controls). The cases are trypanosomatic children with or without a history of transfusion recorded from March 2003 to December 2017. The control is the subject of the same sex, age and place of residence as the trypanosome with or without a history of transfusion whose serology Card Agglutination Trypanomiasis Test (CATT) is negative. Result: 26.9% of cases had a history of transfusion. The most affected age group is 6 to 10 years old. The risk of exposure to HAT is significantly increased in patients with a history of transfusion (OR = 1.8 [1.2-2.7], $p = 0.00264$). Conclusion: At the moment when we are trying to eliminate HAT, if we do not take into account this mode of transmission we may experience stagnation.

Key words: Mbuji-Mayi; post-transfusional; Democratic Republic of Congo ; risk; African human trypanosomiasis.

2.14

RISK OF RESURGENCE OF HAT IN LOW-PREVALENCE CONFLICT AREAS: CASE OF EASTERN KASAI PROVINCE IN THE DRC FROM 2013 TO 2018

*Rashidi Samuel**; *MBO Florent**; *Erick Miaka ***

**National Human African Trypanosomiasis Control Programme*

***HAT Platform*

Human African trypanosomiasis (HAT) is an endemo-epidemic disease specific to tropical Africa that is often prevalent in rural and remote areas where the health system is deficient (1). To date, sustained efforts to implement the main control strategies which include the reduction of the human reservoir through active and passive screening, monitoring of the treatment of patients and vector control, have reduced the number of cases reported annually to a level close to elimination (2). However, it is accepted today that the cessation of control activities has most often been one of the causes of resurgence of the disease (3). This may be due to different contributing factors such as wars, customary conflicts, lack of funding, etc.

The objective of our work is to discuss the risk of resurgence of the disease in a low prevalence conflict area.

This is a cross-sectional analytical study that will look for the correlation/association between conflict and the resurgence of cases through the analysis of epidemiological data from Eastern Kasai Province from 2013 to 2018.

An increase in new cases (NCs) from 2017 to 2018 was observed in the same proportions as 4 years ago with low coverage (66%), i.e. 399 endemic villages visited out of 603 planned for the last two years, with a gap of 89,536 people at risk not covered. 80% of NCs were diagnosed in the first stage in 2017 and 2018 unlike in previous years; which shows an active transmission of the disease. This situation has also been observed in the other provinces of the DRC, Angola and Guinea. Thus, it is legitimate to ask the question about the epidemiology of sleeping sickness in the context of conflict. It is in this regard that the present study is of interest and proposes to respond to the following research question: What is the

influence of conflict on the fight against sleeping sickness?

The objective of our study is to contribute to the reduction of morbidity and mortality relating to sleeping sickness by improving the fight against sleeping sickness in a context of conflict.

THE HAT ATLAS: A GIS-BASED SYSTEM TO PLAN CONTROL ACTIVITIES AND MONITOR PROGRESS IN HAT ELIMINATION

Grout Lise¹, Paone M², Priotto G¹, Cecchi G², Ebeja AK³, Diarra A³, Franco JR^{1*}

¹World Health Organization, Control of Neglected Tropical Diseases, Innovative and Intensified Disease Management, Geneva, Switzerland

²Food and Agriculture Organization of the United Nations, Animal Production and Health Division, Rome, Italy

³World Health Organization, Regional Office for Africa, Communicable Disease Unit, Brazzaville, Congo

ABSTRACT

The Atlas of human African trypanosomiasis (HAT) is jointly developed by WHO and FAO in the framework of the Program against African Trypanosomiasis (PAAT). It centralizes epidemiological and control data from all National Sleeping Sickness Control Programs (NSSCP), NGOs, and research institutions involved in HAT control into a single repository. Initially a tool to understand disease distribution and transmission, the Atlas has also become a crucial tool to monitor progress towards HAT elimination, to plan control and surveillance activities, and to inform epidemiological modelling. It accepts data in any format which has the advantage of placing less stringent requirements for SSNCP but it entails more processing time to incorporate into the repository. National capacities to use the HAT Atlas for monitoring and planning has been built in 15 countries through in-person training sessions.

As a tool to monitor HAT elimination, the Atlas tracks and visually displays the adopted indicators. In particular, as of the year 2000, case distribution is captured at the village level. The Atlas also captures data on active case-detection even for villages reporting no cases, and it includes georeferenced information on health facilities providing HAT diagnosis and treatment. Using the Atlas disease data and independent human population data, the areas at risk of HAT are mapped and their evolution is monitored over time.

As a planning tool, the Atlas facilitates the geographical targeting of HAT control and surveillance activities, as well as the assessment of their

impact. For active screening, maps generated from the Atlas help identify the villages to be screened, optimize the timing of their visits, and evaluate the capacities and needs of the mobile teams. The tool is also used to select the optimal location of sentinel sites for passive surveillance, treatment facilities and clinical trials.

2.16

PASSIVE SURVEILLANCE FOR SUSTAINABLE ELIMINATION OF HUMAN AFRICAN TRYPANOSOMIASIS IN CENTRAL KONGO PROVINCE, DRC

Jacques Makabuza Mukabela

*¹Triumphal Boulevard intersection with Av. de Libération, Kasavubu, Kinshasa,
DR Congo.*

jacquesmakabuza@gmail.com

In view of the steady decline in the number of cases of Human African Trypanosomiasis (HAT) in Central Kongo Province in the DRC, elimination of the disease is possible. We, thus, conducted a project using the latest innovative diagnostic tools (Rapid Diagnostic Test (RDT), LED fluorescence microscopy and Loop-Mediated Isothermal Amplification (LAMP)) and a large coverage of passive screening in primary health care structures. Patients with positive RDT results were referred to microscopy sites for confirmatory tests and if negative, LAMP was performed (at LAMP sites) on fresh blood or collected and dried blood samples (at microscopy sites) on filter paper. In addition, reactive active screening was done in villages that reported cases passively.

From October 2015 to December 2016 (Phase 1), passive screening coverage increased by 60% compared to 2013 and the proportion of stage I cases increased from 27% to 64%. The project was scaled down and maintained in areas where the disease remained endemic. Therefore, the total number of sites (RDT, microscopy and LAMP sites) decreased from 595 to 141 from January 2017 to August 2018 (phase 2) and 61 sites from August to December 2018 (phase 3). The number of HAT cases reported declined from 125 in phase 1, 24 in 2017 to 11 in 2018.

Activities implemented routinely by the NHATCP, in areas outside the project, reported 10 cases of HAT in 2017 and, in 2018, no case of HAT was detected in the areas previously covered by the project.

Surveillance is essential to ensure the sustainable elimination of HAT and subsequent validation. We consider that the active screening activities carried out by the NHATCP in areas previously covered by the project, considered free of the disease, have played a role and could be part of a validation process confirming the elimination of HAT.

2.17

ENHANCED PASSIVE SCREENING FOR HAT IN ANGOLA - PROGRESS TOWARDS ELIMINATION.

*Makana Don Paul, Amadeu Dala, Kayembe Simon, Bessell Paul, Joseando,
Constantina Machado E Ndung'u Joseph*

In December 2016 a programme was initiated in the provinces of Zaire and Cabinda in Angola to expand and intensify passive screening for HAT. These provinces form a large transboundary region with the Democratic Republic of the Congo (DRC) and the Republic of Congo. Zaire is endemic for HAT, whilst Cabinda had not reported cases for many years, but is tsetse fly infested, and little medical surveillance has been conducted.

To enhance case detection, passive screening was expanded to all health facilities in Zaire and to selected facilities in Cabinda. Screening for HAT was by a hierarchical diagnostic algorithm in which patients who are positive by a rapid diagnostic test (RDT) are referred for confirmatory testing by microscopy at 6 health facilities. This was supplemented by 10 health facilities that had the capacity to perform mHCT. A further two facilities provided molecular testing using LAMP for patients who were RDT positive but not confirmed as infected with HAT.

Between December 2016 and December 2017, 4,516 RDTs were performed, 67 (1.5%) were positive with one case identified in Zaire. Referral of RDT positives was hampered by difficulties in accessing the small number of facilities with microscopy. In 2018 the programme was expanded to 82 health facilities in Bengo and Uige provinces with 13,297 RDTs performed to June 2018, with 79 positives and 38 HAT cases confirmed. The number of cases was increased by the addition of mini-mobile teams that follow-up the RDT positives. Reactive screening in villages where HAT cases had been reported recently identified a further 12 cases.

This programme has demonstrated that enhanced passive screening can drive local elimination of HAT. Passive screening augmented with small mobile teams overcomes some of the challenges of case referral. Reactive screening in villages where HAT cases have been reported appears to be very beneficial.

HUMAN AFRICAN TRYPANOSOMIASIS: CONSTRAINTS TO EFFECTIVE REPORTS IN NIGERIA

**. I, Olaleye O.O.¹, Aluma L.A and Gbadamosi F.I.¹, Abdulkadir A. D.²*

*¹Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research.
Southwest Zonal Office Ibadan, Oyo State.*

*²Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research. Ilorin
Liason office, Kwara State*

**Corresponding author's Email: *olusolaolaleye1@gmail.com*

Human African Trypanosomiasis (HAT) is a neglected tropical disease, caused by protozoan parasites, *Trypanosoma brucei gambiense*, in West Africa and Central Africa. This disease is transmitted to humans by infected Tsetse bites.

Nigeria is an endemic nation for HAT. The last reported case of HAT in Nigeria was in the year 2012. The World Health Organisation's 2019 fact sheets also indicates that less than 100 new cases per year are reported. However, the recent case of Nigeria acquired HAT in United Kingdom is a source of concern to Public Health practitioners. Therefore, the aim of this work is to determine the impediments to effective reports of HAT in Nigeria.

The method for this study was literature search through Google. The search results indicated the following as impediments to effective reporting of HAT in Nigeria. These are: Inadequate knowledge of the disease by some rural health workers as well as rural dwellers, improper diagnosis, lack of modern diagnostic tools, weak surveillance of old and new foci, low political will and inadequate funds.

In order to eliminate HAT in Nigeria, there is an urgent need to strengthen surveillance in both old and new HAT foci. Furthermore, the population at risk should be educated by enlightenment campaigns, refresher training courses should be carried out for health workers and laboratory scientist and Technologist on the use of modern equipment.

KEY WORDS: HAT, Impediments, Nigeria, Diseases

2.19

HUMAN AFRICAN TRYPANOSOMIASIS (HAT): DECREASING PREVALENCE, INCREASING COST PER CASE DETECTED, THE CHALLENGE OF ACTIVE CASE DETECTION FOR DISEASE ELIMINATION

*Valverde Mordt, O;
DNDi, Geneva, Switzerland
ovalverde@dndi.org*

Introduction. Since the beginning of HAT control activities in the first half of the XXth century, the backbone has been active case detection based in mobile teams screening the whole available population in endemic areas at the community level. This method has been extremely effective while prevalence was higher than 1%, having had a major role in the reduction of disease transmission to level approaching elimination as a public health problem as targeted by WHO and partners for 2020. Only 334 cases had been actively detected over more than 2.4 Million people screened in 2018 in DRC, according to the National Sleeping Sickness Control Programme (PNLTHA DRC) and strong decreases in the number of detected cases in the time series since 2013 are regular each year.

Aim. To assess the cost per case detected by active case search and propose alternative methods

Methods. DNDi financially supported up to 10 mobile teams of the PNLTHA DRC since 2013. The direct investment for the teams' activities and supervision will be calculated and the average cost per case detected will be shown for 2014 and 2018. Cost of serological tests will be adjusted to 2018 unit cost multiplied by the number of persons examined. Planning and administrative costs will be excluded. USD vs Euro exchange rate is fixed at 31.12.2018 $0.52 \text{ €} = 0595 \text{ USD}$

Results. In 2014, 423299 persons had been examined by 8 supported Mobile teams, who detected 395 cases. Total cost was 706791 USD. Cost per examined person was 1.67 USD. Cost per case detected was 1789 USD

In 2018, 526426 persons were examined, and 35 cases detected by 10 mobile teams. Total cost was 746356.5 USD. Cost per person examined was 1.42 USD. Cost per case detected was 21,324.5 USD

Conclusion. Cost-effectiveness of classic active case search in asymptomatic population at the community level has strongly decreased due to the overall reduction in disease prevalence. Targeted re-active case search concentrated on foci with recently detected cases and introducing clinical signs and symptoms of the disease in the detection process will be necessary to achieve the final elimination in a context of limited resources and long-term maintenance of disease elimination.

2.20

EVALUATION OF THE FEASIBILITY OF INTEGRATING TRADITIONAL HEALER IN THE DETECTION OF HUMAN AFRICAN TRYPANOSOMIASIS IN CENTRAL AFRICA, CASE OF THE DRC

Mutangala W, Mwamba E*, Kakozi V*, Fukinsia A*, Kwedi N.S**, Mpanya A*, wono P**, Okoko A***

**National program of HAT in DRC: PNLTHA*

*** Coordinating Organization for the control of endemics in Central Africa (OCEAC)*

ABSTRACT

One of the major challenges facing the program is the efficient implementation of all control strategies to achieve WHO's goal of eliminating HAT as a public health problem by 2020, although it remains to be in DRC with 19 out of 26 provinces that are endemic to declare more than 85% of all new cases diagnosed in Africa.

Several traditional factors are major obstacles that affect the implementation of HAT control activities. On the premise that African rural populations are primarily seeking health care among traditional healer, the overall objective of this project was to document the process of a collaborative model between traditional healers and the National program of HAT and to measure the contribution of this model on the rate of attendance of suspected cases of this disease in the sanitary formations (FOSA) involved in the HAT.

RESULTS

The Site of Nkara in the provincial Coordination of Bandundu Sud in DRC was selected for this survey which took place between September 2016 and January 2017.

Five Traditional healers were selected and trained in HAT call signs; As well as a technician responsible for the FOSA. Of the 73 clinical suspects referred by practitioners to FOSA, 9 were CATT positive and among which 4 were find with HAT parasite in the blood and all at stage 2 of the disease.

CONCLUSION

Thanks to this collaborative model, the traditional healers referred the clinical suspects to the FOSA, which resulted in the increase in the rate of attendance and the confirmation of the patients among the persons referred.

RECOMMENDATION

Extend this model of collaboration between the traditional healers and the PNLTHA through all the provincial coordinations for good passive surveillance of the HAT.

Key word: Traditional healers: The traditional doctor who's recognized by the community in which it lives as competent to provide health care through the use of plant, animal or mineral substances and other methods based both on the socio Cultural and religious knowledge, beliefs related to physical, mental and social well-being, as well as to the etiology of diseases prevailing in the community (WHO).

2.21

ENVIRONMENT AND COMMUNITY ENGAGEMENT FOR THE ELIMINATION OF HAT IN GUINEA

Alpha Ahmadou Diallo

Ministry of Health & Université de Conakry dalphahm@yahoo.fr

OBJECTIVE

Analyse initiatives, efforts, interactions among different stakeholders for the co-construction of a coherent system to facilitate the acceleration of the elimination of HAT.

MATERIALS AND METHODS

Data collection tools were administered to targets $n = 84$. The survey was conducted using multidisciplinary, participatory and triangulation approaches.

RESULTS

The construction of a healthy city to combat HAT more effectively required a holistic analysis of the determinants that affect disease $n = 88$ in order to anticipate situational changes. To this end, it was necessary to organise a response focused on contextualisation and innovation to improve the health and well-being of patients with the participation of communities, while emphasising equity and sustainability towards the elimination of the disease. The results are analysed at three levels: the physical environment, the institutional and organisational framework and participation.

The frequencies were disaggregated by variable, modulated and interpreted and subsequently, compared with existing literature.

DISCUSSIONS

The trends identified are consistent with those in the literature review. The lessons learnt clearly highlight the need for synergy of action, innovative approaches in research and development, as well as partnerships and public accountability.

CONCLUSION

From the analysis of the results, the response capacity to the disease is critical and requires strengthening as well as understanding of the social, environmental and institutional determinants.

CONTROLLING AFRICAN TRYPANOSOMOSIS AND TSETSE FLIES IN THE SLEEPING SICKNESS AND AAT FOCUS IN (CHAD)

B. Guihini¹; M. Peka²; JB. Rayaisse³; I. Tirados⁴; J. Rouamba⁵; Wilfrid Yoni³; L. Sanogo³; J. Darnas²; F. Courtin⁶; G. Adoum¹; S. Torr⁴; P. Solano⁶;

¹Institut de Recherche en Elevage pour le Développement (IRED) – BP 433 N'djaména/Tchad ²Programme National de Lutte contre la Trypanosomiase Humaine (PNLTHA) – BP 440 – N'Djaména/Tchad ³Centre International de Recherche-Développement sur l'Élevage en zone Subhumide (CIRDES) – 01 BP 454 Bobo – Dioulasso 01/Burkina Faso ⁴Liverpool School of Tropical Medicine–Pembroke Place–Liverpool L3 5QA/UK. ⁵Université de Ouagadougou, Burkina Faso ⁶UMR Intertryp IRD – CIRAD-Montpellier

ABSTRACT

Located in the extreme south of Chad, at the border with the Central African Republic (CAR), the Maro's sleeping sickness focus is the most active after that of Mandoul, with 17 cases diagnosed in early 2015 (PNLTHA). The focus is crossed by many rivers, the most important being the Grand Sido, and the Chari with its multiple tributaries. To alleviate this situation, vector control was initiated in 2017 by the Livestock Research Institute for Development (IRED) and its partners (IRD, CIRDES, PNLTHA, LSTM) through the Trypa-No project. The objective of this project is to reduce the density of tsetse flies, in order to break the host-vector contact and trypanosome transmission to humans and animals in the Maro focus. A géographic survey determined that the focus hosts 14,532 inhabitants distributed in 45 settlements among which 1,345 cattle were counted. The baseline entomological survey revealed the presence of *Glossina fuscipes fuscipes* as a biological trypanosome vector at apparent density (DAP) of 0.55 tsetse flies/trap/day. From, 279 sampled cattle, only 14 were found positive to trypanosomes, giving a prevalence of 5,3%. For the vector control purpose, 2035 impregnated tiny targets were deployed in 2018 and replaced by new ones in 2019 to reduce the density of tsetse flies along the streams. Periodical monitoring of the impact of impregnated targets on tsetse density and the incidence of the disease in animals have been carried out. The results obtained are encouraging, although there is still a residual population of tsetse flies transmitting trypanosomes to humans and cattle.

Keyword : Chad - Maro focus – Animal African Trypanosomosis –
Sleeping Sickness – *Glossina fuscipes fuscipes* – Vector Control

2.23

LIVESTOCK AND THE EPIDEMIOLOGY OF SLEEPING SICKNESS: MECHANISMS AND IMPLICATIONS

Julianne Meisner^{1,2}, Jon Wakefield^{3,4}, David M Pigott^{5,6}, Ali Rowhani-Rahbar¹, Jonathan D Mayer^{1,7}, Caitlin A Bever⁸, Peter M Rabinowitz^{2,6,9}

¹Department of Epidemiology, University of Washington, Seattle, USA;

²Center for One Health Research, University of Washington, Seattle, USA;

³Department of Biostatistics, University of Washington, Seattle, USA;

⁴Department of Statistics, University of Washington, Seattle, USA; ⁵Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA;

⁶Department of Global Health, University of Washington, Seattle, USA;

⁷Department of Geography, University of Washington, Seattle, USA; ⁸Institute for Disease Modeling, Seattle, USA; ⁹Department of Environmental and Occupational Health Sciences, University of Washington, Seattle, USA.

Coordinated control efforts for human African trypanosomiasis (HAT)—particularly active casefinding followed by treatment—have reduced the number of incident infections in recent decades. However, the timeline to and sustainability of eradication goals for the gambiense form (gHAT) are threatened by knowledge gaps in its epidemiology, including the uncertain role of animal reservoirs, in particular pigs. Furthermore, eradication goals exclude the rhodesiense form (rHAT) due to the known importance of animal reservoirs, which are difficult to control.

Our research seeks to close this gHAT knowledge gap, inform the feasibility of rHAT eradication with control of the cattle reservoir alone, and evaluate a mechanism for the livestock-HAT association with potential for intervention.

We are conducting our research in Uganda, Malawi, South Sudan, and Democratic Republic of Congo (DRC), and will present our preliminary results from Malawi and South Sudan. We have mapped the density of cattle and pigs, separately, in these countries, using human and livestock survey and census data and stratifying all maps on time. We will use these maps to estimate the total effect of livestock (cattle and pig) density on gHAT risk in South Sudan, and on gHAT and rHAT risk in Uganda, using outcome data from the WHO Atlas of HAT.

In addition to presenting these preliminary results, we will discuss the remainder of our research plan. After finalizing results for Malawi and South Sudan and performing the same analyses in Uganda and DRC, we will next use causal inference methods to estimate the magnitude of two mechanisms by which livestock may influence HAT risk in all four countries.

Finally, in collaboration with the Institute for Disease Modeling we will build and parameterize a four-species stochastic compartmental model under the Compartmental Modeling Software framework, to evaluate the contribution of interventions on livestock to eradication of both forms of HAT. Our estimated timeline for completion of this research is August 2021.

GENETIC DIVERSITY AND PHYLOGENETIC RELATIONSHIPS OF SOME PALPALIS GROUP TSETSE FLY IN CONGO BRAZZAVILLE BASED ON MTDNA COI SEQUENCES

*Abraham Mayoke^{1,4}, Rosemary Bateta⁴, Shadrack S. Muya³, Paul O. Mireji⁴,
Sylvance Okoth⁴, Samuel G. Onyonyo⁴,*

ABSTRACT

Background: Human African Trypanosomiasis (HAT) is transmitted by Tsetse flies (*Glossina*) of the palpalis group in Congo Brazzaville. Despite the morphological characterization established in 50' and 60's, *Glossina fuscipes* species still questionable. Considering the uncertainty of some subspecies in Congo Brazzaville, whereas *Glossina palpalis palpalis* is well identified. The overlap between the two species was reported around Brazzaville, bringing the dynamic of the two species more complex. The taxonomic status and genetic diversity *Glossina palpalis palpalis* and *Glossina fuscipes fuscipes* has not been established using molecular tools. Mitochondrial DNA (mtDNA), COI is used in discriminating closely related tsetse flies species from palpalis group. This work aim to establish the taxonomic status and the phylogenetic relationship between the two taxonomic species of palpalis group (*Glossina palpalis* and *Glossina fuscipes*). Thereafter evaluate the Genetic diversity of the ambiguous *Glossina fuscipes* subpopulations in Congo Brazzaville.

Methods: Tsetse samples were collected using biconical traps, in Bomassa (BMSA), Bouemba (BEMB), and Talangai- (TLG) in Ngabe corridor and in Bokosongo for *palpalis palpalis*, from June to August 2017. A total of 384 samples were collected using biconical traps without attractants were considered. To discriminate amongst the two closely related tsetse, the mitochondrial DNA was used, the cytochrome Oxidase subunit I (COI) gene was amplified using COIF1/COIIR1 (570pb) and C-I-J2195/CULR (850bp) species specific sets of primers targeting respectively *Glossina fuscipes fuscipes* and *Glossina palpalis palpalis*. Sequencing data were analyzed in DNsp to access genetic diversity over the 3 populations. Mismatch distribution based on haplotypes observed and expected frequencies was accessed for population demographic history and population differentiation were implemented on DNAsp and Arlequin.

Results: We amplified two fragments COI gene of 570 and 850 bp for *G. f. fuscipes* and *Glossina p. palpalis* respectively and confirmed by direct sequencing. The general BLAST analysis yield 99% similarity for *Glossina fuscipes fuscipes* and *Glossina palpalis palpalis*. The higher similarity between individuals per species and also, *G.f. fuscipes* different but similar to *G. p. palpalis*. The populations show higher genetic diversity ($H=46$, $Hd=0.884$) and moderate nucleotide diversity (0.01173). We observed little maternal gene flow between regions TLG and BMSA ($Gst=0.08823$) and moderate differentiation between BEMB and TLG and BMSA ($Gst=0.11415$ and 0.15536) and the mismatch analysis showed population demographic expansion in the 3 localities. P-distance observed (0.07221) between BEMB and TLG, (0.15148) between BEMB and BMSA and (0.04793) between TLG and BMSA and are all significant ($p<0.05$). F_{st} shows high and significant variation within populations and among groups and among populations within populations, respectively 89.73% and 7.93% and 2.35% of the total variance.

Conclusions: The *Glossina* from *palpalis* group (*Glossina fuscipes fuscipes* and *Glossina palpalis palpalis*) species have been amplified, confirming the existence the two species in Congo Brazzaville. The expanding *Glossina* populations in Congo must be a whistle signal that further recrudescence of the disease. Genetic indicator obtained are baseline for further research and initiating national disease control in the country.

Keywords: *Glossina palpalis* group, Genetic diversity, phylogeny, Taxonomy, COI, mtDNA, Congo Brazzaville

2.25

TANZANIA ONE HEALTH INITIATIVES IN THE CONTROL OF HUMAN AFRICAN TRYPANOSOMIASIS

Joyce Daffa¹; Justine Assenga¹; Folorunso Fasina²; Moses Ole-Neselle²; Hezron Nonga¹

*¹Ministry of Livestock and Fisheries ²FAO Tanzania
Corresponding author: daffajoyce@gmail.com*

ABSTRACT

Endemic, emerging and re-emerging zoonotic disease outbreaks cause serious health, societal, trade and economic impacts in affected countries. Tanzania is among countries that are at risk of endemic, emerging and re-emerging diseases outbreaks. The government of Tanzania led the development of a national One Health (OH) strategic plan using a multi-sectoral approach. The strategic plan will assist in creating and maintaining active collaboration among the different sectors for pathogen detection, disease prevention and response to zoonotic diseases, antimicrobial resistance and other public health events. The government-led prioritization of zoonotic diseases selected six priority zoonotic diseases, including Human African Trypanosomiasis (HAT). The prioritization exercise was followed by sector and institutional specific recommendations to implement priority activities based on the selected diseases. The government also created surveillance guidelines for the priority zoonotic diseases which provide direction for effective integrated surveillance and response to zoonotic diseases, including HAT in the country. It is anticipated that the guidelines will facilitate proper planning, effective use of resources and shared responsibility among the human and animal health sectors. Recently, the government reviewed the national strategy for control of Tsetse and Trypanosoma spp. This strategy is aligned with the government commitment of eradicating tsetse and eliminating trypanosomiasis in line with the AU-PATTEC Initiative of 2000. This strategy will guide in the control of tsetse and trypanosomiasis in view of improving human and animal health using a One Health approach. Considering the above contributions, these multi-sectoral One Health initiatives will guide in prevention and control of tsetse fly and trypanosomiasis in Tanzania.

Key words: Human African Trypanosomiasis, One Health, Tsetse, Tanzania

2.26

NOVEL DIAGNOSTIC TOOLS FOR TRYPANOSOMIASIS – A REVIEW

Popoola, T.O.¹, Akinseye, R.O.², Adelabu, M.A.³, Ogunla, M.O.⁴
^{1,2,3,4} Nigerian Institute for Trypanosomiasis and Onchocerciasis Research,
South-West Zone, Ibadan, Nigeria.

Human African Trypanosomiasis (HAT) is a fatal, neglected and stigmatizing disease common to poor rural communities. More than 60 million people are under constant risk of infection with livestock and wildlife as reservoirs of the disease. Animal African Trypanosomiasis (AAT) severely impacts agriculture, with 3 million out of 50 million cattle that are kept in tsetse infested areas dying every year, while 35 million doses of drugs are used in treatment. Its economic cost is approximately US\$4.75 billion/year. Generally, the diagnosis of HAT relies on three steps: screening, diagnostic confirmation, and staging. The earlier diagnostic tools include the Card Agglutination Test for Trypanosomiasis (CATT) – with imperfect sensitivity of the test for the pathogen itself; Microscopic examination for the presence of trypanosomes - suffering from variable sensitivity due to the scarcity of the trypanosomal cells in the sample and the constituents of the blood or lymph; Microhaematocrit; Quantitative buffy coat; and Miniature Anion-exchange Centrifugation; Lumbar Spine Puncture for the examination of cerebrospinal fluid. Some new diagnostic tools have therefore been developed to overcome the shortcomings of these earlier ones. Some of these novel tools include Dot-ELISA Technique – employing nitrocellulose strip spotted with the antigen; Rapid Diagnostic Test (RDT) - to screen for gambiense HAT that is cheap and easy to use; RDT for Combined Testing of HAT and Malaria; LED-based Fluorescence Microscopy; Loop-Mediated Isothermal Amplification (LAMP); Nucleic Acid Sequence-based Amplification (NASBA); and Nanobodies - extremely tiny molecules and are fragments of standard antibodies that are both diagnostic and therapeutic.

Keywords: Trypanosomiasis, Diagnosis, Tsetse fly, Nanobodies, CATT.

EPIDEMIOLOGY AND INTERVENTIONS TOWARDS THE ELIMINATION OF HAT IN GUINEA: SYNERGY OF ACTORS, COMMITMENTS AND CHALLENGES

BACKGROUND

In Guinea, Human African Trypanosomiasis (HAT) is a neglected tropical disease that threatens about 3 million people living along over 350 km of the coast, which is the most affected region. In Boffa, over 50 cases out of 28,000 were detected. Given its impact on health, HAT is a public health problem and a major obstacle to socio-economic development. The magnitude and complexity of the factors influencing the disease require a structured network of actors working in synergy to implement effective strategies.

