Sixty eight years of AU/ISCTRC 1949

68

2017 Soixante-huit Années de AU / ISCTRC

34TH GENERAL CONFERENCE OF THE INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC) AND 16TH PATTEC COORDINATORS MEETING

PROGRAMME AND ABSTRACTS BOOK

AFRICAN UNION
INTERAFRICAN BUREAU
FOR ANIMAL RESOURCES

34TH GENERAL CONFERENCE OF THE INTERNATIONAL SCIENTIFIC COUNCIL FOR TRYPANOSOMIASIS RESEARCH AND CONTROL (ISCTRC) AND 16TH PATTEC COORDINATORS MEETING

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ABOUT THE CONFERENCE

Theme of the Conference

Capitalizing on the progress made against human and animal trypanosomiases – the way forward in partnership with all stakeholders

Members of the Scientific Committee

The members of the 34th 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 115 abstracts addressing the various sub-themes of the conference.

Prof. Ahmed Elsawalhy, Director of AU-IBAR, Chairperson
Dr. James Wabacha, ISCTRC Secretary, Member
Dr. Gift Wanda, Member
Dr. Rajinder Saini, Member
Dr. Jose Ramon Franco

Rapporteur and Moderators

Rapporteur General	Grace Mulira
Deputy Rapporteur General	Giuliano Cecchi

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 for presentation.

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, 14th September 2017.

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 the second Session

Certificate awards for the best posters
There will be awards of Certificates for the best five (5) posters presented at the conference. You are therefore requested to vote for one poster indicating your name and poster number.

A summary of presentations that will be made during the conference

Thematic area	**Oral**	**Poster**	**Total**
PATTEC and Country reports	17	0	17
Human African Trypanosomiasis	32	8	40
Animal African trypanosomiasis	16	5	21
Glossina Biology, Control and Eradication	17	10	27
Land use, environment and Socio-economics	8	2	10
Total	**90**	**25**	**115**

NATIONAL COORDINATING COMMITTEE

Chairperson
Dr Yona Sinkala (Director of Veterinary Services)

Secretary
Mr Kalinga Chilongo (Chief Tsetse Control Biologist)

Members

Professor Boniface Namangala	University of Zambia
Dr Swithine Kabilika	Department of Veterinary Services
Dr Lottie Hachaambwa	University of Zambia/University Teaching Hospital
Dr Cornelius Mweempwa	Department of Veterinary Services
Dr Cornelius Mundia	Department of Veterinary Services
Dr Paul Fandamu	Department of Veterinary Services
Mrs Eletina Lungu Jere	Fisheries and Livestock Information Service
Dr Gregory M Mululuma	Department of Veterinary Services
Mr Alikhadio Maseko	Department of Veterinary Services
Ms Tamara M. Chama	Ministry of Foreign Affairs
Mr Daniel Kachingwe	Ministry of Home Affairs (Immigration Department)
Ms Lois Mulube	Department of Human Resource
Ms Brenda Namwila	Department of Human Resource
Ms Prisca Chilufya	Ministry of Works and Supply
Ms Ruth Kambalakoko	Zambia Tourism Agency
Dr Lukuwi Lwindi	Ministry of Home Affairs (Zambia Police)

Sunday, 10th September 2017		
08.15 - 18.00	Registration, Distribution of documents and display of posters	
Monday, 11th September 2017		
08.00 - 0.900	Registration, Distribution of documents and display of posters	
SESSION 1		
09.00hrs	**OPENING CEREMONY** Statements by officials Keynote Address : Capitalizing on the progress made against human and animal trypanosomiases – the way forward in partnership with all stakeholders- 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: Bruce Mukanda **Rapporteur:** Gift Wanda	
11.30 - 11.50	**Key note Presentation** International Scientific Council for Trypanosomiasis Research and Control (ISCTRC) 68 years Journey as a vehicle to promote international cooperation in the fight against T&T-Prof. Ahmed Elsawalhy, James Wabacha and Solomon Haile Mariam	James Wabacha
11.50 -13.00	Presentations by Representatives of Organizations (FAO/PAAT, WHO, IAEA, ILRI, ICIPE, CIRDES, FIND, DNDi)	
13.00- 14.00	***Lunch break***	
SESSION 3a		
	Theme 1 : PATTEC initiative and Country reports	
	Moderator: Pamela Olet **Rapporteur:** Ndoutamia G. Anaclet	
14.00-14.20	**Key Note presentation** The Status of tsetse and trypanosomiasis elimination in Africa – challenges and way forward –Gift Wanda	Gift Wanda