OBJECTIVE

Analyse priority interventions, gaps and challenges for the capacity building of the programme in the local context in order to develop strategies for HAT elimination.

MATERIALS & METHODS

The methodology consisted of a critical analysis of the following aspects: i) Epidemic proportions and causal analysis of possible challenges and solutions; (ii) Policy and programmatic framework for HAT health surveillance and response; iii) Actions and capacities for surveillance, prevention, care, research, monitoring; iv) Network of active stakeholders, responsible commitments and accountability; (v) Challenges of capacity building, internalization and acceleration of elimination. Triangulation was used in the cross-analysis of data with analytical synthesis of key messages and lessons learned to guide public health action and research.

RESULTS

The prevalence rate of trypanosomiasis ranges from 1.8% to 3% in Guinea. Guinea is the country most affected by sleeping sickness in West Africa with nearly 700 cases detected since 2002. Rural populations who depend on agriculture, fishing, breeding or hunting are the most exposed to the disease. The complexity of host-vector-parasite-environment interactions calls for innovative approaches and synergies among stakeholders. This is why the National HAT Control Programme has been in existence since

the 1960s. Innovative, multidisciplinary and participatory approaches have a significant impact on the control and even the elimination of HAT and are found to be more effective and efficient.

The public-private partnership initiated by the WHO and renewed in 2006, then in 2011 and 2016 has borne fruit thanks to the key actions carried out: awareness, sketches, vector control, research, surveillance, free care, etc. The commitment of WHO and the AU, IRD and DNDI and many partners has resulted in the launch of pan-African campaigns to eradicate the disease by 2020. Challenges remain dominated by budget allocation, research, and the capitalization of results, community-based surveillance and local and international partnerships to accelerate the elimination of HAT.

DISCUSSIONS & CONCLUSION

The analysis of social, behavioural and environmental determinants and the challenges in the fight against HAT underscore the complexity of dimensions and interactions to guide strategic choices and good practices. In addition, the focus is on collaboration between stakeholders in the prevention, promotion and preservation of health.

Key words: epidemiology, health, programme, knowledge and actions

BIOCHEMICAL INDICATORS IN TRYPANOSOMIASIS INFECTIONS

Olanrewaju Roland Akinseye, Adelabu Mustapha, Otunla Moses
Nigerian Institute for Trypanosomiasis (& Onchocerciasis) Research*

ABSTRACT

Biochemical assessment of the body fluids gives an indication of the functional state of the various body organs and biochemical changes in the fluids which result from Trypanosomiasis infections depend on the species of the parasite, its virulence, susceptibility of the host and the period of infection during which the samples are taken. Evaluations of biochemical parameters are usually done on specimen which includes serum or plasma and cerebrospinal fluid (CSF) obtain from infected animals or humans. Abnormal fluctuations are observe in indicators such as marker enzymes, electrolytes, plasma proteins, metabolites, plasma amino acids, hormones, haptoglobin, glucose, glycoproteins among other parameters on specimen collected. As observed from researchers past work, they often make use of few biochemical indicators which may be due to inability to get the appropriate ones to use at the point in time. This review is done to summarize the existing and new biochemical indicators use in identifying trypanosomiasis infection subject.

Keywords: Indicators, Biochemicals, Trypanosomiasis, Infections, serum, CSF

**CO-EXISTENCE OF NCDs AND NTDS –
TRYPANOSOMIASIS AS A TYPICAL EXAMPLE**

Olanrewaju Roland Akinseye, Poopola Temitope
Nigerian Institute for Trypanosomiasis (& Onchocerciasis) Research
Email: akinseyeroland@gmail.com*

ABSTRACT

World Health Organization uncover that deaths worldwide from non-communicable diseases (NCDs) exceed those from diseases caused by infections. However, the coexistence of NCDs with pathogenic infection of neglected tropical diseases (NTDs) such as Human African Trypanosomiasis may also contribute to the number of deaths caused by NCDs. NTDs bear similar properties to the NCDs which are their frequent existing and elusive medical signs, and the consequence deformity which last for long. The connection of NCDs and neglected tropical diseases (NTDs) is newly noticed area for scientists to examine. This will open opportunity to examine and control NCDs as most of these diseases are widely found among individuals having NTDs as confirmed by the regular reports obtained from local health care centers of their existence. More research works are required before scientists can say the outcome of co-existence observed in NTDs is NCDs and vice versa. The essence of this paper is to identify and ascertain the existence of close relationship between NTDs and NCDs and to arouse interest of researchers towards this path.

Keywords: NCDs, NTDs, Coexistence, Human African Trypanosomiasis, Infection.

2.30

THE LAST MILE IN ACHIEVING ELIMINATION OF HUMAN AFRICAN TRYPANOSOMIASIS IN NIGERIA

*Enwezor, F.N.C¹, *Anyaike, C², Ntuen, U.G², Igweh, A.C¹, Dede, P.M¹ and Elhassan, Elizabeth³.*

¹Nigerian Institute for Trypanosomiasis (and Onchacerciasis) Research (NITR), No. 1 Surame Road, Ungwar Rimi GRA, Kaduna Nigeria

²Federal Ministry of Health, Abuja, Nigeria

³Filaat Consulting, No 1 Mohammed Yusuf Lere Drive Ungwar Rimi Gra Kaduna, Kaduna State Nigeria

Human African Trypanosomiasis (HAT) or sleeping sickness in Nigeria is spread by tsetse flies infected with *Trypanosomabruceigambiense*. Prior to establishment of the West African Institute for Trypanosomiasis Research (WAITR) in 1947, the prevalence of HAT along the river basins of eight states in Northern Nigeria was alarming 30%. Inhabitants of these areas abandoned their communities because of the devastating scourge. Active surveys, treatment and vector control over three decades through its outstations, resulted in drastic decline in the prevalence of HAT. WAITR became Nigerian Institute for Trypanosomiasis Research in 1960; by 1988, active surveys stopped because of reduced funding and led to closure of all outstations except Gboko. By 1991, HAT was no longer a public health problem in Benue state. A new focus in Abraka, Delta state had emerged by the 1980's and remained active over the next two decades. World Health Organization, government and Foundation for Innovative New Diagnostics (FIND) supported integration of diagnostic tools into the PHC system and intensive passive surveillance. From 2015 to 2017, the prevalence dropped to zero. Despite this, in 2016, a case was exported from the area into the United Kingdom and recrudescence reported in Benue and Taraba states. However, elimination is in the horizon. It is hindered by unavailability of technology and medicines, poor financing, analysis and timely use of information for decision making. To meet the timeline of 2030, it is important that strategies be put in place to strengthen the health system.

2.31

SURVEY OF HUMAN AFRICAN TRYPANOSOMIASIS IN UKWUANI AND ETHIOPE EAST LOCAL GOVERNMENT AREAS, DELTA STATE, NIGERIA

¹D. Musa*, ¹A. O. Fajinmi, ¹R. Abdullahi, ¹A. E. Irhue, ¹I. M. Toma, ¹F. Sambo, ¹M. A. Kugama, ¹M. A. Kassim, ¹M. T. Ormaga, ¹S. S. Shaida, ¹F. N. C. Enwezor, ¹J. O. Kalejaiye, ¹P. M. Dede, ¹M. Mamman, ²M. B. Alhassan ³I. Anagbogu, & ⁴E. Cephas.

¹Nigerian Institute for Trypanosomiasis and Onchocerciasis Research (NITR) Kaduna, Nigeria ²National Eye Centre Kaduna (N.E.C) ³Federal Ministry of Health (FMoH) ⁴World Health Organisation (W.H.O)

*Corresponding e-mail: musakaus78@gmail.com

ABSTRACT

Human African Trypanosomiasis (HAT) is a protozoal disease that classically manifests with a sleeping syndrome and, thus, referred to as sleeping sickness. Infective bites of tsetse flies (*Glossina* spp) transmit the parasitic causative agents *Trypanosoma brucei gambiense* and *T.b. rhodesiense* to humans in the West and East African subregions, respectively. Nigeria still remains in the World Health Organization's classification of countries endemic for HAT. During the period, 2000 – 2006, a study conducted to determine the prevalence of HAT in Abraka of Ethiope East Local Government Area (LGA) of Delta State, Nigeria, revealed 119 were positive HAT cases following screening by CATT (Card Agglutination Test for Trypanosomiasis). We hereby report findings from a more recent survey conducted in 2012 to update the epidemiological and entomological status of sleeping sickness in Delta State, Nigeria. A total of 1979 people located in 26 villages from two LGAs (Ukwuani and Ethiope East) were serologically screened for *T.b. gambiense* by using CATT. The survey revealed HAT suspect cases in Umutu 1 (1.1%) and Umuebu 6 (9.8%) communities equivalent to 7(4.7%) in Ukuwani LGA, and 4 (3.0%) in Ethiope East LGA that involved 7(0.57%) out of 1220 females and 4 (0.453%) out of 759 males. Biconical traps pitched at various locations of human activities along River Ethiope (Ethiope East) and River Okumeshi (Ukwuani) caught and identified 42 tsetse flies (*Glossina palpalis palpalis*) mostly along the River Okumeshi. The density of the tsetse population was 3.0 flies/trap/day and infection rate was 6.6%. Thus, River Okumeshi, rather than River Ethiope, and its

environs constitute the epicenter of tsetse activities thereby predisposing communities to risk of HAT. A more extensive and collaborative studies of HAT and tsetse flies are required to adequately define the risk of the disease in the Delta region of Nigeria.

KEYWORDS: Human African Trypanosomiasis, CATT, Epidemiology, Delta State, Nigeria

ANIMAL AFRICAN TRYPANOSOMIASIS (AAT)

ORAL EPIDEMIOLOGY

3.01

AN ATLAS TO SUPPORT THE PROGRESSIVE CONTROL OF TSETSE-TRANSMITTED ANIMAL TRYPANOSOMOSIS IN KENYA

Nancy N. Ngari¹, Daniel O. Gamba¹, Pamela A. Olet¹, Weining Zhao², Massimo Paone², Giuliano Cecchi²

¹Kenya Tsetse and Trypanosomosis Eradication Council, Nairobi, Kenya

²Food and Agriculture Organization of the United Nations, Animal production and health division, Rome, Italy

ABSTRACT

Despite the fact that, over the years, various organizations have collected a vast amount of field data on tsetse and African animal trypanosomosis (AAT) in Kenya, recent national-level maps are lacking. To address this gap, an atlas was developed by the Kenya Tsetse and Trypanosomosis Eradication Council (KENTTEC). All data collected by KENTTEC from 2006 to 2018, mainly in the context of regular monitoring activities, were assembled. In excess of 66,000 tsetse flies were caught in the investigated regions (i.e. Lake Victoria basin, South Rift (Lake Bogoria area) and Central Kenya (Mwea/Meru areas)). *Glossina* species caught included *G. pallidipes* (approximately 87% of flies caught), *G. brevipalpis* (7%), *G. fuscipes fuscipes* (4%), *G. longipennis* (<1%), *G. austeni* (<1%), *G. swynnertoni* (<1%). Regarding the AAT component, over 45,000 animals were tested using the buffy coat technique - 98% of which were cattle. Overall, 832 cases of trypanosomes were detected. Three different species of trypanosomes were reported: *Trypanosoma vivax* (approximately 48% of infections), *T. congolense* (43%) and *T. brucei* (9%). Temporal and spatial gaps still affect the atlas based on KENTTEC data. Efforts are being made to actively engage all the other stakeholders at the national and international level that can contribute to the initiative and improve the completeness and geographical coverage of the Atlas. The development and regular update of a national database of tsetse and AAT is considered crucial to guide decision-making to disease control, and advance along the progressive control pathway (PCP) for AAT.

3.02

A NATIONAL ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMOSIS IN MALI

*Boucader Diarra**¹, *Modibo Diarra*¹, *Oumar Diall*², *Boubacar Bass*³, *Yousouf Sanogo*¹, *Etienne Coulibaly*¹, *Mahamadou Sylla*³, *Weining Zhao*⁴, *Massimo Paone*⁴, *Giuliano Cecchi*^{4*}

¹*Direction Nationale des Services Vétérinaires, Cellule de Coordination de la Lutte contre les Mouches tsé-tsé et les Trypanosomoses animales (CCLMT), Bamako, Mali. Email : diarrab@gmail.com*

²*Ministère de l'Agriculture, Comité National de la Recherche Agronomique (CNRA) Bamako, Mali*

³*Ministère de l'Élevage et de la Pêche, Bamako, Mali*

⁴*Organisation des Nations Unies pour l'Alimentation et l'Agriculture (FAO), Division Production et Santé Animale, Rome, Italie Domaine thématique 5 : Biologie, contrôle et éradication des glossines*
• Répartition géographique de *Glossina* spp.

SUMMARY

Much information is available on tsetse flies and African animal trypanosomosis (AAT) in the different regions of Mali. However, these data have never been harmonized or centralized, thus hindering the development of complete epidemiological maps and the rationalization of interventions. To fill this gap, a dynamic geo-spatial database has been created. A repository containing the digital versions of epidemiological data collected between 2000 and 2018 has been assembled. The information has been verified, harmonized, geo-referenced and integrated into a single geo-spatial database. Mapped data showed that *Glossina palpalis gambiensis* is the most widespread tsetse species. It is present in the south, the centre-south and the west of the country. *G. tachinoides* was only found in the south where only a few specimens of *G. morsitans submorsitans* were detected. TAA is present in all regions studied. The dominant species are *Trypanosoma vivax* and *T. congolense*, with *T. brucei* infections being much less numerous. The Atlas of Mali provided a synoptic view of the vector and disease situation at the national. Nevertheless, significant geographic gaps affect the north, northeast, and west, and there is a lack of data over the past five years. TAA remains a major animal health problem in Mali. However, surveillance and control activities are currently very limited, and there is a need to strengthen the progressive control of the TAA.

3.03

TRYPANOSOMOSIS AND MULTIPLE BOVINE INFECTIONS IN THE WILDLIFE-LIVESTOCK INTERFACE OF LAMBWE VALLEY, WESTERN KENYA

Michael Nyanganga Okal^{1*}, Shewit Kalayou^{1*§}, Kawira Mathenge¹, Brenda Kisia Odhiambo¹, Francis Mcodimba¹, Dan Masiga^{1§},

^{*}Equal contributions, [§] corresponding to skalayou@icipe.org and dmasiga@icipe.org

¹ International Centre of Insect Physiology and Ecology (icipe), P.O. Box 30772-00100 Nairobi, Kenya

Background: The control of bovine trypanosomosis and diseases shared with wildlife requires strategies that will reduce pathogen transmission between wildlife and both domestic animals. For sound and cost-efficient strategies, rational epidemiologic surveillance and disease vulnerability identification is needed. An understanding of the co-occurrence of diseases is critical for designing cost-effective interventions. Method: This cross-sectional study was designed to document the status of trypanosomosis and multiple tick-borne pathogens (TBPs), and to identify and quantify risk factors for the infections in the cattle population of the Lambwe valley, southwestern Kenya. Lambwe Valley has a surface area of 324 km² of which 120 km² is covered by the Ruma National Park. Blood samples were collected from the marginal ear vein of 680 local zebu cattle in December 2018 and screened for trypanosomes and tick-borne pathogens using molecular detection tool using high-resolution melting analyses. Result: The overall trypanosome infection (*Trypanosoma congolense* savannah, *T. brucei* sub group, and *T. vivax*) was 28.3 % (95% CI: 25.9, 32.7), respectively. *T. congolense* savannah was observed at an infection rate of 14.8 % (CI: 9.9, 16.3), *T. brucei* sub group at 7.9% (CI: 6.1, 8.3), *T. vivax* at 7.8% (CI: 6.0, 8.5) and mixed infection at 2.3% (CI: 0.9, 3.1). Assay for presence of human Serum resistance associated (SRA) gene showed no human-infective trypanosomes in cattle. Overall there was a high prevalence of 78.9% for TBPs, including *Anaplasma platys* (10%), *A. phagocytophilum* (12.7%), *A. marginale* (6.7%), *A. ovis* (7.7%), *Theileria velifera* (37.8%), *T. mutans* (23.5%) and *Ehrlichia* spp. (2.9%). The putative risk factors animal age, sex and herd size showed no significant association with any of the infections. However, the distance of homestead from the park's fence and village were significantly associated with trypanosome,

anaplasma and theileria infection with 83% of the overall infection occurring less than 2km distance from the park. Notably, the prevalence was not evenly distributed across the valley: Cattle from villages near the North Eastern part of the park were significantly at risk. Conclusion: Our study shows that, risk-based vector control interventions should focus on the 2km radius of the park. The high prevalence of *A. phagocytophilum* is of public health concern and needs further research to determine the vector involved in its transmission.

Keywords: Lambwe Valley, Kenya, Trypanosomosis, Bovine, *T. brucei* sub group, *T. congolense* savannah, *T. vivax*, tick borne pathogens

PRELIMINARY INVESTIGATION OF TRYPANOSOMA EQUIPERDUM AMONG EQUUS FERUS CABALLUS (DOMESTIC HORSE), IN KANO STATE, NIGERIA

*¹Atikat, U., ¹Maigari, A. K., ¹Musayyiba, S., ¹Abullahi, I. Z., ²Hafsat, M. and Sadiq, A. A.

¹Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano Liaison Office, Infectious Diseases Hospital, France Road, Kano State, Nigeria.

²Onchocerciasis Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, Unguwan Rimi GRA, Kaduna, Nigeria.

Corresponding Author: atikaumar34@gmail.com, 08031554487.

ABSTRACT

Horse is an odd – toed ungulate mammal belonging to family Equidae. They are bred for different purposes, including cultural display, racing, transportation, companionship, and breeding. Major ailments frequently reported in horses are caused by parasites, of which *Trypanosoma equiperdum*, mechanically transmitted by haematophagus flies, causes serious genital and abdominal oedema, paraphimosis, urticarial plaques, neurological disorders, reduced productivity, loss of condition and mortality. In some cases, horses that carry *T. equiperdum* may remain as asymptomatic carriers, and since Trypanosomiasis was reported in cattle and camels in Kano State, it is likely that, horses may be reservoirs of these parasites. Hence, this study was aimed at investigating the occurrence of *T. equiperdum* in horses in Kano State, using standard trypanosome detection methods and polymerase chain reaction (PCR). The results revealed an overall infection rate of 0.7%, where mares having parity number ≤ 6 had higher infection rate (0.5%) compared to stallions (0.2%), with all the infection occurring in under conditioned animals. However, foals, yearlings, colts and fillies were uninfected. To the best of our knowledge, this is the first report of *T. equiperdum* using both parasitological and molecular techniques in Kano State. The occurrence of *T. equiperdum* in horses signals the need for expanded surveillance of both the disease and its vectors to prevent disease dissemination and ascertain the reservoir status of trypanosomes in equine population.

Key words: Horses, *Trypanosoma equiperdum*, Kano State.

3.05

AFRICAN ANIMAL TRYPANOSOMIASIS OUTSIDE TSETSE BELT

Merid N. Getahun^{1}; Joel L. Bargu¹; Abel Orone¹; John Ngiela; Peter O. Ahuya¹, Jackson M. Muema, Rajinder K. Saini, Baldwin Torto and Daniel K. Masiga
mgetahun@icipc.org*

African Animal trypanosomiasis is becoming increasingly widespread beyond its traditionally defined land and is an established threat to animals outside tsetse belt both in and outside Africa. However, our specific knowledge of the clinically important trypanosomes such as (*Trypanosoma evansi*, *T. vivax*, *T. congolense*) infection rate, diversity from field-collected hematophagous flies and domestic animals from tsetse free area is limited. In this project we aim to examine species of potential mechanical vectors, blood meal host preference and the presence of trypanosomes both in biting flies and domestic animals outside tsetse belt in Northern Kenya, with emphasis to camel. We have demonstrated that camels are infected with diverse species of pathogenic trypanosomes (*T. vivax*, *T. evansi*, *T. congolense*), showing camel trypanosomiasis is complex, than previously thought. Furthermore, we identified *Hippobosca camelina*, *Stomoxys calcitrans*, tabanid flies as the main mechanical vectors of various trypanosomes, as they were positive for the same trypanosomes, and camel is the preferred blood meal source. We conclude trypanosomes are conserved regardless of geography and mode of transmission.

**FACTORS ASSOCIATED WITH PERSISTENCE OF ANIMAL
AFRICAN TRYPANOSOMIASIS IN LANGO SUB REGION,
NORTHERN UGANDA**

*Robert Mandela Wangoola¹, Bardosh Kevin², Christine Amongi Acup³, Susan Welburn³, Charles Waiswa¹, James Bugeza⁴ **

*Coordinating Office for Control of Trypanosomiasis in Uganda Plot 78
Buganda Road, P.O Box 16345 Kampala.*

Email: rwangoola@gmail.com

ABSTRACT

African Animal Trypanosomiasis (AAT) continues to inflict heavy losses on livestock production especially cattle in terms of decreased production and productivity in Uganda. AAT is a disease complex caused by tsetse-fly-transmitted *Trypanosoma brucei brucei*, *Trypanosoma congolense*, *Trypanosoma vivax* and *Trypanosoma brucei rhodesiense* and is most important in cattle but also known to cause serious losses in pigs, camels, goats, and sheep. Several control measures including live bait technology, mass treatment of cattle with trypanocidal drugs and deployment of tsetse traps have been used in the past ten years but the problem still persists in some areas. This necessitated an exploration of the factors associated with continued trypanosome infections in cattle, which are also known reservoirs for the zoonotic trypanosomiasis. A structured questionnaire was administered to 286 Animal owners from 20 villages purposively selected from Lira, Kole and Alebtong districts of Lango sub region to obtain information on the factors leading to persistence of infection. Over 50% of the respondents reported trypanosomiasis as a major challenge to their livestock. Land ownership ($P=0.029$), type of livestock kept ($P=0.000$), disease control strategy employed ($P=0.000$), source of drugs ($P=0.046$) and drug preparation ($P=0.017$) were associated with persistent AAT infection. We recommend continued farmer sensitization on the threat of AAT and the available prevention and control options. The use of isometamidium chloride for prophylaxis against trypanosomiasis is highly recommended. There is also need to foster qualified private veterinary drug supply in the region by all concerned stakeholders.

3.07

PREVALENCE OF TRYPANOSOMOSIS AMONG CAMELS EXAMINED BY HCT, PCR AND CATT/T .EVANSI IN SOUTH DARFUR, SUDAN

Adam¹, M. E., Salih², D.A. and Abdelrhman², A.H.

¹Nyala Veterinary Research Laboratory

²Central Veterinary Research Laboratories

ABSTRACT

A total of 515 camels blood samples (153 males and 362 females) of different age groups were collected from different localities of South Darfur during 2012- 2013. These samples were subjected to conventional parasitological tests including haematocrit concentration test (HCT) and blood smears. Using (HCT) the overall prevalence of *Trypanosoma evansi* in South Darfur State was 3.7% (19/515). The prevalence of *T.evansi* among female camels was (5%) and significantly higher than that of males (0.7%) while camels of more than four years of age were more affected than younger camels. Also 153 camels blood spots in filter papers from the same camels were subjected to DNA extraction then amplified by (PCR) using two pairs of short oligonucleotides primers sequence (ITS1). Using PCR the overall prevalence of camel trypanosomosis was 54.2 % (83/153). From the same camels, 269 samples were examined serologically by card agglutination test (CATT/T .evansi). The overall *T.evansi* prevalence was 85.8% (229/267).

Awareness about camel trypanosomosis should be increased among pastoral groups. More studies are needed in the epidemiology and chemotherapy of camels trypanosomosis in Darfur States to lead the way for formulation of proper control strategy for this disease.

INCIDENCE OF TRYPANOSOMOSIS IN SOME SELECTED FULANI SETTLEMENTS RESIDING IN NORTHERN PART OF KANO STATE, NIGERIA

*¹Abdullahi, I. Z., ¹Maigari, A. K., ²Hafsar, M., ¹Sadiq A. A., ¹Atikat, U. and ¹Musayyiba, S.

¹Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano Liaison Office, Infectious Diseases Hospital, France Road, Kano State, Nigeria.

²Onchocerciasis Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, Unguwan Rimi GRA, Kaduna, Nigeria.

*Corresponding Author: abbati2050@gmail.com, 07032472594

ABSTRACT

Cattle are increasingly being used to augment cash income and enhance food security, thus serve as an important component in the household's livelihood strategies. However, cattle in sub-Saharan Africa may be infected with a wide variety of parasites most importantly trypanosomes. Thus, this study was aimed at determining the incidence of trypanosomes in cattle found at some Fulani settlements in northern parts of Kano State, Nigeria. Blood samples were collected from 1000 cattle residing in Gabasawa, Gezawa and Minjibir Local Government Areas. Standard trypanosome detection methods were used. Similarly, coordinates of the sampling sites were taken and maps generated. The result shows an overall incidence of 0.40% where White Fulani breeds of cattle were more infected than Sokoto Gudali and Red Bororo breeds of cattle. Cows had higher incidences (0.30%) than bulls (0.10%). To the best of our knowledge, this is the first report Trypanosomosis in cattle resident of northern part of Kano State. Future surveillance should include the use of more sensitive techniques to ascertain the true epidemiological status of Trypanosomosis in cattle settlements of northern part of Kano State, Nigeria.

Key Words: Cattle, Trypanosomosis, Gabasawa, Gezawa, Minjibir, Kano State

OCCURRENCE OF TRYPANOSOME INFECTIONS IN CATTLE IN RELATION TO SEASON, LIVESTOCK MOVEMENT AND MANAGEMENT PRACTICES OF MAASAI PASTORALISTS IN NORTHERN TANZANIA

Esther G. Kimaro^{ab}, Jenny-Ann Toribio^c, Paul Gwakisa^d, Siobhan M. Mora^c
^a*School of Veterinary Science, Faculty of Science, The University of Sydney,
Australia*

^b*Tropical Pesticides Research Institute, Livestock and Human Diseases Vector
Control Division, P.O. Box 3420, Arusha, Tanzania*

^c*Institute of Infection and Global Health University of Liverpool, United
Kingdom*

^d*Department of Microbiology, Parasitology and Biotechnology, College
of Veterinary Medicine and Biomedical Sciences, Sokoine University of
Agriculture, Morogoro, Tanzania*

ABSTRACT

African animal trypanosomosis (AAT) is a parasitic disease considered to be one of the greatest constraints to cattle production in Tanzania. There is insufficient information on seasonal occurrence of AAT and management practices in Monduli District of the Maasai Steppe ecosystem to guide and prioritize AAT control programs. A cross-sectional survey was undertaken in 10 randomly selected villages of Monduli District. Information on seasonal animal movements, including wildlife interaction, and AAT management practices was gathered using a standardized questionnaire with 130 pastoralists. Blood samples were collected from a total of 960 cattle, in wet and dry seasons. An entomological survey was also undertaken in the dry season. Polymerase chain reaction targeting the internal transcribed spacer 1 (ITS1) was used for parasite identification in cattle blood and in tsetse flies. The overall apparent prevalence of AAT in cattle was 5.8% (95% CI of 4.1–8.3) and 4.2% (95% CI of 2.7–6.3) during wet and dry seasons, respectively. *Trypanosoma vivax* was the most common species identified in cattle. All tsetse flies (n=426) collected were trapped in Esilalei village which is in close proximity to Lake Manyara National Park. Tsetse fly infection status was determined to be 7.0%; (CI 95% of 4.9–9.8%) with nearly 50% of infections due to *T. congolense*. All 130 cattle owners reported that they could easily recognise AAT and the majority (75%) identified the most prominent

clinical signs. Nearly all owners (98.5%) identified that tsetse flies were responsible for AAT transmission. All cattle owners (100%) reported the use of trypanocides for AAT treatment, while 2.3% reported to also use herbal medicine. The trypanocides, Novidium® and Berenil®, were the most frequently reported commercial drugs and were used by 42% of cattle owners. Vector control by hand spraying was reported by the majority (90.8%) of cattle owners, while dipping and deployment of insecticide-impregnated targets were reported by few cattle owners (16.2% and 5.4%, respectively). The majority of cattle owners (83.1%) reported to move cattle away from home villages during the dry season with many migrating to areas in close proximity to wildlife parks. This study confirms the presence of circulating pathogenic trypanosomes in tsetse flies which continue to pose a threat for the Maasai cattle. The seasonal movement of cattle during dry season was associated with more clinical cases of cattle trypanosomosis. This study demonstrates the need to strengthen surveillance and control strategies for AAT.

Keywords: Cattle trypanosomosis, tsetse flies, seasonal movements, management practices, seasonality, Northern Tanzania.

3.10

MOLECULAR PREVALENCE OF TRYPANOSOME SPECIES INFECTION IN CATTLE AND TSETSE FLIES IN IDAH, IBAJI AND I GALAMELA LOCAL GOVERNMENT AREA OF KOGI STATE, NIGERIA.