14.20-14.30	Discussions	
14.30 - 14.45	1.01 Report on AU-PATTEC coordination office from 2015 to 2017. *Wanda Gift and Girma Urgeacha*	Girma Urgeacha
14.45 - 15.00	1.02 Report and Recommendations of 15th PATTEC National Coordinators and Focal/ Points meeting. *Wanda Gift, Girma Urgeacha*	Girma Urgeacha
15.00 - 15.10	1.03 Zambia Country Report 2016-2017 *Chilongo K and Mweempwa C.*	Chilongo K
15.10 - 15.20	1.04 Progress report on tsetse and trypanoamiasis activities in Tanzania from 2015 to 2017 *Joyce Daffa*	Joyce Daffa
15.20 - 15.30	1.05 Tsetse and trypanosmosis control by PATTEC Burkina 2013-2016 *Percoma Lassané, Pooda Sié Herman, Pagabeleguem Soumaila, Sidibe Issa*	Percoma Lassané
15.30 - 15.40	1.06 Country report of area-wide tsetse eradication programmes in Zimbabwe: 2015-2017 *W. Shereni*	W. Shereni
15.40 - 15.50	1.07 Current status of on-going tsetse and trypanosomiasis control operations in Nigeria through the PATTEC initiative *Dede, P.M., Ajakaiye, J.J. and Igweh A.C.*	Dede, P.M.
15.50 - 16.00	1.08 Country report on the control status of tsetse and trypanosomiasis in South Sudan *Erneo B. Ochi, Ayak C.Alak and Aluma A. Ameri*	Erneo B. Ochi
16.00 - 16.30	Discussion	
16.30 - 16.45	***Health Break and Viewing of Posters***	
SESSION 3b:		
Theme 1 : PATTEC initiative and Country reports Continued		
16.45 - 16.55	1.09 Report on tsetse and trypanosomosis control activities in Sudan *Mohammed Adam Hassan*	Mohammed Adam Hassan
16.55 - 17.05	1.10 Report for Mali *Boucader DIARRA*	Dr Boucader DIARRA

17.05 - 17.15	1.11 Progress report on tsetse and trypanosomosis control in Ghana *Y. Adama, B. Andersonb*	Y. Adama, B. Andersonb
17.15 - 17.25	1.12 Control of human African trypanosomiasis in the Democratic Republic of Congo:Country report of 2013-2015 *Makabuza J, Mpanya A, Lutumba P and Lumbala C*	Makabuza J.
17.25 - 17.35	1.13 Tsetse flies and trypanosomosis control and eradication operation in Ethiopia *Dagnachew Beyene and Solomon Mekonnen*	Dagnachew Beyene
17.35 - 17.45	1.14 The activities carried out by PATTEC-NIGER since 2015 *Moumouni HAROUNA*	Moumouni HAROUNA
17.45 – 18:15	Discussion	
	Cocktail to be confirmed	
Tuesday 12th September 2017		
SESSION 3c:		
Theme 1 : PATTEC initiative and Country reports Continued		
08.15 - 08.25	1.15 Evaluation of situation of trypanosomiasis in the north of Congo Brazzaville *Nina Rock Aime*	Nina Rock Aime
08.25- 08.35	1.16 The eradication of the tsetse fly glossina Palpalis Gambiensis from the Niayes of Senegal using an area-wide integrated pest management approach that includes the release of sterile males *Baba Sall, Momar Talla Seck, Jérémy Bouyer, Marc Vreysen*	Baba Sall
08.35 - 08.45	1.17 Control strategies implemented under the program after the Ebola epidemic to achieve the goal of eliminating sleeping sickness by 2020 *Camara. M ; Camara.O ; Kagbadouno S.M ; Camara. M .L, Bucheton.B; Solano. P*	Camara, M
08.45 – 10.00	Country reports on Tsetse and trypanosomiasis for the period 2015-2017	Country delegations
10.00 - 10.30	Discussions	
10.30 – 11.00	***Health Break and Viewing of Posters***	