Musa Muhammed Shaibu^{1,2}, Inuwa H. Mairo^{1,2} and Sani Ibrahim^{1,2}*

¹Department of Biochemistry, Ahmadu Bello University, Zaria

²Africa Centre of Excellence for Neglected Tropical Diseases and Forensic Biotechnology, ABU, Zaria

**Corresponding address; mdconk@gmail.com; 07065608479*

ABSTRACT

Background: African trypanosomiasis, a rural disease caused by Trypanosomes; is transmitted mainly by tsetse flies. It accounts for the low agricultural development in sub-Sahara Africa. Objectives: The aim of this study was to determine the presence and distribution of the various Trypanosome species in cattle and tsetse flies in Idah, Ibaji and Igalamela local government area (LGA) of Kogi State using Microscopy and molecular techniques. Methodology: A total of 313 cattle, 30 tsetse flies were sampled from June 2018 to January 2019 in thirteen (13) villages of the three LGAs. Nested PCR was conducted to amplify the internal transcribed spacer I (ITS-I) gene of the 16S ribosomal RNA of trypanosomes. Amplicons generated were sequenced and used to establish phylogenetic relationship. Results: The overall prevalence of trypanosome infections was 1.60% in cattle and 0.0% in tsetse flies. *T.b. brucei*, *T.evansi* and all the three sub-species of *T. congolense* were identified. The highest prevalence was recorded in dry season (1.89%) as against wet season (1.02%). Discussion: *T. congolense* was the major cause of trypanosomiasis in these areas. And of all the three LGAs studied, Ibaji LGA has the highest prevalence of the disease (2.26%) followed by Igalamela (1.23%) and Idah (0.0%). Conclusion: this study has identified trypanosome species in Ibaji and Igalamela LGAs, No trypanosome was detected Idah LGA. These results are important for the designing of community-wide vector and disease control interventions and planning of sustainable regimes for reduction of the burden of trypanosomiasis in endemic areas of the country.

3.11

EPIDEMIOLOGY OF TRYPANOSOMES AND ASSOCIATED LESIONS ON GOATS AND SHEEP IN KANO STATE, NIGERIA

*¹Musayyiba, S., ¹Maigari, A. K., ¹Abullahi, I. Z., ²Hafsat, M., ¹Sadiq A. A. and ¹Atikat, U.

¹Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano Liaison Office, Infectious Diseases Hospital, France Road, Kano State, Nigeria.

²Onchocerciasis Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, Unguwan Rimi GRA, Kaduna, Nigeria.

Corresponding Author: musayyiba@gmail.com, 08136828523.

ABSTRACT

The benefits derived from sheep and goats are far below the expected, due to low productivity linked to numerous factors of which disease is the most important. Moreover, there is paucity of data regarding the epidemiology of trypanosomes in Kano State, because of the chronic nature of these parasites making their detection and characterization difficult by simple microscopy. Consequently, this lack of species specific information makes it difficult for Veterinarians to advice clients on the management of these parasites. Thus, the present study was aimed at determining the occurrence of trypanosomes and the lesions caused by these parasites in sheep and goats. Two hundred (200) sheep and goats of different breeds and sexes were screened using standard trypanosome detection methods. Ante and Post mortem lesions were observed. Overall infection rate of 9.50% was recorded with sheep having higher infection rate (6.50%) than goats (3.00%). Trypanosomes detected included *Trypanosoma congolense* and *Trypanosoma vivax*; whereby, anaemia, oedema of dependent parts, lymphadenopathy and parlour of the mucus membrane were the lesions observed. It can thus be concluded that, trypanosomes are common in goats and sheep. However, these parasites may not be easily detected due to their subclinical or chronic nature, which often do not only result in production loss but also in mortality. Further studies need to be done to correlate the lesions observed with specific trypanosome species for effective control of the disease.

Key words: Trypanosomes, lesions, Goats, Sheep, Kano State

TESTING NEW CANDIDATES TO INCLUDE IN A COMBINATION OF RECOMBINANT PROTEINS FOR EFFICIENT DIAGNOSIS OF AFRICAN ANIMAL TRYPANOSOMOSIS

Toukara M^{1,3}, Thonnus M¹, Bringaud F¹, Thévenon S², Berthier D², Boulangé A^{2,3}, Bengaly Z³ and Rivière L¹.*

¹iMET, UMR 5234-MFP Université de Bordeaux-CNRS, Bordeaux, France

²Intertryp, UMR 17 IRD-CIRAD, Montpellier, France ³CIRDES, UMaVeB, Bobo-Dioulasso, Burkina Faso E-mail : magamba.toukara@gmail.com

Even though AAT is arguably the most important animal disease hampering livestock development in Sub-Saharan Africa, it remains unattractive to industrials. Diagnostic tools, despite their importance in supporting treatment decisions, are poorly developed. Research has focused mainly on molecular tests, unsuitable for field diagnosis due to high technological requirements. Serological tests are based mainly on total trypanosome lysates, and as such are difficult to standardize, and lack specificity. A number of recombinant proteins have been evaluated, but very few made it to the commercial stage. Of enhanced specificity, these tests lack sensitivity in very early and late infection. To improve the sensitivity while maintaining the specificity, we propose a new approach combining several recombinant proteins, both novel and previously characterized, within a single test. Besides literature exploration, we did a large candidate screening by crosschecking proteomics and transcriptomics datasets generated in parallel studies. Several new candidates were selected as potential antibody-detecting targets. We report here the evaluation in a single-target test of the diagnostic potential of TbPLA-1b (phospholipase) and TbGk (glycerol-kinase). Proteins were recombinantly expressed in *E. coli*, and tested by indirect ELISA using both mouse and bovine sera. Both antigens reacted strongly with infected mouse sera. TbPLA-1b reacted poorly with diluted bovine sera, only with immunoglobulin-enriched preparation. TbGk is currently under investigation. This result, showing lack of sensitivity of TbPLA-1b by itself, is typical of the problems encountered with serodiagnostics based on single recombinant protein. We thus also report the selection of novel potential targets, which, associated with already tested recombinant proteins, should allow to improve the overall sensitivity.

CLONING OF AMPLIFIED GLYCEROL KINASE GENE OF TRYPANOSOMA BRUCEI BRUCEI AND ITS IN VITRO EXPRESSION IN HepG2 CELLS

*Habila, Amaya Jobin^{1,2}, Nok Andrew Jonathan^{1,2}, Gbem Thaddeus Thelumun³,
Deize Frank⁴ Kelm Soerge⁴, Balogun Emmanuel Oluwadare^{1,2*}*

¹Department of Biochemistry, Ahmadu Bello University, Zaria

*²African Center of Excellence for neglected Tropical Diseases and Forensic
Biotechnology, ABU, Zaria ³Department of Biology, Ahmadu Bello University,*

Zaria ⁴University of Bremen, Faculty of Biology and Chemistry, Bremen,

*Germany *Corresponding address: oluwadareus@yahoo.com*

ABSTRACT

The control and treatment have been problematic due to livestock migration, toxicity, and resistance to available chemotherapy. Glycerol kinase (GK) African trypanosomes is important to the parasite's survival in its mammalian host due to its involvement in ATP synthesis and lipid metabolism, it has been validated as a target of vaccine and chemotherapy development. This work reports the progress of DNA amplification and cloning of the glycerol kinase gene from *T. brucei brucei* towards the development of DNA vaccine for African trypanosomiasis. Genomic DNA (gDNA) of the blood stream forms (BSFs) of *T.b.brucei* was extracted and quantified. The targeted gene was subjected to nested PCR amplification of the full coding sequence of *T.bbGK* gene, and purified. The gene was cloned into modified pVAX-I by restriction digestion and ligation and the construct, used to transform *Escherichia coli* XL I Blue. pVAXT.bbGK was prepared from positive clones and used for in vitro transfection of HepG2 cells to confirm the in-frame translation and localization by immunofluorescence. pVAXT.bbGK was isolated, purified and sequenced. Transfection of HepG2 cells was efficient with the pVAX T.bbGK, as it indicated expression of the rTbGK observed via fluorescence. The purified pVAX T.bbGK constructs concentration ranged from 1100 ng/μl to 1793 ng/μl. Successful cloning and production of pVAXT.bbGK and its expression in mammalian cell lines under culture condition will be discussed.

Key words: Trypanosomiasis, *Trypanosoma brucei brucei*, Glycerol kinase, Genomic DNA, Polymerase chain reactio

PHOSPHORYLATION PROFILING OF THE BOVINE PROTEOME: A BASIS FOR BIOMARKER DISCOVERY IN TRYPANOSOMOSIS CONTROL

*Oladeji Bamidele⁺ and Ofelia-Galman Omitogun
Biotechnology Unit, Department of Animal Sciences, Obafemi Awolowo
University, Ile-Ife, Nigeria. +bamideledeji@gmail.com*

Post-translation modification of gene activity using phospho-regulatory mechanism at the proteomic level has been suggested as an appropriate epigenetic process for genes whose imprinting status are not influenced by DNA methylation. The role of protein kinases in phospho-regulation is similar to the transcription regulatory activity of transcription factors in that protein kinases only phosphorylate proteins that contain particular amino acid motifs. In previous studies, we found few genes (e.g ASCL2 and PhLDA2) in cattle whose imprinting status were maintained independently of DNA methylation, and also identified site-specific motifs within the conserved domains of these genes involved in phosphorylation. The differential abundance of these genes in trypanotolerant and trypanosusceptible cattle breeds has also been reported. Therefore considering the effect of post translation modification on gene expression and protein activity, and the physiological response of cells to pathological conditions, the objective is to comparatively investigate the phospho-proteome of select tissues involved in the host-parasite interaction of trypanosome infection in both trypanotolerant and trypanosusceptible breeds of cattle. The methodology for this research involves the design of appropriate mass spectrometry work-flows for the detection, identification and quantification of phosphoproteins. The research is expected to identify and validate protein kinases, and profile phosphorylation patterns in the proteome of trypano-tolerant (N'Dama, Muturu) and trypano-susceptible (White Fulani, Red Bororo) cattle breeds. The identification of biomarkers could present a new approach at vaccine development and development of an efficient drug delivery system for the control of African animal trypanosomosis.

Keywords: Phosphorylation, phosphoproteins, trypanotolerance, biomarker, trypanosomosis

MOLECULAR DETECTION OF HUMAN-INFECTIVE TRYPANOSOMES IN CATTLE AND TSETSE FLIES FROM ZAMBIA AND MALAWI

Namangala Boniface^{1,2}, Hayashida Kyouko³, Nakamura Yukiko³, Chatanga Elisha^{3,4}, Musaya Jenelisa⁴, Mweempwa Cornelius⁵, Chilongo Kalinga⁵, Chisi John⁴, Sugimoto Chihiro³*

¹*Department of Paraclinical studies, School of Veterinary Medicine, University of Zambia, P.O. Box 32379, Lusaka, Zambia;* ²*Institute of Distance Education, University of Zambia, P.O. Box 32379, Lusaka, Zambia;* ³*Research Centre for Zoonosis Control, Hokkaido University, Japan;* ⁴*Department of Basic Medical Science, College of Medicine, University of Malawi, Blantyre, Malawi;* ⁵*Department of Veterinary Services, Tsetse and Trypanosomiasis Control Unit, Ministry of Fisheries and Livestock, Lusaka, Zambia.*

*E-mail: b.namangala@unza.zm; boniface_1020@yahoo.com

ABSTRACT

Trypanosomiasis, caused by various trypanosome species mainly transmitted by tsetse flies, affects both livestock and humans in sub-Saharan Africa, including Zambia and Malawi. Several domestic and wild animals act as reservoirs of various trypanosome species. In Zambia and Malawi, Human African trypanosomiasis (HAT) is endemic mainly in the old foci found within river valleys. Current available parasitological methods used for trypanosomiasis diagnosis in endemic regions are either less sensitive, unable to accurately identify species and may sometimes be laborious. In the present study, trypanosome-species-specific PCR, including the human serum resistance-associated gene (SRA)-PCR assay, were employed for parasite detection in clinical specimens obtained from cattle and wild caught tsetse flies from Zambia's and Malawi's river valleys.

So far we have detected various animal-infective trypanosome species including *Trypanosoma congolense*, *T. brucei brucei*, *T. godfreyi/vivax* and *T. simiae* in cattle as well as in tsetse flies, by trypanosome-species-specific PCR. Importantly, by means of SRA-LAMP, we have also been able to detect *T. b. rhodesiense* in cattle and tsetse flies (exclusively involving *Glossina morsitans morsitans*), suggesting their possible role in HAT epidemiology.

RESILIENCE OF THE AFRICAN GRASSCUTTER (THRYONOMYS SWINDERIANUS, TEMMINCK) TO TRYPANOSOMA ORGANISMS

Maxwell N. Opara^{1}, Joy A. Maxwell² and Benjamin O.Fagbemi³.*

*¹Zoonotic Parasite Research Group, Department of Parasitology and
Entomology Faculty of Veterinary Medicine, University of Abuja*

*²Department of Health services, Federal University of Technology, Owerri,
Nigeria*

*³Department of Veterinary Microbiology and Parasitology, University of Ibadan,
Nigeria*

opara.maxwell@gmail.com; oparamax@yahoo.com

ABSTRACT

The grasscutter (*Thryonomys swinderianus*) is a wild hystricomorphic rodent widely distributed in the African sub-region and exploited in most areas as a source of animal protein, thus leading to its recent domestication. Twenty seven (27) captive - reared grasscutters housed in a raised iron cage and fed guinea grass (*Panicum maximum*) and water daily, were used to determine the effects of experimental infection of these rodents with *Trypanosoma congolense* and *T. vivax* for 21 days. The PCV, MCHC, total WBC and Lymphocytes of grasscutters experimentally infected with *T. congolense* and *T. vivax* significantly decreased ($p < 0.05$), while their MCV significantly increased ($p < 0.05$) 21 days post infection (dpi). Plasma glucose and cholesterol were decreased ($p < 0.05$). Body temperature fluctuated between 37.4°C and 39.2°C with a peak on day 12 (39.2°C) in *T. congolense* infection and 37.5°C to 40.1°C which peaked on day 8 (40.1°C) in *T. vivax*. The livers and kidneys showed vacuolar and tubular epithelial degenerations respectively, with thrombosis in alveolar blood vessels, but no mortalities. The results of this study have shown the ability of the grasscutter to harbour trypanosome organisms without any deleterious effect, a factor which could be investigated to understand the reason for the trypano – tolerance. Following this, the grasscutter could thus serve as a candidate animal for vaccine production against African animal trypanosomosis (AAT).

IN VITRO TRYPANOCIDAL ACTIVITIES OF FRACTIONS FROM THE ETHANOLIC STEM BARK EXTRACT OF COMMIPHORA SWYNNERTONII AGAINST TRYPANOSOMA CONGOLENSE.

Yakob P Nagagia,^{b*} Eliningaya J Kweka^{b,c} Richard S Silayo,^d

^aDept. of Vet. Microbiology, Parasitology and Biotechnology, College of Veterinary Medicine and BioMedical Sciences, Sokoine University of Agriculture, P. O. Box 3019, Chuo Kikuu, Morogoro, Tanzania ^bTPRI, Division of Livestock and Human Diseases Vector Control, P.O. Box 3024, Arusha, Tanzania ^cDept. of Medical Parasitology and Entomology, CUHAS, P.O. Box 1464, Mwanza, Tanzania ^dCurrent address: Dept. of Parasitology and Medical Entomology, SFUCHAS, POB 175, Ifakara, Tanzania.

*Corresponding author: E-mail: yakob.nagagi@tpri.go.tz

ABSTRACT

Use of trypanocides is an important component in control of African animal trypanosomosis. However, the few drugs available are beset with the ever-present actual and potential development of trypanosome drug resistance after >60 years of use. The way forward is discovery of new lead molecules from which new trypanocidal drugs can be developed. We report on a study that showed the stem bark extract of *Commiphora swynnertonii* could be a source of such molecules. Ethanolic stem bark extract from *C. swynnertonii* was suspended in distilled water and partitioned with dichloromethane and petroleum ether. Gas Chromatography Mass Spectrometry and High Performance Liquid Chromatography were used to determine the presence of molecules in sub-fractions, followed by an in vitro anti-trypanosomal bioassay test in which their effect on motility of *Trypanosoma congolense* was compared to that of diminazene diaceturate and Phosphate Buffered Saline Glucose (PBSG). Effects of the Aqueous Fraction, Dichloromethane Fraction and Petroleum Ether Fraction on motility of *T. congolense* were shown to decrease in that order. Test fractions had significantly higher effect than PBSG ($p < 0.05$). Among the molecules identified in test sub-fractions, coronopilin and 4,8,13-duvatriene-1,3-diol combination had significantly ($P < 0.05$) stronger effect than sub-fractions with coronopilin alone and the coronopilin and hexadecane-1,2-diol combination. This study has indicated that coronopilin and 4,8,13-duvatriene-1,3-diol are potential

lead molecules for development of new trypanocidal drugs. Further validation studies are needed.

THE EVALUATION OF THE ANTITRYPANOSMAL POTENTIAL OF AQUEOUS EXTRACT OF ADANSONIA DIGITATA IN RATS

Iliyasu, H^{a*}; Jatau, I.D^a; Ogunleye, O.O^{a,b}

^aDepartment of Veterinary Parasitology and Entomology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria.

^bNigerian Institute for Trypanosomiasis Research (NITR), Ilorin, Kwara State, Nigeria

*Corresponding Author

ABSTRACT

The antitrypanosomal potential of *Adansonia digitata* was evaluated in rats. Thirty matured rats were divided into six groups of five animals each. The rats except for group II were each inoculated with 106 *Trypanosoma congolense* intraperitoneally (ip). Rats in groups I and II served as positive and negative control respectively. At the onset of parasitaemia, animals in group III, IV and V were treated intraperitoneally with *Adansonia digitata* extract at 160mg/kg, 320mg/kg and 640mg/kg for 4 days, 2 days and once respectively. Rats in group VI were treated once with 3.5mg/kg diaminazine aceturate (standard drug) intraperitoneally. The parasitaemia and packed cell volume (PCV) were monitored during the course of the infection in the experimental animals, while Erythrocyte osmotic fragility (EOF), total red blood cell (RBC), haemoglobin (Hb) concentration, Total protein, Total white blood cell (WBC) and differential leukocyte count were determined at the end of the experiment (20 days post infection). The result indicates significant decrease ($p < 0.05$) in parasitaemia and band cells between treated and untreated control. However, the increases recorded in Packed PCV, Hb, TP, Total RBC and WBC, Neutrophils, Eosinophils, Monocytes and Lymphocytes between treated and untreated groups were not significant ($p > 0.05$). The result is discussed in relation to the presence of flavonoids and other phytochemicals in the plant material. The need to source for alternative trypanocides from African indigenous plant materials cannot be over emphasized.

Key words: Antitrypanosomal, rats, *Adansonia digitata*, experimental

TRYPANOSOMA CONGOLENSE VERSUS PHLOROGLUCINOL: IN VIVO STUDIES AND INHIBITORY EFFECTS AGAINST TRYPANOSOMAL SIALIDASE IN VITRO AND IN SILICO

Nasirudeen Idowu Abdulrashid^a, Mohammed Auwal Ibrahim^a, Murtala Bindawa Isah^b, Isa Danladi Jatau^c and Elewechi Onyike^a

^a*Department of Biochemistry, Ahmadu Bello University, Zaria, Nigeria*

^b*Department of Biochemistry, Umaru Musa Yar'adua University, Katsina, Nigeria*

^c*Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria, Nigeria*

**Correspondence to: Mohammed Auwal Ibrahim PhD, Department of Biochemistry, Ahmadu Bello University, Zaria, Nigeria. Telephone: +2347031104932; E mail: mauwalibrahim@gmail.com or maibrahim@abu.edu.ng*

ABSTRACT

In the last few decades, no new drug has been developed against Animal African Trypanosomosis (AAT) despite continuous report of resistance against the available drugs and the devastating effects of the disease to the African livestock industry. Herein, the in vivo effects of phloroglucinol against *Trypanosoma congolense* infection in rats were investigated. Rats were experimentally infected with *T. congolense* and treated with 50 and 100 mg/kg/day phloroglucinol and daily parasitaemia was recorded. After two weeks of the treatment, the rats were sacrificed, and blood biochemical parameters including free serum sialic acid, bound sialic acid and total sialic acid were recorded. Moreover, *T. congolense* sialidase was partially purified using DEAE cellulose anion exchange chromatography and the inhibitory kinetics of phloroglucinol against the enzyme were investigated. The results showed that, phloroglucinol at the two doses possesses a trypanosuppressive effect and significantly ($P < 0.05$) ameliorated the anemia and splenomegaly induced by the parasite. However, treatment of both infected and non-infected rats with phloroglucinol resulted in significant hepatomegaly ($P < 0.05$). The free serum sialic acid level was not significantly different between infected control and phloroglucinol treated groups. However, in the in vitro analysis, phloroglucinol inhibited the activity of partially purified *T. congolense* sialidase with a mixed inhibition

mechanism. Molecular docking studies also suggested an interaction between phloroglucinol and homology modelled trypanosomal sialidase with a binding free energy of -4.8 kcal/mol through a single hydrogen bond. It was concluded that phloroglucinol possesses trypanosuppressive effects and ameliorated some trypanosomiasis-induced pathological changes but displayed hepato-toxic effects.

3.20

SHORT- AND LONG-TERM EFFECTS OF ORALLY ADMINISTERED AZITHROMYCIN ON TRYPANOSOMA BRUCEI BRUCEI-INFECTED MICE

Peter S. Musinguzi¹, Nthatsi I. Molefe², Keisuke Suganuma^{*3}

¹Faculty of Biomedical Sciences, Kampala International University, Western Campus, P.O. Box 71, Bushenyi, Uganda ²Unit for Environmental Sciences and Management, North-West University, Private Bag X6001, Potchefstroom, 2520, South Africa ^{*3}National Research Center for Protozoan Diseases, Obihiro University of Agriculture and Veterinary Medicine, Nishi 2-11 Inada, Obihiro, Hokkaido, 080-8555, Japan

Introduction : Human African trypanosomiasis (HAT) and animal African trypanosomiasis (AAT) are diseases of economic importance in humans and animals that affect more than 36 African countries. The currently available trypanocidal drugs are associated with side effects, and the parasites are continually developing resistance. Thus, effective and safe drugs are needed for the treatment of HAT and AAT. This study aimed to evaluate the effects of azithromycin (AZM) on *Trypanosoma brucei brucei*-infected mice.

Methodology : Mice were randomly divided into 7 groups consisting of a vehicle control group, 5 test groups and a diminazene aceturate (DA)-treated group. Mice were treated orally for 7 and 28 days, as short-term and long-term treatments, respectively.

Results : Short-term AZM treatment cured 23% (16 of 70) of the overall treated mice whereas long-term treatment resulted in the survival of 70% of the mice in the groups that received AZM at doses of 300 and 400 mg/kg. Trypanosomes treated *in vitro* with 25 µg/mL of AZM were subjected to transmission electron microscopy, which revealed the presence of increased numbers of glycosomes and acidocalcisomes in comparison to the vehicle group.

Conclusion : The current study showed the trypanocidal effect of AZM on *T. b. brucei* *in vivo*. The demonstrated efficacy increased with an increase in treatment period and an increased concentration of AZM.

3.21

ISOLATION AND CHARACTERIZATION OF TRYPANOCIDAL ACTIVE COMPONENT OF ECHIS OCELLATUS VENOM

*Ilu, Ameh^{1,2}, Nasir Shuaibu M², Mohammed Mamman^{1,3}, Emmanuel O. Balogun^{*2}*

¹Africa Centre of Excellence for Neglected Tropical Diseases and Forensic Biotechnology, Ahmadu Bello University, Zaria, Nigeria

²Department of biochemistry, Ahmadu Bello University, Zaria, Nigeria

³Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria.

**Correspondence: oluwadareus@yahoo.com*

ABSTRACT

Animal African Trypanosomiasis (AAT) exerts significant morbidity and mortality in livestock and other domesticated animals. The common drugs available for treatment are sometimes toxic becoming ineffective, hence, the need for development of novel anti-trypanosomal agents. Previously, it has been shown that crude viperidae venom of the Bothrops genera inhibits the growth of *Trypanosoma cruzi* epimastigote forms causing mitochondrial swelling and cell death. The aim of this study was to isolate and characterise the anti-trypanosomal component in the venom of *Echis ocellatus* (EOV) against *T. brucei brucei* and *T. congolense* in vitro. *T. brucei* and *T. congolense* isolates were incubated for 6 hours with EOV at concentrations of 0.25 to 2.00 mg/ml. EOV exhibited trypanocidal activities with 50% inhibitory concentration (IC₅₀) value of 54.39 µg/ml on *T. brucei* as compared to 40.92 µg/ml for the standard drug Diminazine diacetate (DDA). EOV treated *T. congolense* had an IC₅₀ value of 71.96 µg/ml as compared to the 72.94 µg/ml of DDA. The EOV was subjected to sequential purification by salting-out, dialysis, and ion exchange (IEX) chromatography. EOV eluted in 24 fractions on IEX and trypanocidal activity was conducted on each fraction. Fraction 16 (EOVF16) displayed the highest inhibitory activity on both *T. brucei* and *T. congolense*, 1-way RMANOVA analysis of EOVF16 indicated no statistical difference in its activity when compared with DDA. EOVF16 was resolved using SDS-PAGE, which reveals it to be a 112kD protein. EOVF16 may serve as a potential compound for a novel anti-trypanosomal drug.

3.22

AMELIORATIC AND CURATIVE EFFECTS OF SALECTED ANTI-OXIDANTS AND TRYPAMIDIUM IN WISTAR RATS INFECTED WITH TRYPANOSOMA BRUCEI-BRUCE (FEDERE STRAIN)

Shuaibu Y¹* Mohammed S.S.D.²

¹*Onchocerciasis Research Department Nigerian Institute for Trypanosomiasis Research, Kaduna, Nigeria.* ²*Department of Microbiology, Faculty of Science, Kaduna State University, Kaduna, Nigeria.* *Corresponding author's e-mail yahayashuaibu75@yahoo.com Tel: +234 8061617746

ABSTRACT

Amelioratic effects of antioxidants and Trypamidium in the treatment of *Trypanosoma brucei-brucei* (Federe strain) infection in Wistar rats was investigated. Thirty Wistar rats with average weights of 170-200±20 g were randomly divided into six groups. Group A uninfected, group B, C, D, E and F were inoculated with 1×10^4 of *T. brucei brucei*. Group A rats were not infected and not treated, Group B rats were infected but not treated, Group C rats were infected and treated with Trypamidium, Group D rats were infected and treated with vitamin B-complex, Group E rats were infected and treated with vitamin K, while Group F rats was infected and treated with vitamin B-complex tablet and vitamin K tablet combined together respectively, the treatment were given after three days post infection orally except Group C which were administered intramuscularly. Body weight of the animals observed decrease significantly ($P < 0.05$) in group B at 9-day post infection (9DPI) and (12DPI), and in groups D, E and F at 12DPI compared to group A. Body temperature increased significantly ($P < 0.05$) in group B at 6DPI, 9DPI and 12DPI when compared to groups tested. Packed cell volume of the rats decreased significantly ($P < 0.05$) in all the groups infected at 6DPI and 12DPI compared to group A, but increased towards the end of the experiment. In conclusion oral administration of the antioxidants prevented the decrease in body weight, packed cell volume and body temperature associated with *Trypanosoma brucei-brucei* infection in Wistar rats.

Keywords: antioxidants; Trypamidium; weight; temperature; *Trypanosoma brucei brucei*; Wistar rats

INFLUENCE OF THE ADMINISTRATION OF VITAMINS C AND E ON SOMATIC AND REPRODUCTIVE PROFILES IN WISTAR RAT INFECTED WITH TRYPANOSOMA BRUCEI BRUCEI

Ajakaiye, J. J.^{1*}, Ogwu, D. O.², Bizi, R. L.³, Mohammad, B.⁴, Mohammed, A. A.⁴,
Mazadu, M. R.

¹*Pan African Tsetse and Trypanosomiasis Eradication Campaign Programme, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P. M. B 2077, U/Rimi G.R.A., Kaduna, Nigeria.*

²*Department of Theriogenology and Production, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria.*

³*Human African Trypanosomiasis Research Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P. M. B 2077, U/Rimi G.R.A., Kaduna, Nigeria.*

⁴*Extension Services Unit, Consultancy and Extension Services Division, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P. M. B. 2077, U/Rimi G.R.A., Kaduna, Nigeria.*

*Corresponding author's e-mail: jojagrovvet@yahoo.com Tel: +234 808293522

ABSTRACT

Effect of oral administration of vitamins C and E on some somatic and reproductive profiles of Wistar rats infected with *T. brucei brucei* (Federe strain) was investigated. Twenty five Albino Wistar rats were randomly divided into five groups of five animals each. Group I was administered with 0.5 mL normal saline only, group II was inoculated with 0.1×10^6 of *T. brucei brucei* only. Groups III, IV, and V were administered the same dose of parasites as in group II, and in addition, they were administered with 150 mg/kg b.w. of Vitamin C; 150 mg/kg b.w. of Vitamin E, and the combination of both Vitamins at the same dose in the last group, respectively. Body temperature increased consistently in all groups except group I. However, there was a significant ($P < 0.05$) difference in all treated groups compared to group II on day 28 post-infection. Haematological parameters were significantly ($p < 0.05$) higher in all infected and treated groups compared to group II, most notably in this direction were the values of the haematocrit, eosinophil and neutrophil which were highly significant ($p < 0.01$) when compared to the infected and not treated group. Result of the reproductive organs weight values

recorded showed a consistent decrease in all the germinal organs of both sexes in all infected groups, with group II showing the highest level of significant decrease. In conclusion, antioxidants, vitamins C and E, particularly in its combined form ameliorated the deleterious effects of the trypanosomal infection in the animals.