SESSION 4a: Epidemiology		
Theme 2: Human African Trypanosomiasis		
	Moderators: Josenando Theophile (4a), C.Wamboga (4b), C. Lumbala (4d),E. Matovu (4e) **Rapporteur:** Abdoulaye Diarra	
11.00-11.20	**Key note Presentation** Capitalizing on the progress made towards elimination of HAT – the way forward	Franco Minguell.
11.20-11.30	Discussions	
11.30- 11.40	2.01 The study of trypanosome species circulating in domestic animals in two human African trypanosomiasis foci of CÔTE D'IVOIRE identifies pigs and cattle as potential reservoirs of Trypanosoma brucei gambiense *Martial Kassi N'Djetchi, Hamidou Ilboudo, Mathurin Koffi, Jacques Kaboré, Justin Kaboré, Dramane Kaba, Fabrice Courtin, Bamoro Coulibaly, Pierre Fauret, Lingué Kouakou, Sophie Ravel, Stijn Deborggraeve, Philippe Solano, Thierry De Meeûs, Bruno Bucheton, Vincent Jamonneau*	Martial Kassi N'Djetchi
11.40 - 11.50	2.02 First native human African trypanosomiasis case in Burkina Faso over the two past decades: What is the real risk of the re-emergence of the disease? *Dama Emilie, Drabo Franck, Drabo Aboubacar, Ouédraogo Elie, Coulibaly Bamoro, Kaboré Jacques, Ilboudo Hamidou, Kaboré Justin, Sakandé Hassane, Ouédraogo Micheline, Rayaissé Jean-Baptiste, Courtin Fabrice, Jamonneau Vincent*	Dama Emilie
11.50 - 12.00	2.03 Tracing the source of infection of human African trypanosomiasis: A study of recent (2015/2016) cases in Uganda *Bukachi SA, Wamboga C, Picado, A, Biéler S and Ndung'u JM*	Bukachi SA
12.00-12.10	2.04 Building national capacities for the use of the of human African trypanosomiasis atlas *Grout Lise, Paone M, Priotto G, Cecchi G, Diarra A, Franco JR*	Grout Lise

12.10-12.20	2.05 The sleeping sickness control in Isangi, D.R. Congo: Where do we stand? *Héritier Yalungu, Espérant Bolimbo, Crispin Lumbala, Florent Mbo*	Héritier Yalungu,
12.20 - 13.00	Discussion	
13.00 - 14.00	***Lunch break***	
SESSION 4b: Diagnosis and treatment		
Theme 2: Human African Trypanosomiasis		
14.00 - 14.10	2.06 Confirmation of antibodies against L-tryptophan-like epitope in human African trypanosomosis serological diagnosis *Silla Semballa, Romaric Nzoumbou-Boko, Philippe Holzmulle, Paul Chuchana, Jean-loup Lemesre, Philippe Vincendeau, Pierrette Courtois, Sylvie Daulouède and Philippe Truc*	Silla Semballa,
14.10 - 14.20	2.07 Prospective evaluation of a rapid diagnostic test for Gambiense human African trypanosomiasis developed using recombinant antigens in the Democratic Republic of the Congo *Lumbala C., Biéler S., Kayembe S., Makabuza J., Ongarello S., Ndung'u JM.*	Lumbala C.
14.20 - 14.30	2.08 Introduction of rapid tests to screen for human African trypanosomiasis in elimination strategies of the national programme in Guinea *Oumou Camara, Sylvain Bieler, Mamadou Leno, Daniel Tenkiano, Emile Lélano, Bala Traoré, Fodé Cissé, Moussa Kérouané Camara, Mariame Camara, Bruno Bucheton, Joseph Ndungu, Mamadou Camara*	Oumou Camara
14.30-14.40	2.09 Diagnostic tools for human African trypanosomiasis elimination and clinical trials (DITECT-HAT) *Lejon V, Koné M, Makabuza J, Ngay I, Camara O, Kaba D, Lumbala C, Mumba D, Camara M, Ilboudo H, Dama E, Fèvre E, Jamonneau V, Bucheton B, Büscher P*	Lejon V
14.40-14.50	2.10 Digital recording of DITECT-HAT study participant data, including macroscopic and microscopic images *Büscher P, Lejon V, Hasker E*	Büscher P

14.50-15.00	2.11 Trypanosome detection in skin biopsies from HAT patients and unconfirmed serological suspects in Guinea: the skin, a new target for diagnosis? *Mariame Camara, Brice Rotureau, Nono-Raymond kuispond Swar, Oumou Camara, Alseny M'mah Soumah, Hamidou Ilboudo, Alexandre Girard, Mamady Camara, Annette MacLeod, Bruno Bucheton.*	Mariame Camara
15.00-15.10	2.12 Novel TBR-PCR primers for improved detection of trypanozoon satellite DNA in human blood *Van Reet Nick, Balharbi Fatima, Bebronne Nicolas, Büscher Philippe*	Van Reet Nick
15.10-15.20	2.13 Rapid detection of human-infective trypanosomes in clinical specimens from Luangwa, Zambezi and Kafue river valleys using LAMP *Namangala Boniface, KAJINO Kiichi, HAYASHIDA Kyouko, HACHAAMBWA Lottie, LISULO Malimba, OPARAOCHA Elizabeth, SIMUUNZA Martin, SIMUKOKO Humphrey, CHOTA Amos, CHIZEMA Elizabeth, KASONKA Lackson, GWENHURE Lambert, MAKAYA Pius, SUZUKI Yasuhiko, SUGIMOTO Chihiro*	Namangala Boniface
15.20-15.30	2.14 Development and evaluation of a novel dry lamp kit for rapid diagnosis of human African trypanosomiasis *Kyoko Hayashida, Boniface Namangala, Lottie Hachaambwa, John Chisi, Junya Yamagishi, Chihiro Sugimoto*	Kyoko Hayashida
15.30-15.40	2.15 Diversity of aquaglyceroporin genes (TBAQP) in trypanozoon and their relation to melarsoprol and pentamidine cross-resistance *Van Reet Nick, Pyana Pati, Birhanu Hadush Abera & Büscher Philippe*	Van Reet Nick

15.40-15.50	2.16 The value of baseline clinical assessment in case detection for human African trypanosomiasis *Olaf Valverde Mordt, Victor Kande Betu Kumeso, Wilfried Mutombo Kalonji, Digas Ngolo, Séverine Blesson, François Simon, Clélia Bardonneau, Antoine Tarra*	Olaf Valverde Mordt
15.50-16.30	Discussion	
16.30- 17.00	***Health Break and Viewing of Posters***	
SESSION 4c: Symposium		
17.00	FIND/WHO Symposium	
18.00	Cocktail Courtesy of FIND	
Wednesday 13th September 2017		
SESSION 4d: Control and Surveillance Strategies		
08.15- 08.25	2.17 Enhanced screening and diagnosis of Gambiense human African trypanosomiasis in north-western Uganda - moving towards elimination *Charles Wamboga, Enock Matovu, Paul Richard Bessell, Albert Picado, Sylvain Biéler, Joseph Mathu Ndung'u*	Charles Wamboga
08.25- 08.35	2.18 A targeted door-to-door strategy for sleeping sickness detection in low-prevalence settings in CÔTE D'IVOIRE *Mathurin Koffi, Martial N'Djetchi, Hamidou Ilboudo, Dramane Kaba, Bamoro Coulibaly, Emmanuel N'Gouan, Lingué Kouakou, Bruno Bucheton, Philippe Solano, Fabrice Courtin, Stephan Ehrhardt, and Vincent Jamonneau*	Mathurin Koffi,
08.35 - 08.45	2.19 A strategy combining passive surveillance and reactive active screening to control human african trypanosomiasis during the ebola crisis in GUINEA *Camara M, Bucheton B, Camara O, Camara M, Biéler S,* Ndung'u J	Camara M
08.45 - 08.55	2.20 Inputs from new strategies to contribute to the elimination of HAT: The case of the Mandoul Focus, Chad *M. Peka, S. M. Bainda, J. Darnas, T. Benadjim, G. Langarsou, R. Wang, P. Bessell, P. Albert, J. Ndung'u, A.Diarra, J.R. Franco.*	M. Peka