Keywords: Albino Wistar rats, Body temperature, Reproductive organs, Serum chemistry, *Trypanosoma brucei brucei* (Federe strain), vitamins C and E.

IN VITRO ANTITRYPANOSOMAL ACTIVITY IN EXTRACTS OF FOUR CYANOBACTERIA

Agee Jerry Tersoo^{1,2}, Chia Ahii Mathias³, Garba Auwalu^{1,2}, Mohammed Mamman^{1,4}, Balogun Emmanuel Oluwadare^{1,*}

¹Africa Centre of Excellence for Neglected Tropical Diseases and Forensic Biotechnology, ABU, Zaria, Nigeria

²Department of Biochemistry, Ahmadu Bello University, Zaria, Nigeria

³Department of Botany, Ahmadu Bello University, Zaria, Nigeria

⁴Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria.

*Corresponding address: oluwadareus@yahoo.com

ABSTRACT

African human and animal trypanosomiasis are neglected tropical diseases (NTDs) that constitute huge concerns in sub-Saharan Africa due to their negative health impacts to humans and animals, and for being a major constraint to economic development in the sub-region. There is no vaccine against trypanosomiasis and the few available anti-trypanosomal drugs have unsatisfactory outcomes and, thus, the need for new compounds to combat the disease cannot be overemphasized. Coloured microorganisms of the phylum Cyanobacteria are known to produce secondary metabolites some of which have been demonstrated to be therapeutic but are yet to be explored for anti-Trypanosoma potentials. With the aim of finding new anti-trypanosomal compounds, crude methanol extracts of four cyanobacteria (*Microcystis aeruginosa* EAWAG I 98, *Microcystis flos-aquae* UTEX 2677, *Microcystis wesenbergii* and *Oscillatoria* sp) were prepared and used to carry out bioassay guided fractionation against *Trypanosoma brucei brucei*. Sub-fractionation of the most active crude extract was carried out by Liquid column chromatography and Thin Layer Chromatography using Hexane, Ethyl acetate and methanol as solvents, and subjected to GC/MS analysis. The study led to the identification of novel compounds in *M. flos-aquae*. The potentials of cyanobacteria as sources of promising lead compounds for development of new trypanocidal drugs will be discussed.

Key words: Trypanosomiasis, *M. flos-aquae*, *M. aeruginosa*, *M. wesenbergii*, *Oscillatoria* sp, *T.b. brucei*

3.25

PATHOGENICITY OF LOCAL ISOLATE OF TRYPANOSOMA BRUCEI SPECIES IN RATS AND THE EFFECTS ON THE BRAIN, PITUITARY AND GONADS

*Davinson Chuka Anyogu, Jacinta Omeke and Aloysius Chukwuebuka Eze
Department of Veterinary Pathology and Microbiology, University of Nigeria,
Nsukka 410001, Enugu, Nigeria*

African animal trypanosomiasis consistently militates against livestock farming across Africa with enormous economic losses due to morbidity and mortality of affected animals. Some Trypanosome species have been reported to cross the blood-brain barrier making complete cure almost impossible. The present study aimed to assess the effects of *Trypanosoma brucei* species isolated from a local dog on the brain, pituitary and gonads of rats. Ten (10) healthy adult male rats were used for the study. They were divided equally into the control group, A and the infected group, B. Baseline values of the body weight, rectal temperature, packed cell volume, haemoglobin concentration, red blood cell count, total white blood cell count, serum Luteinizing hormone and serum testosterone were obtained before infecting group B, and weekly afterwards for 9 weeks. Infection of group B was by intraperitoneal injection of 106 Trypanosomes. At day 68 post infection (PI), three rats from each group were humanely sacrificed and the brain, pituitary gland, spleen and testes were fixed in 10% neutral-buffered formalin for histopathology. Parasitaemia peaked on weeks 2, 5, and 6 post-infection. Anaemia occurred in group B on week 9 PI. Leukocytosis was recorded in group B on days 12 and 20 PI, followed by leukopaenia on days 33 and 61 PI. Splenomegaly was observed in group B. Microscopic lesions in the brain of the infected rats were characterized by perivascular oedema, massive perivascular cuffing by round mononuclear cells, and vascular hyperaemia. There were also neuronal oedema and focal areas of necrosis of nerve cells. No lesions were observed in the pituitary gland and no significant variations were seen in the hormones assayed in serum. Testicular tissue from the infected rats showed a focal area of severe degeneration and necrosis of the seminiferous tubules. It was concluded that the local isolate of *T. brucei* species used in the study was mildly pathogenic, although it crossed the blood-brain barrier with consequent severe inflammatory reactions in the brain. It, therefore, may serve as a useful model for brain

involvement in both Animal and Human African Trypanosomiasis.

Keywords: Trypanosoma brucei, Pathogenicity, brain, pituitary gland, testes

3.26

HAEMATOLOGICAL INDICES ASSOCIATED WITH TRYPANOSOMES IN TRADE CATTLE (*BOS INDICUS*) AT KANO, NORTHWESTERN NIGERIA

**¹Hafsat, M., ²Maigari, A. K., ²Atikat, U., ²Musayyiba, S. and ²Abdullahi, I. Z. ¹Onchocerciasis Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, Unguwan Rimi GRA, Kaduna, Nigeria. ²Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano Liaison Office, Infectious Diseases Hospital, France Road, Kano State, Nigeria.*

**Corresponding Author: hafsymg@gmail.com, 08030545313*

ABSTRACT

Haematological profile is a pre – symptomatic diagnostic technique that is continuously been used to identify problems and to indicate dietary causes of diseases or cause of low production. This study was therefore, conducted to evaluate the occurrence of trypanosomes in association with haematological indices of 200 apparently healthy cattle brought to Kano State, Nigeria. Standard Trypanosome detection methods were used in addition to full blood counts using auto analyser to evaluate the haematological parameters. The results revealed an overall incidence of 5.0% with adult cattle having higher infection rate, 3.5% ($p=0.012$), compared to calves, 1.5%. Incidences of the disease in cows and bulls were even, 2.5% ($p=0.769$) in each. The mean packed cell volume (PCV), mean corpuscular haemoglobin (MCH) and mean corpuscular haemoglobin concentrations (MCHC) of parasitaemic cattle was lower compared to aparasitaemic cattle. However, the mean platelets volume (MPV) of parasitaemic cattle was higher than that of aparasitaemic cattle. Results of the differential white blood cells count shows higher eosinophils and neutrophils counts in the blood of parasitaemic cattle, however, basophils and monocytes were found to be of the same range in both parasitaemic and aparasitaemic cattle. This study underscores the relevance of haematological indices in cattle infected with trypanosomes. Therefore, further studies to determine the standard reference values in different breeds of cattle are recommended.

Key words: Trypanosomosis, Haematology, *Bos indicus*, Cattle

**SOME ASPECTS OF THE EPIDEMIOLOGY OF
TRYPANOSOMOSIS IN CATTLE (BOS INDICUS)
FOUND IN THE GRAZING RESERVES OF KURA LOCAL
GOVERNMENT AREA, KANO STATE, NIGERIA**

*¹Muhammad, A. A., ¹Maigari, A. K., ¹Idris, H. Y., ¹Aminu, A., ¹Malami, A. I.,
¹Umar, I., ²Machina, I. B., ³Garba, R., ³Ladan, I. I., ⁴Zubair, A. I. and ⁴Baura, M. S.
¹Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano
Liaison Office, Kano State Epidemiology Unit, Infectious Diseases Hospital,
France Road, Kano State, Nigeria. ²Molecular Laboratory, Nigerian Institute
for Trypanosomiasis Research, No. 1 Surame Road, Unguwan Rimi GRA,
Kaduna, Nigeria. ³Nigerian Institute for Trypanosomiasis (and Onchocerciasis)
Research, Katsina Liaison Office, Katsina State, Nigeria. ⁴Nigerian Institute
for Trypanosomiasis Research, Northwest Zonal Headquarter, Birnin Kebbi,
Kebbi State, Nigeria *Corresponding Author: asmy2012@yahoo.com,
+234(0)8038898433

ABSTRACT

The menace of Trypanosomosis still constitutes a major obstacle to food security in spite of previous attempts towards chemotherapy and tsetse control. This study therefore, was conducted to determine the current status of tsetse and Trypanosomosis in some grazing reserves of Kura LGA of Kano State, Nigeria. A total of 1 000 blood samples were collected from apparently emaciated and anaemic cattle. These samples were screened for the presence of trypanosomes through wet mount preparation, dark ground concentration and buffy coat methods. Similarly, bi-conical traps were stationed in the sampling points. An overall incidence of 2.7% was recorded with preponderance of the infection rate occurring in adult cows. Loss of condition, fever, jaundice, decreased milk production, weight loss, profuse diarrhoea, abortion, anaemia, leucocytosis, dysmetria, ataxia, ptyalism, lymph node enlargement, submandibular edema and hyperfibrinogenemia were observed. *Trypanosoma congolense* and *T. vivax* were the species detected. Although no any tsetse flies was caught, the presence of Tabanids, *Haematobia irritans* and *Stomoxys calcitrans* was established, suggesting the involvement of other factors in the outcome of the observed clinical features. These results confirmed the prevalence of Trypanosomosis, and could serve as a basis for future research on Trypanosomosis in Kura LGA.

Key Words: Cattle, Kura LGA, Kano State, Trypanosomosis, Epidemiology

IN VITRO EVALUATION OF ANTITRYPANOSOMAL EFFECTS OF CRUDE METHANOL EXTRACTS OF ANOGEISUS LEIOCARPUS, KHAYA SENEGALENSIS AND POTASH AGAINST TRYPANOSOMA CONGOLENSE

Tauheed AM^{1}, Mamman M^{1,2}, Balogun E O^{2,3}, Ahmed A⁴ and Suleiman, MM^{1,5}*

*¹Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Kaduna State, Nigeria ²Department of Biochemistry, Faculty of Life Sciences, Ahmadu Bello University, Zaria, Kaduna State, Nigeria ³Africa Centre of Excellence for Neglected Tropical Diseases and Forensic Biotechnology, Ahmadu Bello University, Zaria, Kaduna State, Nigeria ⁴Department of Pharmacognosy and Drug Development, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Kaduna State, Nigeria ⁵College of Agriculture and Animal Science, Mando, Ahmadu Bello University, Kaduna State, Nigeria *Correspondence: mtauheed@abu.edu.ng; amtauheed40@gmail.com*

ABSTRACT

High prevalence of treatment failure caused by resistance of trypanosomes to available antitrypanosomal drugs calls for concerted efforts to develop new drugs. Combination of *Anogeisus leiocarpus* (AL), *Khaya senegalensis* (KS) and potash (P) was evaluated against *T. congolense* in vitro. Fifty microliter each of 0.2, 2 and 20 µg/µl concentrations of AL was incubated in a with Fifty microliter of blood containing ~107 trypanosome cells were incubated in each well of a 96-well microtitre plate in the presence of 0.1 - 10 µg/µl of *A. leiocarpus*. Similar concentrations of each of KS, P, AL+KS, AL+KS+P and diminazene aceturate (positive control) were prepared as described for AL above. Negative control wells were devoid of the extracts and drug but supplemented with phosphate buffered saline. The plate was incubated at 37°C and the efficacy of treatment was observed at 30 min intervals for complete immobilisation or reduced motility of the parasites. The highest concentration (10 µg/µl) of AL+KS+P completely immobilized the parasites within 3 hours, while AL and KS wells immobilized the parasites within four hours. AL+KS and P wells showed significant ($P < 0.05$) reduction in the number of viable parasites when compared to the PBS wells. At the end of the 6-hour observation, the preparation of each well was subsequently inoculated into fresh mice intraperitoneally. Mice inoculated with AL+KS and AL+KS+P at 20 µg/µl did not develop parasitaemia in 4 weeks. It is apparent that AL+KS+P combination exhibited in vitro antitrypanosomal potential.

3.29

SURVEY OF AFRICAN ANIMAL TRYPANOSOMIASIS IN JOS SOUTH AND NORTH LOCAL GOVERNMENT OF PLATEAU STATE NORTH-CENTRAL NIGERIA.

Olaolu O.S^{a}, Ogbu, K.I^b, Alanza, A.J^a and Iliyasu, B^a.*

^aNigerian Institute For Trypanosomiasis Research, Vom, Plateau state, Nigeria

^bFederal College of Animal Health and Production Technology, Vom, Plateau State, Nigeria

**Correspondence: olaoluolushola@gmail.com +2347031831646*

ABSTRACT

African Animal Trypanosomiasis (AAT) has remained an adversity to the economic and social wellbeing of people in Sub-Saharan Africa and a threat to food security. AAT in Nigeria is wide spread and a major constraint to rural economic development. The existence of Trypanosomiasis on the Plateau hitherto known to be tsetse and trypanosomiasis free formed the basis for this study. The prevalence rate of AAT in cattle in Jos and environs was studied over a period of eight months (February - September) 2013. A total of 200 blood samples were collected through jugular vein puncture and examined for trypanosomes using standard trypanosome detection methods. The overall prevalence revealed that 7.5% of the samples screened were positive. Adults and heifers had prevalence rates of 6.7 % and 11.4% respectively. There was no significant difference ($p > 0.05$) between the different age groups. In relation to breeds, Sokoto Gudali, Red Bororo and White Fulani breeds of cattle, constituted 11 (6.3%), 1 (6.7%) and 3 (33.3) prevalence rate respectively. Based on Trypanosoma specie, Trypanosoma congolense recorded 4 (36.4%), while Trypanosoma brucei had 7 (63.6%) prevalence. In respect to sex, there was no significant difference between males and females ($p > 0.05$). Based on the location, the prevalence rate did not differ significantly ($p > 0.05$) between Jos North and Jos South Local Government Areas. However, Trypanosoma brucei was found to have higher prevalence rate than T. congolense in the study area. The significance of this study in relation to socio-economic development is discussed in the face of ethno-political crisis and climate change.

Keywords: Prevalence, Trypanosomes, Infection, Cattle, Jos

AN ATLAS TO SUPPORT THE PROGRESSIVE CONTROL OF TSETSE TRANSMITTED ANIMAL TRYPANOSOMIASIS AND HISTORICAL IMPACTS OF TSETSE CONTROL IN ZIMBABWE

W. Shereni¹, L. Neves², G.A Vale², L. Nyakupinda¹, G. Cecchi⁴

ABSTRACT

Zimbabwe has realised major successes in the fight against tsetse and trypanosomiasis over many years. Lately, Africa animal trypanosomiasis (AAT) has been a limitation to attaining food security as the disease is still prevalent in the country. Tsetse and AAT monitoring is conducted in areas at risk and control interventions remain critical. Despite the huge successes, data was not centrally stored hence the Atlas had to be compiled to address this challenge.

Data spanning 19 years was assembled. In the atlas, 4 679 tsetse trap locations were recorded for 486 467 days and 79 374 blood samples examined for AAT. All the data available was digitised and assembled into the atlas. To interpret the impacts of tsetse control on the distribution of tsetse and prevalence of AAT, tsetse control data covering 40 years, from 1980 to 2019, was compiled for the country. A national level self-assessment of the Progressive Control Pathway (PCP) status was generated. The latter, in combination with the atlas and tsetse control data, was used for the zonal PCP mapping in Zimbabwe

The assembled data in the atlas will be used to focus on appropriate areas for tsetse and AAT control and monitoring. It will also be useful for large scale geo-spatial analysis of the effects of climatic, anthropogenic and control on the distribution of tsetse and AAT. In addition, the atlas, PCP self-assessment and the related PCP map will inform future national work plans for tsetse and AAT control.

Keywords: Atlas, Progressive Control Pathway, Control, Tsetse, AAT

3.31

AN ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMIASIS IN BURKINA FASO

L. Percoma¹, J. B. Rayaissé², H. S. Pooda¹, S. Pagabeleguem¹, R. Ganaba³, A. Sow⁴,
Rafael Argilles⁵, Weining Zhao⁴, Massimo Paone⁴, I. Sidibé¹, G. Cecchi⁴

¹*Insectarium de Bobo-Dioulasso-Campagne Panafricaine d'Eradication de la
Tsé-tsé et de la Trypanosomose ;*

²*Centre International de Recherche-Développement sur l'Elevage en Zone
Subhumide*

³*Agence de Formation, de Recherche et d'Expertise en Santé pour l'Afrique
(AFRICSanté), 01 BP 298 Bobo-Dioulasso 01, Burkina Faso*

⁴*Food and Agriculture Organization of the United Nations, Animal production
and health division, Rome, Italy*

⁵*Joint FAO/International Atomic Energy Agency (IAEA) Programme, Insect Pest
Control, Vienna, Austria*

ABSTRACT

The study aimed to assemble a national Atlas on the geographic distribution of tsetse and African animal trypanosomosis (AAT) to guide the planning, implementation and monitoring of control activities. It consisted of searching published articles on AAT and tsetse from the year 2000 onwards, retrieving raw data as well as unpublished data. All input data were consolidated in a data repository. Tsetse data were gathered at trap level and parasitological data at either locality or animal level. In the repository, data were grouped by geographical area. When raw data were not available, information was extracted directly from articles. A database was created using open source software PostgreSQL, and mapping was carried out using QGIS. Data were collected in 31 articles, 2 PhD theses, 1 MSc dissertation and several reports. Raw data could be obtained for 14 articles, while the other were extracted from 17 articles. The entomological database (trap-level component) contained 13,799 traps from 107 localities, A total of 66% of traps were negative. In total, 67,738 tsetse were caught, of which 50.92% *Glossina tachinoides*, 42.11% *G. palpalis gambiensis*, 6.07% *G. m. submorsitans*, 0.10% *G. medicorum* and < 0.01% unidentified species. Mapping shows a good data coverage in the western part of the country, less so in the South, Southwest and East, while data are virtually absent in the North. For AAT, database contained 10571 animals from 121 localities, 79.54% of which were negative.

Trypanosomes species encountered were *T. vivax*, *T. brucei*, *T. congolense*. This study updated the tsetse and AAT distribution in Burkina Faso, one of prerequisites for PATTEC projects implementation and for advancing along the Progressive Control Pathway for AAT.

Keywords: Atlas, Tsetse, African Animal Trypanosomosis, Database, Articles, repository, mapping

TRYPANOCIDAL ACTIVITY AND ITS DERIVATIVES FORMITOPSIS PINICOLA AGAINST TRYPANOSOMA BRUCEI BRUCEI IN VIVO AND IN VITRO

*Abedo, A.J¹., Abdulmalik, U¹., Abdullahi, R.S¹., Muhammed, H¹., Shettima, F¹.,
Muhammed, I.S²., Enoh, E. E¹., Tasie, C.P., Tamba, Z¹ and Ogar, M.U¹.*

¹*Vector and Parasitology Department Nigerian Institute for Trypanosomiasis
Research (NITR), No.1, Surami Road, Kaduna State, Nigeria.*

²*Research planning Monitoring and Extension, Statistics and Socio economic
Department.*

Corresponding author Email: onyinoyi1999@gmail.com

The crude extracts of petroleum ether, methanolic and aqueous extract of *Formitopsis pinicola* were tested for trypanocidal activity against *Trypanosoma brucei brucei* in vitro. The result showed that the methanolic extract had the highest trypanocidal activity at 0.5 mg/ml. Phyto chemical screening carried out on this extract reveal the presence of alkaloids saponins cardiac glycosides tannins etc. Further separation carried out on silica gel column, lead to the collection of 42 fractions which were pulled together to give 11 (I-XI) fractions based on the TLC result run on a suitable solvent system. The fractions were also tested for in vitro trypanocidal activity which showed that fraction IV had the highest activity with Minimum Inhibitory Concentration (MIC) at 0.25 mg/ml. Also Preparatory Thin Layer Chromatography of fraction IV revealed five distinct spots on exposure to Ultra-Violet light (ABCD and E). Similarly, in vitro trypanocidal activity carried out on these components, showed that only component C possessed trypanocidal activity at 0.05 mg/ml. Furthermore in vivo trypanocidal activity carried out on laboratory bred rats using crude methanolic extract and fraction IV of *Formitopsis pinicola* which were prepared separately to a final concentration of 70 mg/kg/wt, showed the group treated with crude methanolic extracts and fraction IV, twenty four hours post inoculation had 40% and 90% reduction in parasitemia respectively. While the groups treated from day seventh post infection with the same extracts had 20% survival rate in each group. The difference between the treated and non-treated control was significant ($P < 0.05$).

Key words: Trypanocidal activity *Formitopsis pinicola*, Column Chromatography Studies and *Trypanosoma brucei brucei*.

OPTIMIZATION OF ANTITRYPANOSOMAL POTENTIALS OF TRACE METAL SALTS IN *T.BBRUCEI* INFECTED RATS

¹*U.O. Adamu, ²R.P. Ovbagbedia, ³O. Mabel, ⁴J. Tijani and ⁵A. Mann

¹Animal African Trypanosomiasis Research Department, Nigeria Institute for Trypanosomiasis Research, Kaduna Nigeria

²Nigeria Institute for Trypanosomiasis Research Asaba, Delta State Nigeria

³Vector and Parasitology Department, Nigeria Institute for Trypanosomiasis Research, Kaduna Nigeria

⁴Chemistry Department, Federal University of Technology Minna, Niger State Nigeria

ABSTRACT

The optimization of antitrypanosomal potentials of trace metal salts have been studied. Forty five healthy adult albino rats of both sexes weighing 150-200 grams were used to assess the trypanosomal potential of silver nitrate (AgNO₃), Zinc chloride (ZnCl₂) and copper nitrate (CuNO₃), silver nanoparticle (AgNP) and copper nanoparticle (CuNP) on *T.bbrucei* infections. The rats were divided into nine groups of five rats each namely: Group I (negative control), Group II (uninfected supplemented control), group III (positive control), Group IV (infected but treated with AgNO₃), group V (infected but treated with ZnCl₂), group VI (infected but treated with CuNO₃), group VII (infected but treated with diminazeneaceturate), group VIII (infected but treated with AgNP) and group IX (infected but treated with CuNPs). Each rat in the treated group received the metal salts and metallic nanoparticles (at 50 mg/kg diluted in distilled water) daily for 10 days during the course of the infection. The prepatent periods and survival times were shorter ($P < 0.05$) in the positive control than in their infected but treated groups. The degree of antitrypanosomal potential of the metallic nanoparticles and salts are as follows: CoNO₃ > ZnCl₂ > AgNO₃ > CuNP > AgNP

Keywords: Antitrypanosomal, African Trypanosomiasis, Trace metals, Optimization and Nanopartiicles.

EVALUATION OF TRYPANOCIDAL POTENTIALS OF ANDROGRAPHIS PANICULATA AGAINST TRYPANOSOMA BRUCEI BRUCEI

¹D. B. Maikaje, ²Z. Ladan*, ³T. O. Olanrewaju, ³R. Emmanuel, ⁴L. Apinega, ²T. Jock, ²N. Isaiah, ⁵P. Waziri

¹Department of Microbiology, Kaduna State University, Kaduna, Nigeria.

²Department of Chemistry, Kaduna State University, Kaduna, Nigeria.

³Human African Trypanosomiasis Research Department, Nigerian Institute for Trypanosomiasis Research, Kaduna, Nigeria.

⁴Department of Pharmaceutical and Medicinal Chemistry, Ahmadu Bello University, Zaria, Nigeria

⁵Department of Biochemistry, Kaduna State University, Kaduna, Nigeria.

*E-mail of corresponding author: Zakariladan@gmail.com

ABSTRACT

This study described the evaluation of 70% ethanolic extract of *Andrographis paniculata* leaf, fractionated with ethylacetate and dichloromethane to afford their various crudes and tested in-vitro against *Trypanosoma brucei brucei* using Diminazene diacetate as standard control. In an attempt to determine the efficacy of *A. paniculata* leaf extracts against *T. b. brucei* parasite, apoptosis was observed at higher concentrations (10, 5, and 2.5 mg/mL) but trypano-static at lower concentration (1.25 mg/mL) within 2 h incubation. Trypanocidal activity of the various extracts showed comparable inhibitory effect (100%) on *Trypanosoma b. brucei* with the standard drug. We observed that *T. b. brucei* (Federe strain) isolated from Nigeria was visible in bloodstream 7 days post infection (dpi) and reached cerebrospinal fluid (CSF) within 11 dpi. From this study, *A. paniculata* leaf extract is a potential trypanocide for the management of *T. b. brucei*.

Keywords: *Trypanosoma brucei brucei*, *Andrographis paniculata*, Trypanocidal activity, cerebrospinal fluid

SURVEILLANCE OF TRYPANOSOMOSIS IN SOME SELECTED FULANI SETTLEMENTS IN KIRU LOCAL GOVERNMENT AREA OF KANO STATE, NIGERIA

¹*Machina, I. B.,* ²*Maigari, A. K.,* ³*Zubair, A. I.,* ⁴*Garba, R.,* ²*Mohammed, A. A.,*
¹*Idris, H. Y.,* ²*Aminu, A.,* ²*Malami, A. I.,* ²*Umar, I.,* ³*Baura, M.,* ⁴*Ladan, I. and* ¹*Yusuf,*
A. B.

¹*Molecular Laboratory, Nigerian Institute for Trypanosomiasis Research, No. 1
Surame Road, Unguwan Rimi GRA, Kaduna, Nigeria.*

²*Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano
Liaison Office, Infectious Diseases Hospital, France Road, Kano State, Nigeria.
Nigerian Institute for Trypanosomiasis Research, Northwest Zonal
Headquarter, Birnin Kebbi, Kebbi State, Nigeria*

³*Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research,
Katsina Liaison Office, Katsina State, Nigeria.*

**Corresponding Author: machinaidris@gmail.com, 08061664526*

ABSTRACT

Trypanosomosis is one of the major haemoparasitic disease of livestock with high morbidity where untreated animals usually die, particularly when poor nutrition or other factors contribute to debilitation. This surveillance study was therefore, aimed at conducting Trypanosomosis surveillance in cattle found at some Fulani settlements in Kiru LGA of Kano State, Nigeria. Blood samples were collected from the jugular veins of 500 apparently healthy cattle. Standard trypanosome detection methods including wet mount preparation, haematocrit centrifugation technique, buffy coat method and mouse inoculation, were used. The packed cell volume (PCV) of the sampled animals was equally determined. The result of the conventional microscopy revealed an incidence of 0.6%. White Fulani breeds of cattle were more infected (0.4%) than other breeds of cattle. The mean PCV of infected cattle (21 ± 0.07) was found to be lower compared to the mean PCV of uninfected cattle (33 ± 0.4) and that, *Trypanosoma congolense* was the most prevalent species detected. In conclusion, the parasitaemic cattle were treated with Diminazine aceturate. We therefore, recommend more surveillance in the grazing reserves of neighbouring LGAs to help curtail the transmission rate.

Key Words: Cattle, Kiru LGA, Kano State, Trypanosomosis, Surveillance

3.36

ANTI TRYPANOSOMAL ACTIVITY OF CRUDE EXTRACTS OF ENDOPHYTIC FUNGI (FUSARIUM MONILIFORME) ISOLATED FROM GUEIRA SENEGALENSES LEAF

*Malala, A.U. Umar, K.M. Machina, I.B. Bashir, A.K
Nigerian Institute for Trypanosomiasis Research, Centre for Dry Land
Agriculture Bayero University Kano.*

ABSTRACT

Agriculture is the mainstay of many economics and it is fundamental to the socioeconomic development of a nation, because it is a major element and factor in national development (Ahmed 1993). The majority of the disease burden faced is from infection with endemic diseases, in particular African Animal Trypanosomiasis (AAT). Drugs derived from natural sources play an important role in the avoidance and treatment of human diseases. Recent studies have shown a variety of health properties of endophytic fungal extract. The ethylaceted and the methanolic extraction were carried out. The two fungal extract were tested on *Trypanosoma brucei* bruce (federe strain). The in vitro assessment of *Fusarium moniliforme* extracts show clear trypanocidal activity at different concentrations with LC50 of 0.022 as indicated in the probability plot table. It also shows that as the concentration increase the mortality also increases.

Key words: Trypanosome Endophytic Brucei Acremonium Fusarium

SOURCE DISTRIBUTION OF TRYPANOSOMES DETECTED IN CAMELS AND CATTLE BROUGHT TO KANO STATE, NIGERIA

*¹Maigari, A. K. and ²Dabo, N. T.

¹*Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, Kano Liaison Office, Infectious Diseases Hospital, France Road, Kano State, Nigeria.*

²*Department of Biological Sciences, Faculty of Life Sciences, College of Natural and Pharmaceutical Sciences, Bayero University, Kano, Nigeria.*

*Corresponding Author: akabirum@gmail.com; +234(0)8036028452

ABSTRACT

Trypanosomiasis remains an important disease affecting livestock productivity, and by virtue of Kano State as a commercial hub of West Africa, it is assumed that the possibility of importing infected animals into the State cannot be discounted. The present study therefore, investigated 800 trade animals, including 240 camels and 560 cattle, using both standard parasitological and molecular methods. Maps indicating the sources of the animals were generated. It was found that, animals were brought from Agadas, Azare, Gaidam, Garin Alkali, Garko, Getso, Gingime, Kafin Hausa, Hadejia, Mai Adua, Maigatari and Wudil where, Mai Adua in Katsina State stands out as the major source of the animals brought to the sampling site. Parasitological prevalence was found to be 3.4% where camels brought from Azare had higher occurrence of *Trypanosoma evansi*. Similarly, *T. congolense* and *T. vivax* were detected in cattle brought from Dambatta, Maigatari, Mai Adua and Wudil; whereas *T. brucei* was only detected in cattle brought from Wudil. However, molecular prevalence revealed a prevalence of 51.3% where *T. brucei* was the most prevalent species detected (21.3%), followed by *T. congolense* (10.0%), *T. evansi* (5.0%) and *T. vivax* (5.0%) while mixed infection involving *T. brucei* with *T. congolense* (2.5%) and *T. brucei* with *T. vivax* (1.3%) were the least encountered. These findings signalled the need for expanded surveillance of parasite dynamics, epidemiological studies as well as prevention and control of the disease.

Key Words: Camels, Cattle, Kano, Trypanosomes, Sources

ENQUÊTE SUR LES TRYPANOSOMOSES ANIMALES DANS DEUX LOCALITÉS D'ÉLEVAGES BOVINS SOMBA DANS LA SAVANE GUINÉENNE AU TOGO

S. Boma^{1*}, T. N'Feidé¹, E. Talaki², B. Bonfoh¹, B. Dao¹

¹Ministère de l'Agriculture de la Production Animale et Halieutique (MAPAH), Institut Togolais de Recherche Agronomique (ITRA), BP. 1163 Cacadévi (Lomé), Togo.

²Université de Lomé, Faculté Des Sciences, Département de Zoologie et Biologie Animale, Laboratoire d'Entomologie Appliquée

*Auteur correspondant, E-Mail to : bomasoudah@gmail.com, Tel : 90 16 08 87

ABSTRACT

Cattle breeding in sub-Saharan of Africa is compromised by numerous animal disease, economically, the most important of which is animal trypanosomiasis. The present study was realized to have a better knowledge of this disease, of which Togolese Institute of Agricultural Research have initiated the control through PDRI-Mô project. A periodical cross-sectional Tsetse survey, three sample period by year (3 years), was carried out at Mô and at Tchaoudjo (Central Region), successively with twenty biconical traps. In each locality, the recording of mortalities of the calf was coupled with the trypanosome survey by microscopic analysis of blood sample of 210/1437 randomly cattle at Mô and 382/1160 at Tchaoudjo. Calf death rate was between $12.3 \pm 13\%$ (Mô) and $9.9 \pm 12\%$ (Tchaoudjo) affected by the season : $17.9 \pm 14\%$ in the rain season versus $11.1 \pm 12\%$ in the dry season. Apparent density of Tsetse per trap was of 1.78 at Mô versus 0.84 at Tchaoudjo. Trypanosome prevalence rate was respectively of 25.9% and 17.3%. The study revealed a bloodless sate of the cattle with a low haematocrit, of $24.2 \pm 4.9\%$ and $26.8 \pm 4.7\%$ respectively.

To improve the health and the productivity of these breed, adequate cur against vector and parasite were advocated.

Key words: Animal trypanosomiasis ; bloodless ; Calf death ; Central region ; Togo

SPOT CHECK ON ANIMAL TRYPANOSOMIASIS IN CATTLE FROM THREE (3) FARMS AT KIRU AND BUNKURE LOCAL GOVERNMENT AREAS OF KANO STATE

Abdullahi, M.A.^{1*}, Osue, H. O², Umar, A. D².

¹Animal African Trypanosomiasis Research Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P.M.B. 2077, U/Rimi G.R.A., Kaduna, Nigeria. ²Research Planning, Monitoring, Extension, Statistics and Socio-Economics Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P.M.B. 2077, U/Rimi G.R.A., Kaduna, Nigeria. *Corresponding author's e-mail: goodthinking338@gmail.com Tel: +234 8030839855

ABSTRACT

African trypanosomiasis is an important blood parasitic disease in human and animals constituting one of the major animal health constraints to livestock production in 38 sub-Saharan Africa. A spot check for animal trypanosomiasis was conducted in 3 livestock farms from 2 districts as well as 2 local Government areas of Kano State, north Western Nigeria. The check was subsequent to suspected outbreak of trypanosomiasis and flies menace in the farms, which has caused emaciation, decreased productivity and low grade mortality (often sudden) among the herds. In all the three farms, ticks infestation was very significant and the predominant species of the ticks was *Rhipicephalus (Boophilus) decoloratus* which are mostly engorged. Blood samples collected randomly from 70 emaciated cattle were examined for presence of trypanosomes using buffy coat technique while *Babesia* and *Anaplasma* were analyzed by making thin blood smear fixed in absolute methanol and stained with 10% Giemsa. 22 samples (representing 30% of all the samples) had different species of haemoparasites; *Trypanosoma theileri* in 2 samples, *Anaplasma marginale* in 13 samples and *Babesia bovis* was seen in 7 samples. The Mean Packed cell Volume (PCV) was 25%, highest PCV recorded from all the samples observed was 41% at Bunkure 2 while lowest 16 % was at Rahama integrated farms. From this spot check, it is evident that ticks infestation is still a major constraint to livestock production in Nigeria.

Key words: African trypanosomiasis, emaciation, *Rhipicephalus* spp., *Trypanosoma theileri*, *Anaplasma marginale*, *Babesia bovis*

IN VITRO ANTITRYPANOSOMAL ACTIVITY OF ADANSONIA DIGITATA (BAOBAB) LEAVES

**¹Agbadoronye, P. C., ²Maigari, A. K. and ³Irhue, A. E.*

*¹Nigerian Institute for Trypanosomiasis Research, Suleja Outstation, Niger State. ²Nigerian Institute for Trypanosomiasis Research, Kano Liaison Office, Infectious Diseases Hospital, France road, Kano. ³Nigerian Institute for Trypanosomiasis Research, South South Zonal Office, Asaba, Delta State, Nigeria *Corresponding Author E – Mail:*

ABSTRACT

Trypanosomosis represents one of the major veterinary problems with very limited therapeutic options, where the available treatments are decades old, suffered limited efficacy and possess undesirable effects. This has resulted in directed interests on alternative strategies. For instance, *Adansonia digitata* has attracted much interest, because it has been shown to possess novel efficacy in the management of many infectious diseases. Its pharmacological properties include antibacterial, anti – fungal, anti – malarial, anti – pyretic and its parts have been used for many healing purposes. Hence, exploring its ethnomedicinal potentials against Trypanosomosis is simply indispensable. Leaves of *A. digitata* were collected, cleaned and air - dried for 20 days. The samples were then grinded to obtained powdered samples. Similarly, phytochemical screening of the powdered samples was conducted using aqueous, methanol and ethanol solvents following standard laboratory techniques. Results of the phytochemical screening of the extracts revealed the presence of some bioactive compounds including flavonoids, tapenoids, saponins, alkaloids, tannins, anthraquinones, steroids, resins, phenols, glycosides and leucoanthocyanins. The in vitro antitrypanosomal activity of the extracts was evaluated on *Trypanosoma brucei* in a 96 well microtiter plate, at 5, 10, 15 and 20 mg/ml; while Diminazine Aceturate was used as control. Similarly, the in vitro antitrypanosomal activity of the extracts showed that aqueous extract had the least antitrypanosomal activity while ethanolic extract was more active at 5 and 10 mg/ml, followed by methanolic extract with modest antitrypanosomal efficacy at 10 mg/ml. This study reaffirms the presence of some bioactive compounds in *A. digitata* leaves and the extracts showed some potential activity against Trypanosomes. Further studies are therefore recommended to isolate the bioactive components

of *A. digitata* from its various parts, and subject them to various tests using different species of trypanosomes. The IC₅₀ and IC₉₀ values of the extracts also need to be extrapolated for effective comparative analysis of *A. digitata* trypanocidal potentials.

Key words: *Adansonia digitata*, Antitrypanosomal Activity, Trypanosomiasis

3.41

LUTTE CONTRE LA TRYPANOSOMOSE ANIMALE DANS LA PLAINE DE MÔ AU TOGO : IMPACT ZOO-SANITAIRE DANS LES ÉLEVAGES DE BOVINS

S. Boma^{1*}, T. N'Feidé¹, E. Talaki², B. Bonfoh¹, B. Dao¹

¹Ministère de l'Agriculture de l'Élevage et de la Pêche (MAEP), Institut Togolais de Recherche Agronomique (ITRA), BP. 1163 Cacadé (Lomé), Togo.

²Université de Lomé (UL), Ecole Supérieure d'Agronomie (ESA), BP. 1515 Lomé, Togo.

*Auteur correspondant, E-Mail to : bomasoudah@gmail.com, Tel : 90 16 08

87

Local cattle breeding in central Region of Togo is characterized by trypanotolerant cattle breeding with or without the use of trypanocidal drugs and insecticide treatments against Tse tse fly. To evaluate the impact of these two approaches on the productivity of humpless cattle, preliminary zoo-sanitary survey was conducted in the humpless cattle breeding area, at Mô and Tchaoudjo. Then, for three years, at Mô, community management of animal trypanosomiasis was lead. Only, positive animals and/ or those with low hematocrit (<25%) were treated with curative dose (3.5 mg.pv. kg-1) of diminazen and received Deltaméthrine insecticide bath (10 ml.100 kg of cattle). The assessment at Mô revealed the decrease of the prevalence, 25.9% to 16.8%, the change for the better health because hematocrit enhance to 24.2% to 27.5% and calf death reducing (6.4%). However, at Tchaoudjo, where the innovation was not implemented, the prevalence was 17.3%, hematocrit 26.8% and calf death, 9.9 ± 12%. These results show the need for implementation of reasoned actions to control animal trypanosomiasis to improve the productivity of local cattle in Togo.

Key words: trypanotolerant cattle, trypanocidal drug, insecticide, productivity.

CLINICOPATHOLOGICAL EFFECT AND EFFICACY OF QUINAPYRAMINE AND HOMIDIUM BROMIDE INTERACTION IN GOATS INFECTED WITH *T.VIVAX* OR *T. EVANSI*

¹F. M.Youssif, ²O. S.A. Mohammed, ³K. H. Elmalik and ⁴T. Hassan

¹Central veterinary research laboratories (CVRL) Khartoum-Sudan.

²Department of Med. Pharm.Toxi. Fac.Vet. University of Khartoum.

³Department of Public Health and Preventive Medicine. Fac.Vet. Khartoum
University.

⁴Department of Med. Pharm.Toxi. Fac.Vet. Sudan University.

ABSTRACT

Seventy of Nubian goats, in both sex, 8-12months, wighted 9-11kg, were divided in groups 10 in each, were infected with *T. vansi* experimentally, thirty goats were chosen randomly, divided into two groups each of ten. Group (1) was uninfected-untreated (control negative group), while group 2* was infected with *T. evansi*, untreated (control positive group) and goats in group(2**) infected with *T. vivax*, untreated (control positive group).each goat in group 3 was given single intramuscular dose of quinapyramine at the rate of 5 mg/ kg (therapeutic dose) followed by 1 mg/ kg of homidium bromide (therapeutic dose) while, goats in group 4 were each given single intramuscular dose of quinapyramine at 12.5 mg/kg (two and half-therapeutic dose) followed by 1mg/ml (therapeutic dose) of homidium bromidee, ach goat in groups 5 and 6 was given 5mg/ kg (therapeutic dose) of quinapyramine followed by 1mg/ml (therapeutic dose) of homidium bromide, 5 mg/kg (therapeutic dose) of quinapyramine followed by 2.5 mg/ kg (two half-therapeutic doses) of homidium bromide respectively.

Goats in group (2*) which were infected with *T. evansi* showed 4-7 days post infection hypothermia, watery lacrimation, frothy salivation, mucopurulent conjunctivitis, mucopurulent nasal discharge, severe diffuse alopecia, diarrhoea, depression, apathy, muscle tremors, slight increase in the respiratory rate, decrease in the pulse rate , convulsion and shivering. In the second week the lymph nodes and testis were hot and swollen, off food, cachexia, recumbent with lateral curvature of the neck for 1-2days then the animals died.And goats in group (2**) which were infected with

T. vivax started clinical signs at 7-10 days post infection, which included hypothermia, watery lacrimation with mucopurulent conjunctivitis, mucopurulent nasal discharge and frothy salivation. Lately week post infection decrease in appetite, depression, watery yellowish diarrhoea, muscle tremors, with lateral curvature of the head, post treatment signs started to decrease in severity and started to regain the appetite, the diarrhoea stopped 10 days later. These animals became healthy and looked normal within the third week post dosing. The body temperature, respiratory rate, pulse rate, blood pressure and body weight were within the normal range in all the groups although there were significant changes in some haematological (PCV, RBC, HB, WBC, MCV, MVH and MCHC), serobiochemical (LDH, CK, PK, ALP, SDH, GOT, AST, serum creatinine, urea, direct bilirubin, total protein, albumin, glucose, , globulin, phospholipids, triglycerides, total cholesterol, sodium and potassium, chloride, magnesium, calcium, inorganic phosphorus, zinc, copper, iron and magnesium. Parameters under investigation compared to goats of group (1). However goats of groups (2* and 2**) showed decrease in body temperature, respiratory rate, pulse rate, body weight and blood pressure changes comparable to control or treated groups. The gross pathological findings in the different organs, which had been examined, which had been developed by trypanosomosis either, flabbiness of the heart in goats of groups (2*, 2**, 3, and 6), hepatic atelectasis especially in groups (2 and 3), fatty changes in liver and kidneys absent or mild lesions. Goats in groups (3-4) showed distended urinary and gall bladder.

Key words: Nubian goats, quinapyramine, ethidium bromide, T. evansi, T. vivax, biochemical, haematology, clinical signs, post mortem findings, efficacy and toxicity.

SITUATION OF TRYPANSOMA EVANSI IN CAMELS AND CATTLE IN EGYPT

Mohamed Ibrahim Eisa

*Prof. Infectious Diseases, Dept. Vet Med., Faculty of Veterinary Medicine
Zagazig Univ., Egypt. Email: eisasharaf@yahoo.com*

ABSTRACT

In the present study, a total of 450 random serum samples were collected from apparently healthy camels (220) and cattle (230) located at South and North of Egypt during 2018. Sera samples were tested by ELISA for seroprevalence of Trypanosomiasis in camels and cattle. Also, 32 blood smears were done from suspected diseased animals from South Egypt for detection of *Trypanosoma evansi*. The seroprevalence of Trypanosomiasis in South of Egypt was 23.5% (27/115) in camels and 15% (18/120) in cattle, while in North of Egypt it was 15.2% (16/105) in camels and 0% (0/110) in cattle. *Trypanosoma evansi* was detected in 7 blood smears out of 32 suspected animals (21.9%) (5 camels and 2 cattle) in South of Egypt. The prevalence of antibodies was high in South of Egypt than North. This may be due to neighboring contact with Sudan which is the main way for camels importation and high rate of infection in older animals than younger ones. Trypanosomiasis is known to cause severe illness in animals and affect on meat and milk production in southern Egypt. Preventive and therapeutic measures against Trypanosomiasis should be done.

CLINICOPATHOLOGICAL EFFECT AND EFFICACY OF CYMELARSAN AND OXYTETRACYCLINE INTERACTION IN CAMELS AND NUBIAN GOATS INFECTED WITH T.EVANSI

¹F. M. Youssif, ²A. A. Jameel and ³T. Hassan

¹Central Veterinary Research Laboratories (CVRL) Khartoum-Sudan. rozavet@gmail.com

²Department of Pathology. Fac. Vet. U. of K.

³Department of Med. Pharm. Toxi. Fac. Vet. Khartoum University.

ABSTRACT

Twenty five of one humed Sudanese camels infected naturally with *T. evansi*, in both sexes, 10-18 months and weighing 350-450 kg were divided in 5 groups five camels in each. Each camel in group 3 was given single intramuscular dose of CymelarsanR at the rate of 0.250 mg/ kg followed by 20 mg/ kg of oxytetracycline, while animals in group 4 were given a single intramuscular dose of Cymelarsan® at 0.125 mg/ kg (half therapeutic dose) followed by oxytetracycline at 50 mg/ kg. A single dose of Cymelarsan® at 0.125 mg/ kg followed by a single intramuscular dose of oxytetracycline at 100 mg/ kg were given to each camel in group 5. Sixty of Nubian goats were divided into groups ten in each and were infected experimentally with *T. evansi*. Goats in groups 3 and 4 were each given single intramuscular dose of CymelarsanR at the rate of 0.125 mg/kg followed by single intramuscular dose of oxytetracycline at rate of 10 mg/ kg while goats in group (4) were also each given single intramuscular dose of CymelarsanR 0.125 mg/kg followed by single dose of oxytetracycline (intramuscular I/M) at rate of 50 mg/kg. Group (5) was given Cymelarsan 0.125 mg/kg followed by oxytetracycline 20 mg/kg intramuscularly twice/ week for two weeks. Group (6) was given the drugs similar to group (5), but daily for 8 days.

Animals in group 1 were used as un- infected-untreated (control negative), while animals in group 2 were infected-untreated (control positive).

The peripheral blood of goat swas free of the parasite 23, 18 and 11 days post treatment in groups (3), (4) and (5) respectively. in camels the peripheral blood was free of the parasite 23, 18 and 11 days post

treatment in groups (3), (4) and (5) respectively. Camels of group (2) showed severe parasites (+++) whereas the parasite was not detected in the liver tissue of camels in other groups (3,4 and 5) in the five weeks slaughter program. Also the parasites in the liver were observed in some groups and disappeared from other post treatment. Most of the clinical signs, macro and microscopical lesions observed in group (3,4 and 5) either disappeared or they were mild. There were no changes in Hb concentration, PCV, RBC and WBC count in camels of groups (3-5). No significant changes were observed in the MCH, MCHC and MCV on experimental camels. Also decreases in the MCV and an increase in MCHC were observed in camels of group (2) compared to control group (1). The serum activity GOT, GPT and ALP and serum concentration of urea, creatinine, total protein and cholesterol within the reference interval in the different groups tested. No significant changes were seen in serum concentration of globulins, triglycerides and glucose in groups (3-5). Compared to control group (1). However, a decrease in the globulin value was detected only in group (5).

Keywords: *T. evansi*, Cymelarsan, Oxytetracycline, Macro/microscopical lesions, sero-biochemical and haematology.

3.45

THE POOR REPORTING OF AFRICAN ANIMAL TRYPANOSOMIASIS IN THE LIVESTOCK SECTORS IN NIGERIA

Michael Adedotun Oke

*Michael Adedotun Oke Foundation, plot 232 Kaida Road Old Kuntunku
Gwagwalada, P. O. Box 11611, Garki Abuja, Nigeria. (maof2020@gmail.
com) +23408027142077*

African Animal trypanosomosis has been ravaging several parts of the agro-ecological zones of Nigeria, covering about 80% of the land mass between latitude 4°N and 13°N. Jos, Mambilla and Obudu highlands which had been hitherto declared as tsetse and trypanosomosis free zones are now infested (Onyiah et al., 1983; Onyiah, 1997; Dede et al., 2005; Ahmed et al., 2005). The epidemic solely affects individual, families/communities and disrupts their economy posing a serious obstacle to agriculture and livestock development. Generally human population such as farmers, shepherds, herdsmen, hunters, tourists, merchants, researchers are at risk of exposure to trypanosomosis (PHAC, 2001; WHO, 1998).

The important of reporting the outbreak, from the recent report from a North central state of Nigeria revealed an overall trypanosome infection rate of 1.5% among sheep and goat over three seasonal variations (Samdi et al., 2010). About 60 million people and 50 million cattle are risk of being infected with up to three million livestock death annually. Less than 15% of cases in human are diagnosed and treated (Kristjanson et al., 1999; Kamuanga, 2003; There is an urgent needs to start reporting to prepare effectively for control, eradication and the assessment of the socioeconomic importance and the costs of the various methods used.

Keywords. African, animal, trypanosomiasis, reporting, farmer

AFRICAN ANIMAL TRYPANOSOMOSIS (TAA) IN THE KADIOLO CIRCLE: RESULTS OF THE APPLICATION OF A PROPHYLAXIS PROTOCOL ON BEEFS OF LABOR

*Modibo Diarra², Zakaria Bocoum¹, Boucader DIARRA², Youssouf Sanogo²,
Hamidou M Maiga³, Mahamadou. S.M.Sylla², Ahamadou Haidara²*

¹Laboratoire Central Vétérinaire (LCV)

*²Cellule de Coordination de la Lutte contre les Mouches tsétsé et les
Trypanosomoses animales, (CCLMT)*

*³Université des Sciences des Techniques et des Technologies de Bamako,
(USTT-B)*

**Auteur Correspondant: Dr Modibo DIARRA*

Tél : 00 (223) 75315540/ 69717988

E-mail : modibodiarra76@gmail.com/ modibododo@yahoo.fr

SUMMARY:

At the end of the 2000s, significant mortalities were reported in the Kadiolo circle following an explosion of TAA. The application of the prophylactic treatment protocol elaborated and validated by the Central Veterinary Laboratory (LCV) in 1997, with the oxen plowing was intended a spatiotemporal appreciation of the effectiveness of the device.

In August 2010, a mass treatment with Diminazene was carried out on a sample of 484 oxen, of different sexes and ages, followed two weeks after treatment with Isometamidium. The internal deworming was carried out in early and late rainy season in 10 villages in the circle, with oral liquid albendazole.

The results showed an infection rate of 13.84% at the start of the program and 10.22% 15 days after the diminazene treatment. Four (4) weeks after the alternating treatments with Diminazene and Isometamidium, 6 cases of suspicion of double resistance were observed.

Diarra. B in 2001, he did not say that “trypanocidal treatments are increasingly ineffective because of the resistance of trypanosomes to drugs.”

Authié.E in 1984 and Claussen et al in 1992; showed evidence of drug resistance in Orodara, Burkina Faso, on the border with Mali.

In-depth studies will confirm suspicions of trypanocidal resistance and whether they occur beyond Kadiolo. This knowledge will make it possible to develop strategies more adapted to the bioecological context of the study environment.

Key words: Trypanosomosis, Oxen of plowing, Chimio prevention, Kadiolo.

THE IMPLICATIONS OF AFRICAN ANIMAL TRYPANOSOMIASIS IN THE LIVESTOCK SECTORS IN NIGERIA.

Michael Adedotun Oke

*Michael Adedotun Oke Foundation, Plot 232 Kaida Road Old Kuntunku
Gwagwalada, P. O. Box 11611, Garki Abuja, Nigeria. maof2020@gmail.com
+23408027142077*

The African Animal Trypanosomiasis, a debilitating disease of man and domestic animals. It is caused by haemoflagellate of the genus: trypanosome, family: trypanosomatidae transmitted by tsetse flies (*Glossina* sp) (WHO, 1998).

From the study, the literature, newspapers, academics Journals, we find out. The direct consequences, represented by the economic losses due to the disease and to the various expenditures incurred in controlling it. They comprise: mortality; disease, which manifests itself in emaciation, retarded growth, abortion, temporary sterility and various organic lesions; the cost of detection, treatment of infected animals (veterinary service personnel, trypanocidal drugs, equipment, operating expenses).

Indirect affect: human health, as the shortage of meat and milk causes protein deficiencies which are particularly harmful to children; reduces agricultural output; livestock production: (i) Limits the possibilities of introducing improved breeds, which are highly sensitive to this disease, thus preventing the upgrading of local livestock by crossing with imported sires; (ii) the presence causes livestock to be concentrated in limited grazing areas, which results in their overuse and deterioration; prevent some pastures from being grazed throughout the year and compel herdsmen to practice transhumances. We suggested that there must be a regular dissemination, extension services targeted the livestock farmers of the best technology too use in eradication and providing veterinary service.

Keywords: African, trypanosomiasis, livestock, implications, Nigeria.

NEW INSIGHT INTO RBC MEMBRANE AND TRYPANOSOME INFECTION

Olanrewaju Roland Akinseye, Adelabu Mustapha, Otunla Moses
Nigerian Institute for Trypanosomiasis (& Onchocerciasis) Research
Email: akinseyeroland@gmail.com*

ABSTRACT

Natural herbs and several synthetic drugs had been used to treat trypanosomiasis and are usually directed to kill the trypanosome. However, RBCs membranes that is the first infection site for trypanosome remains defenseless to the invasion. Hence, there is need to protect the membrane against the invasion to limit the gravity of first acute parasitaemia before immune system is ready to defend the body against the parasites.

Keywords: RBCs, Membrane, Trypanosomiasis, Parasitaemia, Immune system

GLOSSINA BIOLOGY, CONTROL AND ERADICATION

NOVEL ODOR BLEND WITH ENHANCED ATTRACTION OF SAVANNAH TSETSE FLIES

Benson M. Wachira¹, Joy M. Kabaka², Paul O. Mireji^{3,4,5*}, Sylvance Okoth³, Margaret M. Ng'ang'a I, Robert Changasi³, Patrick Obore³, Charles Ochieng'⁶, Grace A. Murilla³, Pierro Ngugi², Ahmed Hassanali I

¹Department of Chemistry, School of Pure and Applied Sciences, Kenyatta University, P.O. Box 43844-00100, Nairobi, Kenya. ²Department of Biochemistry and Biotechnology, School of Pure and Applied Sciences, Kenyatta University, P.O. Box 43844-00100, Nairobi, Kenya. ³Biotechnology Research Institute - Kenya Agricultural and Livestock Research Organization, P.O. Box 362-00902, Kikuyu, Kenya. ⁴Centre for Geographic Medicine Research Coast, Kenya Medical Research Institute, P.O. Box 428, Kilifi, Kenya. ⁵Division of Epidemiology of Microbial Diseases, Yale School of Public Health, New Haven, Connecticut, United States of America. ⁶Shimba Hills National Reserve, Kenya Wildlife Service, P. O. Box 167, Kwale, Kenya.

ABSTRACT

A previous set of studies on the responses of savannah tsetse (*Glossina morsitans morsitans* and *Glossina pallidipes*) to waterbuck (*Kobus defassa*) odour- showed that the repellence of the tsetse-refractory bovid, was due to a combination of different compounds, including \square -octalactone, geranyl acetone, phenols (guaiacol and carvacrol), and blends of straight chained carboxylic acids and 2-alkanones. However, in subtractive assays with blends of the acid and ketone homologues, octanoic and nonanoic acids, and 2-nonanone were attractive to the tsetse flies, unlike the other homologues, which showed repellence to the flies. Structure-activity study with \square -octalactone analogues, \square -nonalactone was attractive to the tsetse, showing that subtle structural changes of some olfactory signals can significantly change behavioural responses of the flies. In present study, we first explored possible synergistic or additive effects of blends of \square -nonalactone, nonanoic acid and 2-nonanone in different proportions on *G. pallidipes* and *G. m. morsitans* in a two-choice wind tunnel. All blends significantly more attractive than fermented cattle urine. Blend of \square -nonalactone, nonanoic acid and 2-nonanone gave the highest attraction to both tsetse species. Follow up field study on *G.*

pallidipes populations in randomized Latin Square Design experiments confirmed synergism between the three compounds, showing 235 % higher attraction than a combination of acetone and phenolic blend of fermented cattle urine with additional 3-n-propylphenol (POCA). The results show clear possibility of significantly enhancing the attraction and level of control of savannah tsetse flies to traps or insecticide-treated targets.

Key words: Savannah tsetse flies, *Glossina pallidipes*, *Glossina morsitans morsitans*,

CONTROL OF TSETSE AND TRYPANOSOMIASIS USING NOVEL TSETSE ATTRACTANTS AND REPELLENT IN KWALE COUNTY, KENYA

Daniel Gamba^{1}, Benson M. Wachira², Imna Malele³, Johnson O. Ouma⁴,
Richard Echodu⁵, Sylvance Okoth², Ahmed Hassanali², Moses Cheruyot¹,
Pamela Olet¹, Raymond Mdachi², Joanna Auma², Paul O. Mireji²*

¹*Kenya Tsetse and Trypanosomiasis Eradication Council (KENTTEC) P.O. Box
66290-00800 Westlands, Nairobi, Kenya.*

¹*Department of Chemistry, School of Pure and Applied Sciences, Kenyatta
University, P.O. Box 43844-00100, Nairobi, Kenya.*

²*Biotechnology Research Institute - Kenya Agricultural and Livestock Research
Organization, P.O. Box 362-00902, Kikuyu, Kenya.*

³*Vector and Vector Borne Disease Institute (VVBD), Tanzania Veterinary
Laboratory Agency (TVLA), P.O. Box 1026, Tanga, Tanzania,*

⁴*Vector Health International (VHI), Arusha, Tanzania*

⁵*Gulu University, P. O. Box ,Gulu, Uganda.*

ABSTRACT

Eastern Africa continues to be under continuous risk of rhodesiense HAT due to presence of the parasites in wild game reservoirs. Attractant baited traps/targets and repellent blends constitutes a cornerstone in disease suppression and eradication efforts. However, efficacy of the traps/targets is dependent on potency of olfactory odor cues used to lure the flies to traps/targets and their field competitive attraction relative to natural vertebrate hosts. Likewise, repellent blends must effectively counter natural attraction of tsetse to their hosts. Previously formulated Waterbuck Derived Repellent (WDR) blend reduced fly catches by 84%. Subtle structural changes in these molecules established a 1) Novel Repellent Blend (NRB) with higher repellence (95%) to *G. pallidipes* (Gpd) and *G. m. morsitans* (Gmm) than WDR, and 2) Novel Attractant Blend (NAB) (patent filed-KIPI/ARIPO) about five folds more attractive to Gpd in the field than POCA blend routinely used in traps and targets for tsetse control, hence can rapidly suppress Gpd populations with five-folds reduction in operational costs. More potent 'pull' may provide more competitive diversion of the flies from cattle and incrementally reduce incidences of infective bites. We will present the performance of these attractants and repellent in area-wide control of tsetse flies and trypanosomiasis in Kwale County in Kenya.