08.55 - 09.05	2.21 Intensive passive surveillance for human african trypanosomiasis in Delta State, Nigeria *Enwezor F.N.C, Dede, P.M, Ovbagbedia, P.R, Onwumah, U,Mamman, M, Igweh, A.C1, Anagbogu, Okeowo, P, Arugba, D, Otobo, E.S, Oseji, M. I, Biéler, S and Ndung'u, J.M.*	Enwezor F.N.C
09.05 - 09.15	2.22 Geographic distribution of human african trypanosomiasis cases in the Democratic Republic of Congo from 2011 to 2015: Analysis of the HAT atlas data *Shampa chansy, Makabuza jacquies., Lumbala Crispin, MBO Florent*	Shampa chansy
09.15 - 09.25	2.23 Feasibility of HAT elimination by improving screening with innovative methods in the Democratic Republic of Congo (DRC) *Mpanya A, Claeys Y, Fukisia A, Snijders R, Makabuza J, Tirados I, Torr S, Boelaert M, Lutumba P, Lumbala C and Hasker E.*	Mpanya A
09.25 - 09.35	2.24 Integration of human african trypanosomiasis into basic health services, a scoping review *Mulenga P, Boelaert M, Chenge F, Lutumba P, Mukalay A , Lumbala C , Luboya O, Coppieters Y*	Mulenga P
09.35 - 10.00	Discussion	
10.00 - 10.30	***Health Break and Viewing of Posters***	
SESSION 4e: Control and Surveillance Strategies		
10.30-10.40	2.25 Implementing human african trypanosomiasis (HAT) integrated passive Surveillance for the documentation of its elimination *Diarra A; Priotto G, Grout L, Franco JR*	Diarra A
10.40-10.50	2.26 Intensified sleeping sickness elimination programme in South Sudan using an integrated strategy: Rolling out the communication strategy *Bukachi SA, Mumbo AA, Alak, ACD, Sebit W, Rumunu J, Biéler S and Ndung'u JM*	Bukachi SA
10.50-11.00	2.27 WHO network for HAT elimination. Update on a key element for the elimination of the disease *Priotto G, Franco JR, Diarra A, Grout L.*	Priotto G

11.00-11.10	2.28 Glossina and african animal trypanosomosis: Status for a one health approach in the fight against african human trypanosomiasis (HAT) in the Maro outbreak (Chad) *Brahim Guihini M; M. Peka; JB. Rayaisse ; I. Tirados; F. Courtin; H.M. Hassan;* *P. Solano; J. Darnas ; J. Rouamba*	Brahim Guihini M
11.10-11.20	2.29 Transmission of sleeping sickness in the health zone of Yassa Bonga (Kwilu, Democratic Republic of Congo) *Philémon MANSINSA DIABAKANA and Pascal GREBAUT*	Philémon Mansinsa Diabakana
11.20-11.30	2.30 Tsetse control operations as an element of chronic HAT reduction in Bandundu Province, DRC *Selby, Richard. Bessell, Paul. Tirados, Inaki. Hope, Andrew. Vander Kelen,* *Catiane. Claeys, Yves. Hasker, Epco. Gimonneau, Geoffrey. Mpembele, Fabrice. Lumbala, Crispin. Lehane, Mike. Torr, Stephen.*	Selby
11.30-11.40	2.31 Evaluation of community participation in vector control in the Democratic Republic of Congo (the case of Katanda and Kasansa health areas in eastern Kasaï Coordination) *Dr Crispin Lumbala, Patrice Kabangu, Dr Jullienne Tshiowa, Leon Ilunga, Trudon*	Dr Crispin Lumbala
11.40.11.50	2.32 Understanding the dynamics of sleeping sickness through mathematical modelling *Kat Rock*	Kat Rock
11.50- 12.20	Discussion	
SESSION 5a: Epidemiology		
Theme 3: Animal African Trypanosomiasis		
	Moderator: Dr Sinkala **Rapporteur:** Mbahin Norber	
12.20-12.40	**Key Note Presentation** The Progressive Control Pathway (PCP) for African Animal Trypanosomosis (AAT)	Cecchi Giuliano
12.40-13.00	Discussion	
13.00-14.00	***Lunch break***	