4.03

FIELD EVALUATION OF WATERBUCK REPELLENT COMPOUNDS AGAINST GLOSSINA MORSITANS MORSITANS AT STATIONARY AND MOBILE SAMPLING TOOLS IN ZAMBIA

Njelembo J. Mbewe^{1,2}; Micheal N. Okal¹; Kalinga Chilongo²; Jackson Muyobela²; Milner Mukumbwali² and Daniel K. Masiga¹*

**Corresponding author email: njelembombewe@yahoo.com*

¹International Centre of Insect Physiology and Ecology, P. O. Box 30772-00100, Nairobi, Kenya

²Tsetse and Trypanosomiasis Control Unit, Department of Veterinary Services, P.O. Box 350001, Chilanga, Zambia.

The waterbuck repellent compounds (WRC) comprising of a blend of pentanoic acid, guaiacol, γ -octalactone and geranylacetone have been shown to repel *Glossina morsitans morsitans* in laboratory experiments. However, field studies that report the repellency of WRC against *G. m. morsitans* are lacking. Therefore in this study, the repellency of the WRC against *G. m. morsitans* at stationary and mobile sampling tools was evaluated. We undertook a series of randomised block field experiments with adjacent days at a site considered as a block in Rufunsa (Lwanshimba area) District of Zambia. The stationary and mobile sampling tools were the Epsilon traps and black screen fly rounds (BFRs) baited with octenol and methyl ethyl ketone as attractants were used as fly collecting tools. Sampling tools with WRC dispensed at different release rates as treatments were randomly allocated to days in a block. Negative binomial regression was used to compare the treatments. In Epsilon traps, WRC released at approximately 1 mg/h, 2 mg/h and 4 mg/h reduced catches of *G. m. morsitans* by 36%, 35% and 25% respectively. From BFRs, WRC released from approximately 1 mg/h, 2 mg/h and 3 mg/h reduced significantly ($P < 0.01$) catches of *G. m. morsitans* by 28%, 17% and 19% respectively. At both sampling tools, the repellency was more pronounced for females than males regardless of the release rates. In conclusion, WRC reduced catches of *G. m. morsitans* caught at both stationary and mobile sampling tools. Therefore we recommend for further studies to evaluate its effectiveness to control AAT.

BIOACTIVITY OF THREE AROMATIC PLANTS' ESSENTIAL OIL: REPELLENT, ANTI-FEEDANT AND TSETSE-CIDAL PROPERTIES.

Emmanuel, R.T.^{1*}, Ogar, M.U.², Omolade, L.O.¹, Odeyemi, S.O.¹, Omotosho, K.¹, Idowu, F.M.², Benjamin, J.E.², Anchau, R.G.², Olanrewaju, T.O.¹, Jonah, A.², K. Ibrahim³

¹Human African Trypanosomiasis Research Department,

²Vector and Parasitological Studies Research Department, Nigerian Institute for Trypanosomiasis and Onchocerciasis Research, Kaduna, Nigeria.

³Pharmacognosy Laboratory, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Nigeria

*Corresponding author: topazz4rolly@gmail.com

ABSTRACT

Application of repellents has been the most reliable way of avoiding bite by haematophagous arthropod vectors. Essential oils from plethora of aromatic plants have proven to be effective in control of arthropod vectors of medical importance. Tsetse-human contact is a vital component of transmission of human African trypanosomiasis (HAT) and control strategies crucial to eradication of this disease. Essential oil obtained from fresh leaves of *Hyptis suaveolensis* (L.) Poit, *Rosmarinus officinalis* Linn. and *Cymbopogon winterianus* Jowitt through Clevenger's apparatus extraction, were reconstituted in Isopropyl Alcohol and tested for repellency property on arm exposed to laboratory-reared teneral and non-teneral *Glossina palpalis palpalis* and *Glossina morsitans submorsitans* at 10 %, 50 % and 100 % concentrations. All test concentrations of essential oils exhibited repellent activity throughout the thirty minutes test duration except 10 % concentration of *Cymbopogon winterianus* oil with five minutes protection time against female non-teneral *Glossina morsitans submorsitans*. Results from this study shows that there is no correlation between tsetse sex, age and species of tsetse and the protection time. However, the essential oils did not demonstrate tsetse-cidal property. These findings provide the facts that these aromatic plants could be a potential source of tsetse fly repellents.

Keywords: Repellents, tsetse, essential oil.

4.05

INNOVATIVE TOOLS IN THE CONTROL OF PALPALIS GROUP TSETSE: PLASTIC SCREENS

Salou E^{*ab}, Rayaisse JB^a, Gimonneau GC^a, Jacquet P^d, Solano P^c et Desquesnes M^e

^aUnité Maladies à Vecteurs et Biodiversité (UMaVeb), Centre International de Recherche – Développement sur l'Élevage en zone Subhumide (CIRDES), 01 BP 454 Bobo-Dioulasso 01, Burkina Faso.

^bDépartement de Sciences biologiques, UFR-ST, Université Nazi Boni (UNB), 01 BP 1091 Bobo-Dioulasso 01, Burkina Faso

^cUMR 177 IRD-CIRAD INTERTRYP, Institut de Recherche pour le Développement, UMR 177 IRD-CIRAD INTERTRYP, Montpellier, France.

^dEcole Nationale Vétérinaire de Toulouse (ENVT), 23 chemin des capelles 31076 Toulouse, France

^eInterTryp, Univ Montpellier, CIRAD, IRD, F-34398 Montpellier, France

Sleeping sickness and African animal trypanosomoses constitute a public health problem and a hindrance to the economic development of the sub-Saharan countries. The fight against these parasites is centred around vector control actions of tsetse flies that are the main vectors. However, the available vector control tools for large scale application are often expensive. This study aims to evaluate the duration of the residual effect of insecticides and the attractiveness of new plastic screens whose production cost is more affordable than the tools currently available. Three prototypes of insecticide-impregnated plastic screens were exposed for 12 months in the field to the effects of sun and rain. They were subsequently tested by tarsal contact bioassays of teneral day-old *Glossina palpalis gambiensis* every two months. The KD rate was estimated at 1 hour and the mortality rate at 24 hours. Fieldwork consisted of comparing the performance of different screen models by brightness (plastic versus fabric), shape (vertical and horizontal), colour and size using the Latin square protocol. The evaluation of screens exposed to natural conditions highlighted a KD and near 100% mortality for 9 months with a drop in efficiency at 12 months. In the field, all plastic screens (except the white screen) had the same performance as the reference screen (75cm*50cm black/blue/black) for *G. p. gambiensis* and *G. tachinoides*. The blue screen (75cm*50cm) that captures between

1.05 and 1.20 times more tsetse than the reference screen, could be recommended for control operations.

Key words: vector control, plastic screens, tsetse, Burkina Faso, innovation

THE MULTITARGETS METHOD (MTM): A PROOF OF CONCEPT FOR THE CONTROL OF BITING FLIES AS VECTORS, USING INNOVATIVE TOXIC SCREENS

Desquesnes M^{1,2,3*}, Bouhsira E⁴, Chalermwong P³, Drosne L^{1,2,3}, Duvallat G⁵, Franc M⁴, Gimonneau G^{2,6}, Grimaud Y⁷, Guillet P⁸, Himeidan Y⁹, Jacquet P⁴, Jittapalapong S¹⁰, Karanja W⁹, Liénard E⁴, Onju S¹¹, Ouma J⁹, Rayaisse J-B⁶, Masméatathip R¹¹, Shah V⁸, Shukri S⁴, Thaisungnoen K³, Thevenon S², Salou E⁶

¹CIRAD, UMR InterTryp, Bangkok, Thailand ; ²InterTryp, Univ Montpellier, CIRAD, IRD, F-34398 Montpellier, France; ³Faculty of Veterinary Medicine, Kasetsart University, 10900 Bangkok, Thailand ; ⁴Ecole Nationale Vétérinaire de Toulouse (ENVT), 23 chemin des capelles 31076 Toulouse, France ; ⁵Université Paul Valéry Montpellier 3, CEFE, Montpellier, France ; ⁶CIRDES, 01 BP 454, Bobo-Dioulasso, Burkina Faso; ⁷GDS Réunion, 1 rue du Père Hauck, 97418 La plaine des Cafres, La Réunion, France ; ⁸AtoZ Textile mills l.t.d., P.O. Box 945, Arusha, Tanzania ; ⁹Africa Technical Research Centre (ATRC), P.O. Box 15500, Arusha, Tanzania ; ¹⁰Faculty of Veterinary Technology, Kasetsart University, 10900 Bangkok, Thailand ; ¹¹Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, 73140 Nakhon Pathom, Thailand.

* Corresponding author: Ernest Salou, CIRDES, BP 454 01 Bobo-Dioulasso, Burkina Faso <salouernest@gmail.com>

ABSTRACT

Blue fabric toxic-screens were, so far, limited to the control of low prolific larviparous tsetse flies. In a consortium of research institutes and a private partner (AtoZ, Arusha, Tanzania) named FlyScreen (thanks to the financial support of the French National Research Agency: ANR-15-CE35-00031), we developed a new technology called « multi-layer, multi-functionalized polyethylen films », which allows production of various color patterns insecticide-impregnated screens, avoiding fabric's drawbacks. Indeed, phthalogen-blue cotton fabrics used as attracting toxic screens for tsetse flies have the following drawbacks: the cost of cotton fabrics is high, phthalogen dye is toxic (now forbidden in Europe), the color tuning of fabrics is inconsistent, and, acting as sponges, fabrics retain inside large quantities of insecticides bio-unavailable for flies contact.

This new technology allowed the development of full blue screens at very low cost for tsetse flies control, but also to adapt and develop attracting screens specific to highly prolific hematophagous flies such as *Stomoxys* spp., using white and blue targets. Such white and blue toxic screens were evaluated under the so-called « multi target method » (MTM) for the control of hematophagous flies in cattle.

Preliminary field evaluations carried out in dairy cattle farms in Thailand are highly promising; the use of 18-35 screens per farm brought a significant reduction in fly densities during up to 8 months. The next generation of screens aims at a « one year efficacy » against flies.

This technology is a potential major achievement to reduce pesticides contamination in animal-products and environment; it opens an avenue for tsetse and other hematophagous fly's control.

Keywords: fly control, toxic target, livestock, blue screens, *Stomoxys*, tsetse flies.

4.07

PERFORMANCE OF ODOUR-BAITED INSECTICIDE-TREATED TARGETS MOUNTED ON SMALL TREES IN THE ERADICATION OF TSETSE (GLOSSINA SPECIES) IN ZIMBABWE

Mhindurwa¹ and D.Tsikire¹

*¹Tsetse Control Department, P. O. Box CY 52, Causeway, Harare, Zimbabwe,
E mail: faraimh@yahoo.com, davetsik@gmail.com*

ABSTRACT

Performance of blue-black-blue targets (1.7m x 1.0m) mounted on two small adjacent trees, henceforth termed wooded site, in attracting tsetse was investigated using electrocuting grids with blue-black-blue targets (1.0m x 1.0m) mounted on two small adjacent trees 4.28m tall and the results compared with tsetse catches from an open site. Targets were baited with 3-n-propyl phenol, octen-o-l and 4-methyl phenol in the ratio of 1: 4: 8. The study was conducted in an almost homogenous mopani woodland at Rekomechi Research Station, Zambezi Valley, Zimbabwe. Thirty two samples were collected from four paired sites in 16 days, 3 hours daily (1400-1700 hours) in April and May 2019. De-transformed means for paired wooded and open sites were 3.95 and 4.79 male *G. morsitans*, 5.07 and 6.01 female *G. morsitans*, 3.04 and 3.63 male *G. pallidipes* and 7.45 and 10.37 female *G. pallidipes*, respectively. Performance of targets on wooded sites decreased by 17.54 %, 15.54 %, 16.25 % and 28.16 %, respectively. Variations between paired sites were statistically insignificant except for female *G. pallidipes* ($P < 0.05$). This implies that targets can be mounted between two small trees as supporting frames without compromising its performance, reducing cost of operation and redirecting savings for other rural development projects.

Keywords: Tsetse, targets, metal frames, electrocuting grids, wooded site, open site.

GENETIC DIVERSITY AND PHYLOGENETIC RELATIONSHIPS OF SOME PALPALIS GROUP TSETSE FLY IN CONGO BRAZZAVILLE BASED ON MTDNA COI SEQUENCES

*Abraham Mayoke^{1,4}, Rosemary Bateta⁴, Shadrack S. Muya³, Paul O. Mireji⁴,
Sylvance Okoth⁴, Samuel G. Onyonyo⁴, Joanna E. Auma⁴, Johnson O. Ouma²*

ABSTRACT

Background: Human African Trypanosomiasis (HAT) is transmitted by Tsetse flies (*Glossina*) of the palpalis group in Congo Brazzaville. Despite the morphological characterization established in 50' and 60's, *Glossina fuscipes* species still questionable. Considering the uncertainty of some subspecies in Congo Brazzaville, whereas *Glossina palpalis palpalis* is well identified. The overlap between the two species was reported around Brazzaville, bringing the dynamic of the two species more complex. The taxonomic status and genetic diversity *Glossina palpalis palpalis* and *Glossina fuscipes fuscipes* has not been established using molecular tools. Mitochondrial DNA (mtDNA), COI is used in discriminating closely related tsetse flies species from palpalis group. This work aim to establish the taxonomic status and the phylogenetic relationship between the two taxonomic species of palpalis group (*Glossina palpalis* and *Glossina fuscipes*). Thereafter evaluate the Genetic diversity of the ambiguous *Glossina fuscipes* subpopulations in Congo Brazzaville.

Methods: Tsetse samples were collected using biconical traps, in Bomassa (BMSA), Bouemba (BEMB), and Talangai- (TLG) in Ngabe corridor and in Bokosongo for palpalis palpalis, from June to August 2017. A total of 384 samples were collected using biconical traps without attractants were considered. To discriminate amongst the two closely related tsetse, the mitochondrial DNA was used, the cytochrome Oxidase subunit I (COI) gene was amplified using COIF1/COIIR1 (570pb) and C-I-J2195/CULR (850bp) species specific sets of primers targeting respectively *Glossina fuscipes fuscipes* and *Glossina palpalis palpalis*. Sequencing data were analyzed in DNsp to access genetic diversity over the 3populations. Mismatch distribution based on haplotypes observed and expected frequencies was accessed for population demographic history and population differentiation were implemented on DNAsp and Arlequin.

Results: We amplified two fragments COI gene of 570 and 850 bp for *G. f. fuscipes* and *Glossina p. palpalis* respectively and confirmed by direct sequencing. The general BLAST analysis yield 99% similarity for *Glossina fuscipes fuscipes* and *Glossina palpalis palpalis*. The higher similarity between individuals per species and also, *G.f. fuscipes* different but similar to *G. p. palpalis*. The populations show higher genetic diversity ($H=46$, $Hd=0.884$) and moderate nucleotide diversity (0.01173). We observed little maternal gene flow between regions TLG and BMSA ($Gst=0.08823$) and moderate differentiation between BEMB and TLG and BMSA ($Gst=0.11415$ and 0.15536) and the mismatch analysis showed population demographic expansion in the 3 localities. P-distance observed (0.07221) between BEMB and TLG, (0.15148) between BEMB and BMSA and (0.04793) between TLG and BMSA and are all significant ($p<0.05$). Fst shows high and significant variation within populations and among groups and among populations within populations, respectively 89.73% and 7.93% and 2.35% of the total variance.

Conclusions: The *Glossina* from *palpalis* group (*Glossina fuscipes fuscipes* and *Glossina palpalis palpalis*) species have been amplified, confirming the existence the two species in Congo Brazzaville. The expanding *Glossina* populations in Congo must be a whistle signal that further recrudescence of the disease. Genetic indicator obtained are baseline for further research and initiating national disease control in the country.

Keywords: *Glossina palpalis* group, Genetic diversity, phylogeny, Taxonomy, COI, mtDNA, Congo Brazzaville

PHYLOGEOGRAPHY AND POPULATION STRUCTURE OF THE TSETSE FLY *Glossina pallidipes* IN KENYA AND THE SERENGETI ECOSYSTEM

Bateta R¹†*, Saarman NP²†, Okeyo WA^{1,3}, Dion K², Mireji PO^{1,5}, Okoth S¹, Malele I⁶, Murilla G¹, Aksoy S⁴ and Caccone A²

¹Biotechnology Research Institute, Kenya Agricultural and Livestock Research Organization, Kikuyu, Nairobi, Kenya

²Department of Ecology & Evolutionary Biology, Yale University, CT, USA

³Department of Biomedical Sciences and Technology, School of Public Health and Community Development, Maseno University, Maseno, Kisumu, Kenya

⁴Yale School of Public Health, Yale University, CT, USA

⁵Centre for Geographic Medicine Research Coast, Kenya Medical Research Institute, Kilifi, Kenya.

⁶Vector and Vector Borne Disease Institute, Tanga, Tanzania

ABSTRACT

Glossina pallidipes is the main vector of animal African trypanosomiasis and a potential vector of human African trypanosomiasis in eastern Africa. Vector control efforts have succeeded in reducing infection rates, but recent resurgence in tsetse fly densities raises concerns that vector control programs require improved strategic planning over larger geographic and temporal scales. Knowledge of population structure and dispersal patterns can provide the required information to improve planning. We investigated the phylogeography and population structure of *G. pallidipes* over a large spatial scale in Kenya and northern Tanzania using 11 microsatellite loci genotyped in 600 samples. Our results indicate distinct genetic clusters east and west of the Great Rift Valley, and divergence in the west between the northwest and the Serengeti ecosystem in the southwest. Estimates of genetic differentiation and first-generation migration indicated high genetic connectivity within genetic clusters even across large geographic distances of more than 300 km in the east, but only occasional migration among clusters. Patterns of connectivity imply a major role for river basins in facilitating gene flow in *G. pallidipes*, and confirm isolation by distance among genetic clusters but not within clusters. Estimates of N_e and results from Approximate Bayesian Computation further support that there has been recent *G. pallidipes* population reductions in the Serengeti ecosystem and the

northwest during the last century, but also suggest that the full extent of differences in genetic diversity and population dynamics between the east and the western clusters was established over evolutionary time periods (estimated at ~13 million years). Findings suggest the need to treat eastern Kenya, the Serengeti ecosystem, and northwestern Kenya as independent management units, and to specifically monitor to detect migration events across the geographic boundaries that demarcate genetic clusters to allow rapid and targeted responses to reinvasion after local eradication.

Key words: *Glossina pallidipes*, Trypanosomiasis, phylogeography, population structure

**ENTOMOLOGICAL BASELINE SURVEY FOR A
FEASIBILITY STUDY ON DRONE RELEASED STERILE
TSETSE (DIPTERA: GLOSSINIDAE) IN THE ZAMBEZI
VALLEY, ZIMBABWE**

W Shereni¹, D.Tsikire¹, L Nyakupinda¹, R.A. Herrero²

*¹Division of Tsetse Control Services, Department of Veterinary Services,
Zimbabwe*

*²International Atomic Energy Agency Vienna International Centre, PO Box 100,
1400 Vienna, Austria*

*Email: shereni 2005@yahoo.com , davetsik@gmail.com, nyakupinda@gmail.
com , R.Argiles-Herrero@iaea.org*

ABSTRACT

Between February and April 2019 tsetse (*Glossina* spp) surveys using 32 epsilon traps were undertaken in the Zambezi Valley, Zimbabwe to determine fly apparent densities and natural abortions in wild tsetse populations. Two square blocks of approximately 9km² were identified, to be used as a trial block for release of sterile males and a control block. Trap deployment patterns and densities were identical for both blocks and each block contained 16 traps. Traps were deployed at 1 trap/km² in all grids in the block except for the centre grid where the deployment was at 4traps/km². Collection of traps was conducted simultaneously for both blocks. Fly apparent densities were 0.416 and 4.660 for female *Glossina morsitans morsitans* and *G. pallidipes* respectively, in centre trial block grid. In comparison with the control block, apparent densities for the centre block were lower being 0.146 and 2.285 for female *G. m. morsitans* and *G. pallidipes* respectively. Natural abortion rates detected in the trial block were 2.11% (3/142) for *G. pallidipes* and nil from 14 *G. m. morsitans*. For control block, abortion rates were 1.24% (2/161) for *G. pallidipes* and none from 1 *G. m. morsitans*. Tsetse apparent densities for *G. pallidipes* is exceeding standard guide of at least 1 fly/trap/day required before release of sterile males. Natural abortion rates were within expected ranges of 0.3-2.8% in *G. pallidipes*.

Keywords: *Glossina*, fly apparent densities, natural abortion rates, trial and control blocks, drones, Zimbabwe

4.11

Winnie A. Okeyo^{1,2,3}, Norah P. Saarman⁴, Rosemary Bateta², Kirstin Dion⁴, Michael Mengual⁴, Paul O. Mireji^{2,3,5}, Collins Ouma¹, Sylvance Okoth², Grace Murilla^{2,3}, Serap Aksoy³ and Adalgisa Caccone^{4,3}

¹Department of Biomedical Sciences and Technology, School of Public Health and Community Development, Maseno University, Maseno, Kisumu, Kenya

²Biotechnology Research Institute, Kenya Agricultural and Livestock Research Organization, Kikuyu, Nairobi, Kenya

³Yale School of Public Health, Yale University, CT, USA

⁴Department of Ecology & Evolutionary Biology, Yale University, CT, USA

⁵Center for Geographic Medicine Research Coast, Kenya Medical Research Institute, Kilifi, Kenya.

Abstract

The tsetse fly *Glossina pallidipes*, the major vector of the parasite that causes animal African Trypanosomiasis in Kenya, has been subject to intense control measures with only limited success. The *G. pallidipes* population dynamics and dispersal patterns that underlie limited success in vector control campaigns remains unsolved, and knowledge on genetic connectivity can provide insights, and thereby improve control and monitoring efforts. We therefore investigated the population structure and estimated the migration and demographic parameters in *G. pallidipes* using genotypic data from 11 microsatellite loci scored in 250 tsetse flies collected from eight localities in Kenya. Clustering analysis identified two genetically distinct eastern and western clusters (mean between-cluster $F_{ST}=0.202$) separated by the Great Rift Valley (Fig. 1). We also found evidence of admixture and migration between the eastern and western clusters, isolation by distance, and a widespread signal of inbreeding. We detected differences in population dynamics and dispersal patterns between the western and eastern clusters. These included lower genetic diversity (allelic richness; 7.48 versus 10.99), higher relatedness (percent related individuals; 21.4% versus 9.1%), and greater genetic differentiation (mean within-cluster F_{ST} ; 0.183 versus 0.018) in the western than the eastern cluster. Findings are consistent with the presence of smaller, less well-connected populations in Western relative to eastern Kenya. These data suggest that recent anthropogenic influences such as land use changes and vector control programs have influenced population dynamics in *G. pallidipes* in Kenya, and that vector control efforts should include some region-specific strategies to effectively control this disease vector.

COMPETITIVENESS AND SURVIVAL OF TWO STRAINS OF GLOSSINA PALPALIS GAMBIENSIS IN AN URBAN AREA OF SENEGAL

Mireille Djimangali Bassène^{1*}, Momar Talla Seck¹, Soumaila Pagabeleguem^{1,2},
Assane Gueye Fall¹, Baba Sall³, Marc J. B. Vreysen⁴, Geoffrey Gimonneau^{5,6},
Jérémy Bouyer^{4,5,6}

¹Institut Sénégalais de Recherches Agricoles, Laboratoire National d'Élevage et de Recherches Vétérinaires, Dakar-Hann, Sénégal (ISRA/LNERV), ²Pan-African Tsetse and Trypanosomosis Eradication Campaign (PATTEC), Bobo-Dioulasso, Burkina Faso, ³Ministère de l'Élevage et des Productions animales, Direction des Services Vétérinaires, Dakar, Sénégal, ⁴Insect Pest Control Laboratory, Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture, Vienna, Austria, ⁵Unité Mixte de Recherche Interactions hôtes-vecteurs-parasites-environnement dans les maladies tropicales négligées dues aux trypanosomatides, Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Montpellier, France, ⁶Unité Mixte de Recherche 'Animal, Santé, Territoires, Risques et Ecosystèmes', Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), Montpellier, France
Email: bassenerose@yahoo.fr

In the west area of Senegal called Niayes area, only one tsetse specie, *Glossina palpalis gambiensis* Vanderplank (Diptera: Glossinidae) exists. The government set up a vast program including the sterile insect technique (SIT) to fight against this specie. The mass reared of *G. p. gambiensis* strain from Burkina Faso (BKF strain) which was sexually competitive and compatible with the Senegalese population, was used. However, studies conducted, in four localities (Pout, Sébikotane, Diacksao Peul and the Parc de Hann) in Senegal in 2011, showed that the BKF strain appears not to survive well in the ecosystem of Parc de Hann. Therefore, a strain of *G. p. gambiensis* from the Pout area in Senegal (SEN strain) was sent to the insectarium of the Slovak Academy of Sciences (SAS) for amplification in order to be used for release test in the park. We compare the competitiveness and survival of the two strains of tsetse flies (BKF and SEN), in the Parc de Hann. Comparing the two strains, SEN colony appears to be more resilient than BKF in the park with a daily mortality rate lower for SEN, 0.08 (SD 0.08), than BKF, 0.14 (SD

0.08) (p-value = 0.05). However, the competitiveness of the SEN males was lower (0.14) (SD 0.10)) as compared with that of the BKF males (0.76 (SD 0.11)) (P-value < 10⁻³). Based on these results, it can be concluded that the BKF strain will remain the main strain to be used in the elimination program in the Parc de Hann.

Keywords: Niayes area, *Glossina palpalis gambiensis*, sterile insect technique (SIT), BKF strain, SEN strain, competitiveness, survival

RECOVERY RATES OF G. M. MORSITANS FOLLOWING A LOCALIZED CONTROL OPERATION IN NORTH EASTERN ZIMBABWE: IS CLIMATE CHANGE INFLUENCING RECOVERY?

Mr TNC Mangwiro^{1}, Mr W. Shereni², Mr O.N. Nyirenda², Mr L Mubvuta²,*

¹Bindura University of science Education, Box 1 020 Bindura Zimbabwe

²Tsetse Control Division, Box CY 52 Causeway Harare

**Email mangwiroclement@gmail.com / cmangwio@buse.ac.zw*

ABSTRACT

In this paper we look at the effects of a recent tsetse control operation carried out to suppress a new HAT focus in North Western Zimbabwe. Odour baited insecticide treated targets were deployed in a one-off operation near a settlement suspected to be the source of infection. A grid system of target deployment was used to achieve a target density of 4 per km². All targets were georeferenced using a Global Positioning system (GPS). Using stationary odour baited Epsilon traps we monitored the mean daily catches (flies/trap/day) for 20 days each month before and after deployment of the targets. We continued to monitor the apparent catches (flies per trap per day) after the effective life of the targets. We estimated the population dynamics and the effects on species composition and sex of the deployed targets. We look at the population recovery rates and compare them with other previous control activities where recovery was reported. We report that one species, *G. m. morsitans* is abundant. More than 90% reduction in the fly population is reported and for some period no tsetse are caught. However, we also report a rapid increase in catches following the estimated expiry of the pesticide on the targets. We postulate that the recovery of *G. m. morsitans* following this particular operation was more pronounced than in previous similar operations. We look at factors that may explain the higher recovery rate within the study site and how this may have a bearing on future HAT cases.

4.14

HOST LOCATION AND INTRA-POPULATION FLY SIZE VARIATION IN MALE GLOSSINA MORSITANS MORSITANS CAUGHT USING STATIONARY BAITS

Njelembo J. Mbewe^{1,2*}; Micheal N. Oka²; Kalinga Chilongo¹; Jackson Muyobela¹; Milner Mukumbwali¹ and Daniel K. Masiga²

¹Tsetse and Trypanosomiasis Control Unit, Department of Veterinary Services, P.O. Box 350001, Chilanga, Zambia.

²International Centre of Insect Physiology and Ecology, P. O. Box 30772-00100, Nairobi, Kenya.

*Corresponding author email: njelembombewe@yahoo.com

ABSTRACT

In this study we compared tsetse fly catches of *Glossina morsitans centralis* and *G. m. morsitans* from five stationary baits and further assessed differences in fly size of male *G. m. morsitans* in Zambia. We carried out randomised block design experiments with a nested survey. Negative binomial model was used to compare tsetse catches from Epsilon, H, Ngu and Nzi traps to the sticky blue/black target. The fly size of male *G. m. morsitans* estimated from the wing centroid size (CS) obtained from flies caught was regressed against stationary baits and wing fray category as a proxy of the fly age. The wing shape for the different taxa was compared using geometric morphometric analyses. There was no significant difference in the overall catch among the stationary baits for *G. m. morsitans*. However, the Ngu trap caught 60% less *G. m. centralis* than the reference Epsilon trap. Only male *G. m. morsitans* were considered for analysis of bait effect on fly size because they had an adequate sample size for each stationary device and the proxy for age. Flies caught in the H and Nzi traps and the blue panel of the sticky target were significantly larger ($P < 0.05$) than those caught in the Epsilon trap. This suggests that intra-species fly size variation could play a role in host location. Therefore we recommend for further investigation on the effect of intra-species fly size on dispersal capacities as it may guide refinement of existing vector control method using stationary baits.

4.15

IDENTIFICATION OF TRYPANOSOME SPECIES BY NESTED PCR FROM KUBACHA FOREST USING GENERIC AND SPECIES SPECIFIC PRIMERS.

Attahir. A¹, Rukayya. G¹, Friday. I¹, Abdulraheem. S¹, Ibrahim. I¹, Alice J¹, Jabiru, Isadu, H¹, G. Musa H. D² and Machina, I. B³

¹Department of Vector and Parasitology NITR Kaduna

²Department of Information Management NITR Kaduna

³Department of Molecular Biology NITR Kaduna

Corresponding Author: ahkyauta@gmail.com

Trypanosoma brucei (*T. brucei*) specie is the causative agent of Human African Trypanosomiasis (HAT) which is classically divided into three subspecies. In west and central Africa, *T. brucei rhodesiense* is responsible for the debilitating form of the chronic form the diseases. The African Animals Trypanosomiasis (AAT) is cause by other species of Trypanosomes which include *Trypanosoma brucei*, *Trypanosoma congolense*, *Trypanosoma vivax* and *Trypanosoma evansi* that causes surra in camels.

The Objective of this study is to determine the infection rate of trypanosome in *Glossina morsitans* species which is the only tsetse fly species in Kubacha Forest, *Glossina* species were trapped using biconical traps. A total of 217 flies were trapped in April 2018 among which 78(36%) were males non-teneral with an apparent density of 3.25 flies/trap/day, while 138 (64%) were female non-teneral, with an apparent density of 5.79 flies/trap/day. DNA was extracted from the whole fly using AccuPrep® Genomic DNA Extraction Kit following the manufacturers instructions, the extracted DNA was subjected to Nested PCR assay using the ITS primer, trypanosomes were identified based on the expected band size of the amplicon.

The result shows the high rate of trypanosome prevalence in female with 58(41%) than male 21(27%), indicating a significant difference of ($p < 0.05$) in the trypanosome infection rate among male and female *Glossina morsitans* in Kubacha Forest. Furthermore, the finding revealed infection with *T. vivax* is found to be more prevalent among Female flies 40(69.0%) while the male flies has 12 (57.1%), *T. simiae* was not seen in male *Glossina*

spp in the study area. The apparent densities of male and female flies found in the study area were strongly connected with the infection rate ($r=0.95\%$). This study confirmed that tsetse flies plays a significant role in maintaining the trypanosome parasite and the host factor which are important in the epidemiology of African trypanosomiasis, therefore the need to design a control strategy targeting at the biological vector is very important.

This is corresponding place that have element of plagiarism

https://osteopathic.nova.edu/postgrad-edu/forms/case_presentation_policies.pdf

<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0212226>

Siddall, Mark, et al. "Ideating IDNA: Lessons and Limitations from Leeches in Legacy Collections." *PLoS One*, vol. 14, no. 2, Public Library of Science, Feb. 2019, p. e0212226.

4.16

INTEGRATED TSETSE AND TRYPANOSOMIASIS CONTROL IN AGRO-PASTORAL COMMUNITY OF PATE ISLAND LAMU COUNTY: A CASE STUDY 2009-2018

** Gamba D. O, Cheruyoit M I, Olet, P.A.,
Kenya Tsetse And Trypanosomiasis Eradication Council
Box 66290 00800 Nairobi*

** Corresponding author ochienggamba@gmail.com*

Longitudinal studies were undertaken to establish the effect integrated vector and disease control on tsetse population's density and trypanosomiasis incidence in Pate Island from 2009 to 2018. Integrated Tsetse and trypanosomiasis control was initiated in 2009 and 1200 Insecticide impregnated targets set. Cattle were sprayed with insecticide and treated with diaminazene aceturate. Tsetse flies were sampled quarterly (2009-2018) using H trap trap and biconical traps. Cattle were sampled and trypanosomes were detected using Standard Trypanosome Detection Methods (STDM).

The results indicate consistently reduction in the tsetse populations from the 2009 FTD 1.928 to 0 in Mtangawanda, 0.375 to 0 in Pate, 0.035714 Miabogi to 0 and 0.225 in Rasini to 0 in 2019. The prevalence rate of trypanosomiasis was calculated at 5% n=123 in Mtangawanda 1.627% n=60 in Miabogi and 0 % n=213 at baseline 2009 to mean of 0% in 2019.

In conclusion the integrated control methods significantly reduced tsetse population and disease level in Pate Island leading to improved in livestock body condition, milk production and animal off takes. The impact of the integrated tsetse and trypanosomiasis control on the community's livelihoods and implication on maintenance of the low disease status is discussed.

4.17

PROSPECTS OF FABRIC PANELS IMPREGNATED WITH METARHIZIUM ANISOPLIAE AGAINST VECTORS OF SLEEPING SICKNESS

Riithi N. N.^{1,2*}, Njelembo J. M.^{1,3}, Kokwaro E. D.², Subramanian S.¹, Masiga D. K.¹, Okal M. N.¹.

¹*Animal Health Department, International Centre of Insect Physiology and Ecology, Nairobi, Kenya.*

²*Department of Zoological Sciences, Kenyatta University, Nairobi, Kenya.*

³*Tsetse and Trypanosomiasis Control Unit, Department of Veterinary Services, Chilanga, Zambia.*

Trypanosomiasis poses significant morbidity on populations in sub-Saharan Africa. The disease is extensively controlled by suppressing the vector (tsetse fly). Control of trypanosomiasis can plausibly be improved with integration of novel, low-cost and effective tsetse control tools. This study aimed at developing a fabric-based easy-to-deploy tool for field application of *M. anisopliae* against *Glossina fuscipes*. The relative capacity of fleece, cotton and polyester to retain fungus was compared by estimating in tandem conidia residual on 25cm×25cm of fabric treated with 0.1g/cm² of *M. anisopliae*. For 15 days, conidia were from three random spots on each fabric quantified and tested for viability. Tsetse landing on fabrics treated with 0.25g, 0.50g and 1.00g of conidia were recovered with electrocuting nets and fungus incidences estimated. Lastly, the effectiveness of fabrics with 0.25g of conidia to contaminate field populations of *G. fuscipes* was evaluated on Manga Island in Kenya. There were no differences in conidia retention of fleece and cotton ($p=0.07$). The fabrics retained seven times (95% CI: 5.6 - 8.8 times, $p<0.01$) as much conidia as polyester. Increasing the dose of conidia from 0.25g reduced tsetse attraction to the fabrics ($p<0.01$). The prevalence of *M. anisopliae* in Manga increased steadily to 13.3%, 17.1% and 25% over one, two and three weeks but declined on the fourth and fifth weeks. Fleece treated with 0.25g of *M. anisopliae* effectively contaminate tsetse flies in field conditions. Fabric panels with fungus could ultimately offer low-cost biorational tools for the integrated control of tsetse that transmit sleeping sickness.

4.18

THE EFFECT OF SIMPLE TSETSE CONTROL TECHNOLOGIES TO REDUCE TSETSE POPULATION IN ASSOSA DISTRICT OF BENISHANGUL-GUMUZ REGION, ETHIOPIA

*Dereje Alemu, Senbeta Tasew and Dagnachew Beyene
Bedele Tsetse and Trypanosomosis Investigation and Control Center*

The Assosa district is located in south west of Ethiopia in the Benishangul-Gumuz National Regional State and covers an area of 2090 sqkm. The control project was designed to use a combination of relatively simple and environmentally friendly control methods to suppress fly population to technically prescribed low levels. During pre-intervention, 103 monoconical, pyramidal and biconical trap types baited with acetone, octenol and three-week-old treated cattle urine placed in separate dispensers were deployed by the year 2016. A total of 1935 *G.m.submorsitans* fly species with a mean catch of 17.79 (SD=15.98) were collected that accounted for an apparent density of 9.39 fly/trap/day. To undertake the intervention, more than 2700 targets impregnated with deltamethrin 0.6-0.8% suspension concentration and 190,000 insecticide-treated cattle (ITC) with deltamethrin 1% ready to use formulation approaches were used to reduce tsetse population. Accordingly, post intervention survey carried out by 2018 depicted that of total 78 positioned traps 277 *G.m.submorsitans* tsetse flies were captured having been responsible for an apparent density of 1.78 FTD. Based on the data observed within the intervention period tsetse fly apparent density has been condensed about by 85.7%. The test statistics too confirmed that the decline in tsetse mean catch during post-intervention by 15.28 (SE=1.83; 95%CI=11.67-18.89) flies per trap from the baseline data was found statistically significant; P=0.000. Side by side to entomological survey, during pre-intervention, a total of 593 animals were examined to determine the disease distribution among the herds. Of these examined animals 84 were found positive for *T.vivax*, *T.congolense* and *T.brucei* parasite species and accounted for a prevalence of 14.2% (SD=0.35) and an overall mean PCV value of 23.54% (SD=5.44). On the other hand, during post-intervention period of total 604 sampled animals 21 were found infected with *T.congolense*, *T.vivax* and *T.brucei* that accounted for an overall prevalence of 3.5% (SD=0.18) and mean PCV value of

25.25% (SD=5.15). Accordingly, disease status during post-intervention declined by 75.4% and the decline in disease status was found statistically significant; $P=0.000$. The test statistics analyzed for the equality of means of PCV value of animals pre- and post-intervention, disclosed that improvement has been brought by 1.7% (SE=0.29; 95%CI=1.14-2.27) and it was found statistically significant; $P=0.000$. In conclusion, the results so far obtained have envisaged that the control technologies that have been used are feasible, efficient and effective to reduce the tsetse population.

**NON-CYCLICAL HAEMATOPHAGOUS ARTHROPODS
MAY BE INVOLVED IN THE MECHANICAL TRANSMISSION
OF AFRICAN TRYPANOSOMIASIS**

Bizi, R. L.^{1*}, Nock, I. H.², Ndams, I. S.², Ajakaiye, J. J.³, Dede, P. M.³

¹Human African Trypanosomiasis Research Department, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P. M. B 2077, U/Rimi G.R.A., Kaduna, Nigeria.

²Department of Zoology, Faculty of Life Sciences, Ahmadu Bello University, Zaria, Nigeria.

³Pan African Tsetse and Trypanosomiasis Eradication Campaign Programme, Nigerian Institute for Trypanosomiasis (and Onchocerciasis) Research, No. 1 Surame Road, P. M. B 2077, U/Rimi G.R.A., Kaduna, Nigeria.

*Corresponding author's e-mail: ramatubizi@gmail.com Tel: +234 8023633865

ABSTRACT

African trypanosomiasis is an important blood parasitic disease in human and animals constituting one of the major animal health constraints to livestock production in 38 sub-Saharan Africa. One major promising step in tackling the menace of this disease is through the integrated vector control method particularly of the cyclical vector of the *Trypanosoma* species but other non-cyclical routes of mechanical transmission has made the efforts at controlling this nuisance seemingly intractable. Therefore, a survey for the occurrence of *Trypanosoma* species in non-cyclical haematophagous arthropods was conducted to evaluate their role in the transmission of this disease. A total of eighteen bi-conical traps were mounted in Kachia Grazing Reserve in April and June, 2016. The specific occurrences of non-cyclical haematophagous arthropods and *Trypanosoma* species were identified. The species identified were *Trypanosoma simiae* from *Haematobia irritans*, *Trypanosoma simiae* and *Trypanosoma vivax* from *Stomoxys calcitrans*, *Trypanosoma theileri* from *Haematopota puniens* and *Trypanosoma brucei* from *Amblyomma variegatum*, by PCR analysis, an overall trypanosome infection rates of 17.86% was recorded during the study period. In conclusion, the presence of trypanosomes in non-cyclical haematophagous arthropods

may elicit the mechanical transmission of the disease there by expanding the frontiers of coverage required for the integrated vector control which should be incorporated during field operations.

Key words: African trypanosomiasis, *Trypanosoma* spp., Haematophagous arthropods, non-cyclical, mechanical transmission.

SPECIES DIVERSITY AND PHYLOGENETIC ANALYSIS REVEAL DUAL MATERNAL LINEAGES OF GLOSSINA POPULATIONS IN NIGERIA

S. S. Shaida^{1*}, J. Waber², C. Ngomtcho^{3,4}, U. B. Musa¹, T.T. Gbem^{5,7}, I. S. Ndams^{5,7}, M. Mamman^{1,7}, A. J. Nok^{6,7} M. D. Achukwi⁹ and S. Kelm²

¹Nigerian Institute for Trypanosomiasis Research Kaduna, Nigeria

²Center for Biomolecular Interactions, University of Bremen, Bremen, Germany

³Department of Biological Sciences, University of Ngaoundéré, Ngaoundéré, Cameroon ⁴Ministry of Public Health, Yaoundé, Cameroon

⁵Department of Biology, Ahmadu Bello University Zaria, Nigeria

⁶Department of Zoology, Ahmadu Bello University Zaria, Nigeria

⁷Department of Biochemistry, Ahmadu Bello University Zaria, Nigeria

⁸Africa Centre of Excellence for Neglected Tropical Diseases and Forensic Biotechnology, Ahmadu Bello University, Zaria, Nigeria

⁹TOZARD Research laboratory, Bamenda, Cameroon

*Corresponding Authors: shaidasteven@yahoo.com, skelm@uni-bremen.de

ABSTRACT

Background: Tsetse flies are vectors of trypanosoma sp. the causative agents of the devastating disease trypanosomiasis in humans and livestock. Successful vector control programmes depend on the adequate knowledge on the population dynamics of target species.

Methodology: A survey of tsetse populations was conducted in Nigeria between February and March 2014 and December 2016 in order to determine their diversity. Flies were collected and identified morphologically and molecularly by analysis of Cytochrome C Oxidase SUI (COI) gene sequences. Internal transcribed spacer-1 (ITS-1) sequences were compared to analyse variations within and amongst populations.

Results: A total of 1891 flies was collected out of which 391 were subjected to molecular analysis. The most dominant species encountered were *G. p. palpalis*, *G. tachinoides* and *G. m. submorsitans*. In Yankari Game Reserve and Kainji Lake National Park, *G. tachinoides* and *G. submorsitans* were most frequent, whereas in Old Oyo, Cross river National Parks and Ijah Gwari *G. p. palpalis* was the dominant species.

Interestingly, four unidentified species were recorded during the survey, for which no information on COI or ITS-1 sequences exists. *G. p. palpalis* populations showed a segregation in two clusters along the Cameroon-Nigerian border region.

Conclusions: An improved understanding on the population dynamics of *Glossina* sp. in Nigeria would support decisions on the scale in which vector control may be more effective. It is recommended that further studies on gene flow using other markers, including microsatellites be carried out for more detailed understanding of the isolation status of these populations.

4.21

NATIONALWIDE CAMPAIGN FOR DIPPING USING PYRETHROIDS PREPARATIONS IN TANZANIA: AN OPPORTUNITY FOR THE CONTROL OF TSESE AND TRYPANOSOMIASIS

Justine Assenga¹; Joyce Daffa¹; Folorunso Fasina²; Moses Ole-Neselle²; Hezron Nonga¹

¹Ministry of Livestock and Fisheries

²FAO Tanzania

Corresponding author: assengakanda@yahoo.com

Tanzania has approximately 31.5 million cattle, 15.2 million goats, 6.4 million sheep and approximately 40% of land suitable for grazing is infested by tsetse flies. Tsetse transmitted trypanosomiasis is an important disease which affects both animals and humans in Tanzania. The government of Tanzania has launched a massive dipping campaign throughout the country with the aim of sensitizing livestock keepers to cultivate the habit of dipping animals to prevent ecto-parasites. The government has provided free acaricides (Pyrethroids preparations) for initial filling and replenishment of dips for one year. Furthermore, the government through the Ministry of Livestock and Fisheries is finalizing a dipping regulations for national implementation. The strength of tsetse control in Tanzania is the network of dip tanks where pyrethroids are used to control ticks, tsetse flies as well as other biting flies of veterinary importance. Tanzania has a network of approximately 1489 functional dip tanks which are evenly spread across the country. Where no functional dip tanks are present, hand pumps and spray race are used as alternatives. During the on-going campaign, an estimated > 70% of the Tanzania's ruminant population will be covered using the dip tanks. This complies with the Animal Disease Act no 17, 2003 and the Animal Welfare Act no 19, 2008 both of which require that all livestock keepers must dip or spray their animals against vectors and parasitic diseases. This experience of use of pyrethroids preparations to control ticks and Trypanosomiasis should serve as example of sustainable disease control in poor resources countries.

Keywords: Tsetse, trypanosomiasis, dipping, pyrethroids

TRYPANOSOME PREVALENCE IN TSETSE FLIES IN AREAS OF NO DOCUMENTED HISTORY OF TRYPANOSOME INFECTION.

**Onyekwelu Kenekwelu C.¹, Edeh Godknows C.², Alanza Anthony J.²
¹Department of Medical Biochemistry, College of Medicine, University of Nigeria Enugu Campus. ²Nigerian Institute for Trypanosomiasis Research, South East Zonal Office, Enugu, Enugu State, Nigeria
 Corresponding author: Email: kenekwelu.onyekwelu@unn.edu.ng

ABSTRACT

Background and objectives: Tsetse fly is the sole vector of the zoonotic disease African Trypanosomiasis, which causes sleeping sickness in humans and nagana in animals. Despite all the control measures put in place for the control and eradication of tsetse fly in Nigeria, the vector has continued to spread to new areas. This study investigated the presence, prevalence and species of trypanosome parasite in tsetse flies caught in two areas of no previous documented history of trypanosome infection.

Materials and Methods: Non teneral tsetse flies were collected from Oji-River and Emene areas of Enugu State Nigeria. Genomic DNA was isolated from the whole tsetse fly using genomic DNA extraction kit. Identification and characterization of trypanosome was done by the amplification of internal transcribed spacer I (ITS) of ribosomal DNA and the use of primers specific to Trypanozoon.

Results: In Oji-River, 6 flies were infected with *T. congolense*; 2 with *T. vivax* and 1 with *T. brucei*. Two (2) mixed infections of *T. vivax* and *T. congolense* and 1 mixed infection of *T. brucei* and *T. congolense* were identified. In Emene, nine (9) flies were infected with *T. congolense*, 2 with *T. vivax* and 3 with *T. brucei*. Two (2) mixed infections of *T. brucei* and *T. congolense*; and 1 mixed infection of *T. vivax* and *T. brucei* were identified.

Discussion and conclusion: This study shows the parasitological evidence on the occurrence of animal African trypanosomiasis with likely no active transmission of human African trypanosomiasis in the study areas.

TOWARDS CONTROL: PRELIMINARY INVESTIGATION INTO TSETSE FLIES SPECIES COMPOSITION IN SOUTH-EASTERN NIGERIA

**Dalla, C.V., and Uzoka N.B*

Email: chatchamdallas@gmail.com +2347030477559

Nigeria Institute for Trypanosomiasis and onchocerciasis Research, South East Zone Enugu

ABSTRACT

Public health, Veterinary and Food Security is greatly threatened by the scourging menace of Tsetse and Trypanosomiasis in Africa. This study seeks to establish a baseline data for tsetse spots and characterization of species composition within the region. The mean number of tsetse collected in relation to traps from Enugu, Edo and Asaba were 4.67 ± 5.83 (mean \pm standard deviation), 0.11 ± 0.33 and 2 ± 2.65 respectively. Tsetse fly from Enugu constituted 68.85% with apparent density 5.35f/t/d compared to 1.64% (0.5f/t/d) and 29.51% (2.25 f/t/d) respectively from Edo and Asaba. It is evident that there is a significant variation in apparent density of flies in the studied locations. The difference in trappings of tsetse fly from Enugu and Edo was significant based on Kruskal-Wallis H test ($\chi^2 = 8.294$, $df = 2$, $p = 0.016$). The mean rank of tsetse fly abundance was 18.22, 8.50 and 15.38 for Enugu, Edo and Delta state respectively. Morphological identification tilted to the Palpalis Group. Further entomological studies are ongoing in order to ascertain their phylogeny. This knowledge will help determine the degree of isolation of the population in line with the Pan Africa Tsetse and Trypanosomiasis Eradication Campaign (PATTEC) Area-wide-Integrated pest Management (AW-IPM) approach using the sterile male release technique (SMRT).

Key words: Tsetse and Trypanosomiasis, Phylogeny and Control

4.24

THE INTERNATIONAL JOINT LABORATORY ON VECTOR-BORNE DISEASES (LAMIVECT): A POLE OF EXPERTISE ONE HEALTH ON VECTOR-TRANSMITTED PATHOLOGIES IN THE IVORIO-BURKINABÈ SPACE

Courtin Fabrice^{1,2,}, Kaba Dramane², Bengaly Zakaria³, Gimonneau Geoffrey^{1,3}, Boulangé Alain^{1,3}, Fournet Florence^{4,6}, Moiroux Nicolas^{2,4}, Belem Adrien⁵, Kadjo Kouame⁶ and Dabiré Roch⁷*

*¹UMR 17 INTERTRYP, IRD/CIRAD, 34398 Montpellier, France ²Institut Pierre Richet (IPR), Institut National de Santé Publique (INSP), BP 1500, Bouaké, Côte d'Ivoire ³CIRDES, BP 454, Bobo-Dioulasso, Burkina Faso ⁴Maladies Infectieuses et Vecteurs : Ecologie, Génétique, Evolution et Contrôle (MIVEGEC), Univ Montpellier, CNRS, IRD, BP 64501, Montpellier, France ⁵Université Nazi Boni (UNB), BP 1091, Bobo-Dioulasso, Burkina Faso ⁶Centre d'entomologie médicale et vétérinaire (CEMV), Université Alassane Ouattara (UAO), Bouaké, Côte d'Ivoire ⁷Department of Medical Biology and Public Health, Institut de Recherche en Sciences de la Santé (IRSS), BP 545, Bobo Dioulasso, Burkina Faso *fabrice.courtin@ird.fr*

The International Joint Laboratory on Vector Diseases (LAMIVECT) brings together institutions that have expertise on vector-borne diseases. Three are from Burkina-Faso (IRSS, CIRDES, UNB), two from Ivory Coast (IPR-INSP, CEMV-UAO) and two from France (IRD and CIRAD), all having expertise in vector-borne diseases. LAMIVECT acts upon vector-borne diseases that affect both humans and animals in the Ivorian-Burkinabè area. It aims at structuring activities, exchanging ideas, and pooling research and training actions. It is a multidisciplinary laboratory, in the sense that it hosts medics, vets, entomologists, geographers, etc., primarily interested in diseases such as malaria, human and animal trypanosomiasis, leishmaniasis, tick-borne diseases, onchocerciasis, dengue and lymphatic filariasis. This oral communication is intended in a first part to present the operating structure of the LAMIVECT, which is led by a management committee itself advised via a scientific monitoring committee. In a second part, it will present the aspects of training and research propelled in the Ivoro-Burkinabè space. Of particular interest are the micro-project on typically One health topics. As an example were funded this year projects such as "The methods of use of pesticides in the Ivorian forest zone and their impact on the survival of the tsetse vectors of human and animal

trypanosomoses”, “Treatments with ivermectin in pigs and their impact in vector control against malaria and trypanosomosis“, etc.

4.25

PICTORIAL ILLUSTRATION OF THE TSETSE FLIES CONTROL TECHNOLOGIES PRACTICED OVER THE LAST 10 DECADES IN KENYA

Kamau S.Kabochi^{1}, Onyango I.Awino¹, Njagi Obadiah¹
State Department of Livestock, Directorate of Veterinary Service, Kabete
Veterinary Research Laboratories, Private Bag 00625 Kangemi
* Contact email: kamaukabochi@gmail.com*

ABSTRACT

Efforts to control tsetse flies in Kenya started as early as 1930s in Kibwezi, Makueni County. Indiscriminate bush clearing, use of hand-labour, machines, destruction of wildlife, burning and ground spraying using some of persistent chemicals such as Dieldrin and other Organochlorides were some of popular methods applied. These technologies were discontinued because of their negative effect on environment, animals and humans. Ground spraying against tsetse flies was eventually banned in Kenya by the Government in the year 2002 because of the poisoning of non-target animals. New and friendly technologies have since emerged that have resulted in reduction of tsetse flies into very low densities in some of heavily infested areas. Most of previously used methods are now archived and presented in pictorial illustrations.

BACTERIAL DIVERSITY IN THE GUT OF GLOSSINA PALLIDIPES AND ITS IMPLICATION FOR THE EPIDEMIOLOGY OF SLEEPING SICKNESS IN TANZANIA

Imna Malele^{1}, Hamis Nyingili¹, Eugen Lyaruu¹, Marc Tauzin², B. Bernard Ollivier³, Jean-Luc Cayol³, Marie-Laure Fardeau³ and Anne Geiger⁴*

¹*Vector and Vector Borne Diseases Institute, Majani Mapana, Off Korogwe Road, Box 1026, Tanga, Tanzania.*

²*USC1342 INRA,UMRI13 IRD-CIRAD-SupAgro-UM2, Symbioses Tropicales et Méditerranéennes, Campus de Baillarguet,TA A-82/J, F-34398 Montpellier Cedex 5, France.*

³*Aix-Marseille Université Université du Sud Toulon-Var, CNRS/INSU, IRD, Mediterranean Institute of Oceanography (MIO), UM 110, F-13288 Marseille cedex 09, France.*

⁴*UMR 177, IRD-CIRAD, CIRAD TA A-17/G, Campus International de Baillarguet, 34398 Montpellier Cedex 5,France.*

ABSTRACT

Background: *Glossina pallidipes* is a haematophagous insect that serves as a cyclic transmitter of trypanosomes causing African Trypanosomiasis (AT). To fully assess the role of *G. pallidipes* in the epidemiology of AT, especially the human form of the disease (HAT), it is essential to know the microbial diversity inhabiting the gut of natural fly populations. This study aimed to examine the diversity of *G. pallidipes* fly gut bacteria by culture-dependent approaches.

Results: 113 bacterial isolates were obtained from aerobic and anaerobic microorganisms originating from the gut of *G. pallidipes*. 16S rDNA of each isolate was PCR amplified and sequenced. The overall majority of identified bacteria belonged in descending order to the Firmicutes (86.6%), Actinobacteria (7.6%), Proteobacteria (5.5%) and Bacteroidetes (0.3%). Diversity of Firmicutes was found higher when enrichments and isolation were performed under anaerobic conditions than aerobic ones. Experiments conducted in the absence of oxygen (anaerobiosis) led to the isolation of bacteria pertaining to four phyla (83% Firmicutes, 15% Actinobacteria, 1% Proteobacteria and 0.5% Bacteroidetes, whereas those conducted in the presence of oxygen (aerobiosis) led to the isolation of bacteria affiliated to two phyla only (90% Firmicutes and

10% Proteobacteria). Phylogenetic analyses placed these isolates into 11 genera namely Bacillus, Acinetobacter, Mesorhizobium, Paracoccus, Microbacterium, Micrococcus, Arthrobacter, Corynebacterium, Curtobacterium, Vagococcus and Dietzia spp. which are known to be either facultative anaerobes, aerobes, or even microaerobes.

Conclusion: The study shows that *G. pallidipes* fly gut is an environmental reservoir for a vast number of bacterial species, which are likely to be important for ecological microbial well being of the fly and possibly on differing vectorial competence and refractoriness against AT epidemiology.

Keywords: Facultative anaerobes, Aerobes, Microaerobes, Bacterial diversity, Gut, Sleeping sickness, *Glossina pallidipes*, Tanzania

MOLECULAR EVALUATION OF WOLBACHIA SPP FROM FIELD CAPTURED GLOSSINA PALPALIS PALPALIS FROM IJA-GWARI VILLAGE OF NIGER STATE, NORTHCENTRAL NIGERIA AND LABORATORY BRED GLOSSINA MORSITANS SUBMORSITANS FROM INSECTARY OF THE NIGERIAN INSTITUTE FOR TRYPANOSOMIASIS RESEARCH (NITR), KADUNA.

Onotu, Christopher Sunny¹, Ojekale AO², Gbem TT³

*¹Nigerian Institute for Trypanosomiasis Research (NITR), Kaduna
Lagos State University (LASU), Department of Biochemistry, Ojo, Lagos²
Ahmadu Bello University, Department of Biology, Kaduna³*

ABSTRACT

Trypanosomiasis has posed a serious problem in sub-Saharan African mainly because the parasite trypanosomes responsible are able to evade elimination by the immune system as a result of its antigenic variation ability. A new approach is how to neutralize tsetse infectivity through the study of the biochemistry of endosymbiont "Wolbachia" present in field captured tsetse so as to generate a base study for its molecular characterization. PCR results of endosymbiont Wolbachia spp presence in field captured tsetse fly (*Glossins Palpalis palpalis*) for sixty (60) dissected flies and fifty (50) Laboratory bred teneral *Glossina Morsitans Submorsitans* flies collected from the NITR insectary using ITS primers was carried out, Thirty (30) of the laboratory bred flies in equal distribution of male and female were infected with Trypanosomal *brucei brucei* (federe strain) while the other 20 were left uninfected and all were dissected. Of the dissected 60 fields captured tsetse 12 (20%) were positive for Wolbachia spp with 5 male (21.9% of all male) and 7 female (18.9% of all female). The field captured flies were grouped into four (4) stages of which 25 infected tsetse stage showed 6 positive, 27 hunger stage showed 3 positive, One replete stage showed one positive and 7 engorged stage showed 7 positive. Hence statistically, the odd of wolbachia presence in Infected captured flies to Replete flies was 4.32 and Hunger stage flies to Replete was higher by 7.60. The control teneral laboratory bred flies showed an even distribution of sex with 12 female and 12 male, with 9 infected and 11 non infected showing positive result for wolbachia spp presence, However, the infected flies comprised more

of female (9 of 10) while the non infected were mainly male (11 of 14). The results show that wolbachia spp presence occurred less in field captured flies than in laboratory bred flies and also tsetse specie, sex, and age were determinants of wolbachia presence; however typanosomiasis infection (I.T) status with wolbachia presence was not fully established.

ENTOMOLOGICAL SURVEYS ON TSETSE IN LIVESTOCK PRODUCTION AREAS, CENTRAL AFRICAN REPUBLIC

*Dr Etienne Nguertoum¹, Jean Charles Kounda Mboumbi², Pr Ayao Acapovi³

¹Ministère de l'Élevage et de la Santé Animale/Coordonnateur PATTEC ;

²Entomologiste, Ministère de la Santé/ Programme de lutte contre les vecteurs

; ³Université d'Abidjan, Faculté Des Sciences, Département de Zoologie et

Biologie Animale, Laboratoire d'Entomologie Appliquée

*E-mail: nguertoumetienne@yahoo.fr

ABSTRACT

The CAR savanna areas, which are the most densely populated parts of the country with considerable agricultural and pastoral potential, are heavily infested with tsetse flies and thus potentially under the continuing threat of an epidemic of animal trypanosomoses. In addition, the lack of real data on tsetse fly densities and of technical expertise in the fight against this disease is a real handicap in the control of the disease. Many indirect losses are related to trypanosomoses. Improving the status of animal health is a prerequisite to ensuring productivity of herds and food security for populations. An entomological survey was conducted in livestock production areas in Central African Republic in 2018 for 08 months with the support of the FAO, and assessed the presence of tsetse and trypanosome risk with vavoua traps. This research reveals three (3) dominant tsetse species (*Glossina fuscipes fuscipes*, *Glossina fusca congolensis* and *Glossina morsitans submorsitans*) that colonize the locations surveyed with a predominance of *G. morsitans submorsitans* over 156 species caught. Apparent densities (DAP) are higher 4.25; 4.02 and 3.23 in Bossembélé, Bambari and Bouar respectively, demonstrating that the trypanosome risk is high compared to surveys carried out in the years 1992 and 1989 by GOUTEUX and CUISSANCE who found respective DAPs 2.64 and 2.82. The three identified species have also been described in ZAGROP of YEREMON (Bossembélé) by CUISSANCE, VALLAT, KOTA-NGUINZA and others (1992); the same species were identified and mapped by FINELLE and collaborators in 1963 in the same prefectures surveyed. They reveal the strong predominance of the mechanical vectors, the stomoxes. However, with the crises, the surveyed areas have very little domestic breeding, which is limited to poultry, showing that the reservoir is changing. These results point to the need

for further targeted investigations of non-domestic animals, especially wild animals, to explain the persistence of these tsetse populations and to plan a control program.

Key words: Tsetse flies, Apparent density, Entomological survey, Trypanosome risk, Reservoir

ANIMAL TRYPANOSOMOSIS CONTROL IN MÔ PLAIN, TOGO: ZOO-SANITARY IMPACT IN CATTLE REARING

S. Boma^{1*}, T. N'Feidé¹, E. Talaki², B. Bonfoh¹, B. Dao¹

¹Ministère de l'Agriculture de l'Élevage et de la Pêche (MAEP), Institut Togolais de Recherche Agronomique (ITRA), BP. 1163 Cacadéli (Lomé), Togo.

²Université de Lomé (UL), Ecole Supérieure d'Agronomie (ESA), BP. 1515 Lomé, Togo.

*Corresponding Author, E-Mail to : bomasoudah@gmail.com, Tel : 90 16 08 87

Local cattle rearing in the central Region of Togo is characterized by trypanotolerant cattle rearing, with or without the use of trypanocidal drugs and insecticide pour-on treatment against tsetse fly. To assess the impact of these two approaches on the productivity of local cattle, preliminary zoo-sanitary survey was conducted in the hampless cattle rearing area, at Mô and Tchaoudjo, which are 2 cattle rearing areas in the study area. Then, for three years, at Mô, management of animal trypanosomiasis at community level was undertaken. Only, positive animals and / or those with low hematocrit (<25%) were treated with a curative dose (3.5 mg.l.w. kg-1) of diminazen and received Deltamethrine insecticide bath (10 ml.100 kg of cattle). The zoosanitary assessment at Mô revealed a decrease in the prevalence from 25.9% to 16.8%, improved hematocrit from 24.2% to 27.5% and reduced mortality in calves (6.4%). However, at Tchaoudjo, where the innovation was not implemented, the prevalence was 17.3%, hematocrit 26.8% and calf mortality $9.9 \pm 12\%$. These results show the need to implement reasoned actions to control animal trypanosomiasis to improve local cattle productivity in Togo.

Key words: Trypanotolerant cattle, Trypanocidal drug, Insecticide, Productivity.

4.30

NATIONAL REPORT ON THE PROGRESS MADE BY BOBO DIOULASSO INSECTARIUM SINCE SEPTEMBER 2018

The Directorate of Integrated Control (DLI: Direction de la Lutte Intégrée) is the Bobo-Dioulasso Insectarium -Tsetse Fly and Trypanosomiasis Eradication (IBD-CETT) branch, which is responsible for vector control activities, trypanosomiasis control and training – awareness campaigns. It therefore includes two services, namely the vector control service and the disease control service.

An entomological survey was carried out in IBD-CETT intervention area i.e. the PCZLD project area. It was conducted in the Mouhoun and Center-West regions. The purpose of this mission was to know the entomological status in this area and to collect tsetse flies, but it was conducted in a particular context because of insecurity persisting in these regions. For this purpose, after consulting the senior officers of the defense and security forces, some departments were removed from the list of areas to be assessed.

On each site, 2 traps were laid except for those in the Dokuy district. Thus, 49 biconical traps were laid. A total of 98 tsetse flies of the *Glossina palpalis gambiensis* and *Glossina tachinoids* species were captured at an apparent density of 1.25 tsetse flies / trap / day. The detailed results are shown in Table I.

Table I : Results obtained after the laying of traps

Species	Sex	Number	Total
Glossina palpalis gambiensis	M	18	31
	F	13	
Glossina tachinoïdes	M	28	67
	F	39	
Vecteurs mécaniques	Tabanus spp	11	134
	Stomoxys spp	05	
	Hyppopbosca spp	00	
	Houseflies	118	

All flies of the *G. tachinoïdes* species were caught at Dokuy. Also, all *palpalis* were found only on the upstream branch of the Mouhoun River. No tsetse was caught on the downstream branch or on a tributary. However, this absence of flies at tributary levels may be due to the fact that these water points were dry during the survey.

4.3 I

IMPACT OF TRYPANOSOMOSIS VECTOR CONTROL IN FORÉCARIAH FOCUS, GUINEA

M. Kagbadouno, A. Dansy Camara, O. Camara, I. Camara, P. Solano, B. Bucheton, M. Camara

Forecariah Prefecture, located 100 km southwest of Conakry, is one of the most active foci of Human African Trypanosomiasis in the country. Within the framework of disease elimination as planned by WHO, the national HAT control program carried out by Guinea and its partners have envisaged to apply the tsetse control strategy against the endemic disease in this focus through the project known as « projet Trypa-No ! ». Several components have been developed, including a geographical survey, initial entomological surveys (randomized and targeted at activity sites of patients) and after the introduction of screens (monitoring the control), sensitization of populations, parasitological surveys on domestic animals and biomolecular analyses (PCR) on medium gut samples collected in pools of 2 to 10 tsetse flies, individual and also blood taken from domestic animals. Insecticide impregnated screens were introduced in the focus in January 2018.

The geographic survey showed high mobility of populations at-risk in relation to activities carried out in two mangrove areas (mainland and island). The initial entomological survey showed a heterogeneous distribution of tsetse flies based on areas ($p = 0.01$) and biotopes ($p = 0.0001$). A higher rate of infection was observed on the islands (25.5% vs 8.2% on the continent, $p = 0.005$), higher in females of 52.1j vs 36.4j ($p = 0.0001$). The molecular infections in TRYP1S / R PCR were 21/29 individual microscopically positive intestines and 8/69 positive pools. Of the TRYP positive, 21 were positive for TBR1 / 2 PCR and 2 positive for TGSGP PCR. 3 months after the installation of the tany targets, a significant reduction rate of 71.7% in tsetse densities was obtained ($p = 0.0012$); a non-significant increase in the infection rate of the average intestines under the microscope (T0 -3.5% vs. T +3 -6.1%) was observed; however, a decrease in the proportion of microscopically positive traps, related to the decrease in tsetse densities, was recorded and the TBR1 / 2 PCR was negative on all samples. The parasitological survey conducted after one year of control showed that Buffy Coat (BC) on 393 samples

taken from cattle, goats, sheep and pigs in 14 localities, 29 cattle only samples were positive by direct microscopy, representing 22.48 % of cattle examined. Molecular biology analyzes will tell us about the circulating trypanosome species in these domestic animals. PCR on tsetse guts suggests the presence of trypanosome species of the Trypanozoon group. This is usually uncommon and a first in Guinea. These different surveys show the presence of a significant trypanosome reservoir in the Forecariah HAT focus. And anti-vector control seems to be one of the effective ways to limit the circulation of trypanosomes especially in the presence of livestock and wildlife reservoirs.

4.32

A NATIONAL ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMOSIS IN MALI

Boucader Diarra^{*1}, *Modibo Diarra*¹, *Oumar Diall*², *Boubacar Bass*³, *Youssof Sanogo*¹, *Etienne Coulibaly*¹, *Mahamadou Sylla*³, *Weining Zhao*⁴, *Massimo Paone*⁴, *Giuliano Cecchi*^{4*}

¹*Direction Nationale des Services Vétérinaires, Cellule de Coordination de la Lutte contre les Mouches tsé-tsé et les Trypanosomoses animales (CCLMT), Bamako, Mali. Email : diarrab@gmail.com*

²*Ministère de l'Agriculture, Comité National de la Recherche Agronomique (CNRA) Bamako, Mali*

³*Ministère de l'Élevage et de la Pêche, Bamako, Mali*

⁴*Organisation des Nations Unies pour l'Alimentation et l'Agriculture (FAO), Division Production et Santé Animale, Rome, Italie*

Much information is available on tsetse flies and African animal trypanosomosis (AAT) in the different regions of Mali. However, these data have never been harmonized or centralized, thus hindering the development of complete epidemiological maps and the rationalization of interventions. To fill this gap, a dynamic geo-spatial database has been created. A repository containing the digital versions of epidemiological data collected between 2000 and 2018 has been assembled. The information has been verified, harmonized, geo-referenced and integrated into a single geo-spatial database. Mapped data showed that *Glossina palpalis gambiensis* is the most widespread tsetse species. It is present in the south, the centre-south and the west of the country. *G. tachinoides* was only found in the south where only a few specimens of *G. morsitans submorsitans* were detected. TAA is present in all regions studied. The dominant species are *Trypanosoma vivax* and *T. congolense*, with *T. brucei* infections being much less numerous. The Atlas of Mali provided a synoptic view of the vector and disease situation at the national. Nevertheless, significant geographic gaps affect the north, northeast, and west, and there is a lack of data over the past five years. TAA remains a major animal health problem in Mali. However, surveillance and control activities are currently very limited, and there is a need to strengthen the progressive control of the TAA.

LAND USE, ENVIRONMENT AND SOCIO-ECONOMICS

5.01

FACTORS AFFECTING FARMERS' CHOICE OF TSETSE AND TRYPANOSOMIASIS CONTROL METHODS IN LAMU COUNTY, KENYA

Seth Ooko Onyango^{1}, Sabina Mukoya-Wangia², Josiah Mwivandi Kinama³,
Pamela Akinyi Olet¹*

¹Kenya Tsetse and Trypanosomiasis Eradication Council (KENTTEC), Nairobi, Kenya

²Department of Agricultural Economics, University of Nairobi, Nairobi, Kenya

³Department of Plant Science and Crop Protection, University of Nairobi, Nairobi, Kenya

Tsetse flies and trypanosomiasis is one of the greatest constraints to agricultural development in the sub-humid and humid zones of Africa that needs to be removed if the Sustainable Development Goals and Kenya's Vision 2030 goals of poverty reduction and food security is to be achieved. This study assessed the factors influencing farmers' choice of Integrated Methods (IM), Moving Targets (MT), Insecticide Treated Targets (ITT) and Trypanocidal Drugs/Ethno-veterinary practices (TD) as methods they solely used to control tsetse and trypanosomiasis in Lamu County, Kenya. A structured questionnaire was used to collect Social and economic data from a random sample of 536 farm households. Multinomial Logit regression results showed that the odds of a household choosing IM over TD increased significantly when there were unit increases in Tropical Livestock Units, education level of the household head and when a household was headed by a female. On the other hand, the odds of choosing either IM or ITT or MT over TD all decreased when there were unit increases in household's distance to dips, crush pens or deployment sites of insecticide treated tsetse target screens. Furthermore, the odds of choosing IM over TD decreased when availability of the method was low, when the cost was low, when the method was considered not effective and when extension services were not available. The study recommends that governments and development agencies to consider household characteristics, technological factors and institutional factors when promoting new technologies to farmers.

ENVIRONMENTAL IMPACT OF TSETSE ERADICATION IN SENEGAL

Mamadou Ciss¹, Mireille D. Bassène¹, Momar T. Seck¹, Abdou G. Mbaye², Baba Sall², Assane G. Fall¹, Marc J.B. Vreysen³, Jérémy Bouyer^{3,4,5}

¹Institut Sénégalais de Recherches Agricoles, Laboratoire National d'Élevage et de Recherches Vétérinaires, BP 2057, Dakar – Hann, Sénégal.

²Ministère de l'Élevage et des Productions animales, Direction des Services Vétérinaires, BP 45677, Dakar, Sénégal.

³Insect Pest Control Laboratory, Joint FAO/IAEA Programme of Nuclear Techniques in Food and Agriculture, A-1400, Vienna, Austria.

⁴Unité Mixte de Recherche 'Interactions hôtes-vecteurs-parasites-environnement dans les maladies tropicales négligées dues aux trypanosomatides', Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), 34398 Montpellier, France

⁵Unité Mixte de Recherche 'Animal, Santé, Territoires, Risques et Écosystèmes', Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD), 34398, Montpellier, France.

ABSTRACT

The sterile insect technique is an environment friendly control tactic and is very species specific. It is not a stand-alone technique and has been used mostly in combination with other control tactics within an area-wide integrated pest management strategy. For a period of eight years, the direct impact of a campaign to eradicate a population of the tsetse fly *Glossina palpalis gambiensis* in Senegal was monitored using a set of fruit-feeding insect species (Cetoniinae and Nymphalidae) that served as ecological indicators of the health of the ecosystem. Here we show that the eradication campaign had very limited impacts on the apparent densities of the most frequent species as well as three diversity indexes during the reduction phase involving insecticides but reverted to pre-intervention levels as soon as the release of the sterile male insects started. These results greatly expand our understanding of the impact of vector eradication campaigns on non-target species.

CATTLE OWNERS' PERCEPTION OF THE IMPACT OF BOVINE TRYPANOSOMOSIS IN EAST DARFUR STATE- THE SUDAN

Wisal Elnour M. Elhassan¹, Bannaga, M.A.², Tyseer Elhadi², Elmalik, H. K.³ & A.H.A/Rahman¹

¹Central Veterinary Research Laboratory, ²Faculty of Agriculture, & ³Faculty of Veterinary / University of Khartoum .

ABSTRACT

A study was carried out in East Darfur State to assess cattle owners' perception on the presence, knowledge, control and the impact of bovine trypanosomosis. Questionnaire survey and standard focus group discussions were conducted to collect relevant information from the study population in the State which possesses huge numbers of livestock, particularly cattle, and it is tsetse free but cattle come into contact with tsetse flies during the hot dry season migration to the Republic of South Sudan.

A total of 150 cattle owners were selected by stratified purposive sampling technique and interviewed. Concerning the production systems in the area it is clear that 67.3% of respondents are mixed farmers, more than 95% of cattle are migratory and kept under transhumance system and the main causes of migration is lack of water, poor quality pasture and to avoid blood-sucking flies. 66.7% of respondents recognized tsetse flies and use (Umbogani) as vernacular name. All cattle owners are familiar with biting flies including tabanids and admitted that they are a real problem to cattle during the rainy season where trypanosomosis is wide spread by the aids of those flies. From this survey the majority of respondents ranked trypanosomosis as an important and economic disease causing serious effects on cattle and their productivity. Cattle owners are aware about the disease and its symptoms and know how to make proper diagnosis, according to the cattle owners knowledge there are two peaks of the disease one in summer grazing areas outside the State when cattle herds come into contact with tsetse flies and the other when cattle are trekked to the northern parts of the State in the wet grazing season where biting flies are abundant. Treatment of trypanosomosis is the only methods of control practiced by cattle owners in the State. Dimenazine

aceturate, Ethidium bromide, Isometamedium and Quinaoyramines are used either alone or in a combination for both treatment and prevention. Regarding the frequency of treatment 38.7% and 25.3% of owners treat their cattle twice and four times / year in blanket treatment respectively.

ASSESSMENT OF HERDSMEN'S KNOWLEDGE, ATTITUDE AND PRACTICES ON TSETSE FLY AND BOVINE TRYPANOSOMOSIS IN BAGUDO AND KAOJE DISTRICTS OF BAGUDO LGA, NORTHWESTERN NIGERIA

Aminu B. Yusuf¹, Ahmed Kabiru Maigari², Abdulkadir Abubakar³, Usman Baba Musa⁴, Mohammed Kabiru Haruna⁵, Hamza Adamu Garba⁶, Abdulkarim Isah Zubair⁷, Idris Baba Machina⁸, Abubakar Shehu Alhaji⁷, Umar Sunusi Galadima⁹, Amina Adamu⁷, Diggi Sani¹⁰

¹Biotechnology Research Unit, Nigerian Institute for Trypanosomosis Research (NITR), No 1 Surame Road, Unguwar Rimi GRA, Kaduna, Nigeria. ²NITR, Kano Liaison Office, France Road, Sabon-Gari, Kano, Nigeria. ³Department of Biochemistry, Federal University of Technology, Minna, Nigeria. ⁴Vector and Parasitology Research Department, NITR, No. 1 Surame Road, Unguwar Rimi GRA, Kaduna, Nigeria. ⁵PRMESSD Research Planning, Monitoring, Extension, Statistics, and Socio-Economic Development, NITR, No. 1 Surame Road, Unguwar Rimi GRA, Kaduna, Nigeria. ⁶Animal African Trypanosomosis Research Department, NITR, No. 1 Surame Road, Unguwar Rimi GRA, Kaduna, Nigeria. ⁷NITR, North-West Zonal Office, Gesse Phase II, Birnin Kebbi, Northwestern Nigeria. ⁸Human African Trypanosomosis Research Department, NITR, No. 1 Surame Road, Unguwar Rimi GRA, Kaduna, Nigeria. ⁹Onchocerciasis Research Department, NITR, No. 1 Surame Road, Unguwar Rimi GRA, Kaduna, Nigeria. ¹⁰Livestock Department, Kebbi State Ministry of Agriculture, Birnin Kebbi.

*Corresponding author: yusufab72@gmail.com

ABSTRACT

A study using focus group discussions (FGDs) to assess the knowledge, attitude and practices of herdsmen on tsetse fly and African bovine trypanosomosis was carried-out in Bagudo and Kaoje districts, Bagudo Local Government Area, Northwestern Nigeria. Eleven focus group interviews were conducted to obtain information from 75 respondents comprising crop farmers/livestock herdsmen (livestock keeping/farming/fishing). The result revealed that animal trypanosomosis, locally called “Sammore”, was well known by majority of the respondents (90.7%), while 64% know the vector – tsetse fly, locally called “binade”. The relationship between tsetse fly – as transmitting vector – and the disease was, however, poorly understood. Many respondents (60%) attributed the cause of the

disease to “winne”- animals resting place, whereas 5.3% attributed it to transhumant activities. Bovine trypanosomosis was considered a serious threat to cattle survival and productivity by 64% of respondents and ranked it second to contagious bovine pleuropneumonia in terms of mortality. Respondents demonstrated good knowledge of clinical signs of bovine trypanosomosis and good understanding on control strategies for the tsetse and other biting flies. Isometamidium chloride and diminazene aceturate were the orthodox drugs of choice and used by 26.7% and 22.7% of respondents for treatment of suspected cases. Factors including socio-economic, educational and environmental are influencing changes in the cultural practices including herding. Overall, the herdsmen displayed good knowledge and understanding of bovine trypanosomosis but paradoxically could not relate or attribute the disease to tsetse fly. This gap needs to be bridged by engaging herdsmen and other important stakeholders in enlightenment programs to augment their knowledge and awareness for effective intervention and control strategies of tsetse and bovine trypanosomosis in order to achieve sustainable livestock production in the area.

Key words: Herdsmen, Knowledge, Attitude, Perception, Tsetse fly, Animal Trypanosomosis, Bagudo LGA.

EVALUATION OF THE SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF THE PROJECT TO CREATE SUSTAINABLE TSETSE FLY-FREE AND TRYPANOSOMOSIS-FREE ZONES FOUR YEARS AFTER IT ENDED

Percoma L.I., Dipama A. R²., POODA S. H¹., Pagabeleguem S¹., Belem A. M. G³., Bouyer J⁴., I Sidibé¹.

¹Pan-African Tsetse and Trypanosomosis Eradication Campaign (PATTEC). 01 BP 1087 Bobo-Dioulasso 01 Burkina Faso. ²Ecole Nationale des Eaux et Forêt, Bobo-Dioulasso, Burkina Faso Email : ³Institut du Développement Rural Université Nazi Boni/(IDR/UNB). 01 BP 1091 Bobo-Dioulasso 01-Burkina Faso. ⁴UMR Cirad-Inra ASTRE « AnimalS, health, Territories, Risks and Ecosystems» Associated to UMR IRD/CIRAD INTERTYP.

ABSTRACT

The objective of this study was to assess the socio-economic and environmental impacts of tsetse and trypanosomosis control activities from 2006 to 2013. Over 42,138 insecticide-treated screens were used, 252 km of watercourses sprayed and epicutaneous and trypanocidal treatments performed. The evaluation was based on analytical approaches integrating the environment, the participation of populations and local authorities as well as visual observations. The LEOPOLD matrix facilitated the identification of impacts and the FECTEAU grid, the description and assessment of their absolute importance. In terms of impact, the increase of animal traction in crop farming (97.47% against 90.40% in 2013); a significant decrease in animal mortality (62.09%), an increase in average herd numbers with a relative variation of 48.73% between 2008 and 2017, the increase in average income per agro-pastoralist. In general, 97.98% of the respondents were satisfied with the results of the project and 95.29% found the methods used satisfactory. Negative changes include poaching, opening and extension of fields (51.76% of farmers); immigration (47.06%), overgrazing (40%) and the destruction of sacred sites (17.76%). These findings were supported by direct observations of the biophysical environment. Environmental protection measures together with measures to improve positive impacts and those to mitigate negative impacts have been proposed.

Key words: Impact, control, trypanosomiasis, tsetse fly, PATTEC, environment, socio-economy

5.06

ANIMAL HEALTH STEPS AWAY FROM ANTIBIOTICS-THE HERBAL SOLUTIONS .

Osunderu Oluwakemi Abosedo

Federal College of Complementary and Alternative Medicine, Abuja.

Forestry Research Institute Of Nigeria (FRIN), IBADAN,P O Box

1 733 1,Ikeja,Lagos,Nigeria.

Corresponding Author's Email and Phone Number: ooluwakemi@gmail.com

08060284722

Livestock diseases occur all year round in Nigeria but more mortalities are recorded when the weather is cold,dry and windy.The local livestock farmers have been able to identify several diseases like Trypasonomiasis, Newcastle,Contagious Bovine PleuroPneumonia(CBPP),helminthosis and Salmonellosis.These diseases have been given vernacular names based on prominent lessions,clinical signs,and organism seen or organs affected(1). The purpose of this study is to document the etnopractices being employed by the indegenous livestock farmers and to help scientists have a better understanding of indegenous knowledge,beliefs and Practices on disease control so as to acieve success in our collective effort towards sustainable animal health and food security.This paper presents information obtained from interviews conducted among livestock farmers in Southwest Nigeria comprising Ogun,Lagos,oyo,Osun and Ekiti states and existing literature on ethnoveterinary knowledge and practices. Some of the plants used by the farmers include Ageratum conyzoides for trypasonomiasis, Solanum incadium for coccidiosis,Momorcardia balsamina for fowl pox, khaya senegalensis bark for helminthosis and Capsicum fructenscens for Newcastle.There is a need to document the people's indegenous knowledge on ethnoveterinary medicine to ensure animal health and sustainable food security in Africa.

REFERENCES:

1. Abdu et al(2000):Ethnovetrinary Practices research and Development. 56-64.

**ASSESSMENT OF KNOWLEDGE, ATTITUDES
AND PRACTICES OF THE LOCAL COMMUNITY
SURROUNDING ARABUKO SOKOKE NATIONAL RESERVE,
KILIFI COUNTY, KENYA TOWARDS TSETSE FLIES AND
TRYPANOSOMIASIS**

Serem E.K^{1}, Abdullahi, O.A¹, Bargul, J. L.,^{3,4} and Mburu D. K².*

¹Department of Public Health, Pwani University P.O Box 195-80108, Kilifi

²Department of Biological Sciences, Pwani University P.O Box 195-80108, Kilifi ³ Department of Jomo Kenyatta University of Agriculture and Technology, P.O Box 62000-0200 Nairobi, Kenya. ⁴ International Centre of Insect Physiology and Ecology (ICIPE) PO Box 30772-00100, Nairobi, Kenya.

**corresponding author Serem Erick Kibichiy email: e.serem@pu.ac.ke*

Phone +254720282189

ABSTRACT

Animal trypanosomiasis remains a problem along the Kenyan coast leading to loss of animals and exacerbating poverty. Kilifi County is generally dry throughout the year and farmers prefer to live around Arabuko Sokoke National reserve where they can always get pasture. This leads to close contact between wild animals and livestock and subsequently transmission of trypanosomiasis. A cross sectional study (n = 404) was used to assess the knowledge, attitudes and practices of the local community on tsetse flies and trypanosomiasis. Focus group discussions were used to obtain more information. The data was keyed in using EpiData 3.1 and exported to STATA for analysis using univariate logistic regression and multivariate analysis. Results: (53%) of the participants were female, (30%) elderly (> 55 years), married (77%), (33%) no formal education. Only 16% had sufficient knowledge of tsetse flies. Females were less knowledgeable (crude Odds ratio 0.39 (95% CI 0.19-0.80)) compared to males. Participants with secondary and tertiary education levels were associated with higher odds of tsetse flies' knowledge; crude odds ratios 3.90 (95% CI 1.47-10.32) and 5.58 (95% CI 2.01-15.50). Majority of the people dipped or sprayed their animals to control ticks but were not aware that the acaricides could prevent tsetse bites. Clinical reports indicated that trypanosomiasis was the second most reported disease after helminth infections. Equines had the highest prevalence 0.8%. Many clinical cases not reported as private vets/para-vets attend to

most of the clinical cases.

Conclusion: More education programmes to bridge the huge knowledge gap.



African Union – Interafrican Bureau for Animal Resources
(AU-IBAR)

Kenindia Business Park
Museum Hill, Westlands Road
PO Box 30786
00100 Nairobi
Kenya
Tel: +254 (20) 3674 000
Fax: +254 (20) 3674 341 / 3674 342
Email: ibar.office@au-ibar.org
Website: www.au-ibar.org