14.00 - 14.10	3.01 Developing an atlas of tsetse and african animal trypanosomosis for Senegal *Ciss M., Sall B, Seck M.T, Bouyer J, Cecchi G.*	Ciss M
14.10 - 14.20	3.02 Parasitological prevalence of bovine trypanosomosis in Kubo Division of Kwale County of coastal: Baseline survey *Mbahin, N., Affognon, H., Andoke, J., Tiberius, M., Mbuvi, D., Otieno, J., Muasa, P., Saini, R.K.*	Mbahin, N.,
14.20 - 14.30	3.03 Prevalence and risk factors associated with bovine trypanosomosis using conventional methods and polymerase chain reaction (PCR) in the Blue Nile State, Sudan *Khalda Abbass Elkhazeen, Rehab Ali Yagi, Dia Eldeen Ahmed Salih, Rihab Ali Omer and Atif Elamin Abdelgadir*	Khalda Abbass Elkhazeen
14.30 - 14.40	3.04 Prevalence of trypanosome infections in cattle and tsetse flies in the Maasai Steppe, northern Tanzania *Mary Simwango, Anibariki Ngonyoka, Happiness Nnko, Linda P. Salekwa,* *Moses Ole-Neselle, Sharadhuli I. Kimera and Paul S. Gwakisa.*	Mary Simwango
14.40 - 14.50	3.05 Study of bovine trypanosomosis in Say and Torodi Departments (Niger) *M. Harouna, P. kone, A Hassane, Z. Bengaly*	M. Harouna
14.50 - 15.00	3.06 Screening cattle as potential reservoirs of sleeping sickness around Liwonde national park, Malawi, *Emmanuel Maganga, Chihiro Sugimato, John Chisi, Jenelisa Musaya, Edward Senga, Peter Namabala, Gilson Njunga, Patrick Chikungwa*	Emmanuel Maganga
15.00 - 15.10	3.07 Vectors and parasitological prevalence of african animal trypanosomosis in cattle in the Department of Djerem (Adamaoua - Cameroon) *Abah S., Njan Nloga A.M, Tchuengem Fohouo F. N.*	Abah S
15.10- 15.20	3.08 Determination of the prevalence of african trypanosome species in indigenous dogs of Mambwe district, eastern Zambia, by loop-mediated isothermal amplification *Malimba Lisulo and Boniface Namangala*	Malimba Lisulo

15.20- 15.30	3.09 The incrimination of three trypanosomes species in clinically affected German-shepherd dogs in Sudan *Bashir Salim,Ehab Mossaad, Keisuke Suganuma*	Bashir Salim
15.30 – 16.00	Discussions	
16.00 - 16.30	***Health Break***	
SESSION 5b Diagnosis		
16.30 – 16.40	3.10 Detection of re-emerging bovine trypanosomiasis in southern Zambia by loop-mediated isothermal amplification (LAMP) *Bukowa K M, Sugimoto C, Simukoko H, Sinyangwe L, Chitambo H, Mataa L, Moonga L, Fandumu P, Silawve V, Inoue N and Namangala B.*	Bukowa K M
16.40 - 16.50	3.11 Utilization of crude and recombinant ELISAs for serodiagnosis of camel trypanosomosis in Sudan *Ehab Mossaad, Bashir Salim, Keisuke Suganuma, Peter Musinguzi , Mohamed Adam Hassan , E.A. Elamin , G.E . Mohammed , Amel O. Bakhiet, Rawan A. Satti, Noboru Inoue*	Ehab Mossaad
16.50 - 17.00	3.12 Repertoire and expression of variant surface glycoproteins of Trypanosoma evansi in experimentally infected Malaysian ponies *Elshafie, E. I, Sani, R. A, Sharma, R, Abubakar. A, Mahira, W.*	Elshafie, E. I
17.00 -17.10	3.13 Assessment of virulence in Trypanosoma evansi isolates from camel trypanosomiasis endemic regions *Grace Murilla, Christine M. Kamidi, Joanna Auma, Paul O. Mireji, Kariuki* *Ndungu, Rosemary Bateta, Richard Kurgat, Collins Ouma and Serap Aksoy*	Grace Murilla
17.10-17.30	Discussions	

Thursday 14th September 2017		
SESSION 5c : Chemotherapy and drug resistance		
08.15 – 08. 25	3.14 Drug quality analysis of isometamidium chloride hydrochloride and diminazene diaceturate in the framework of epidemiological surveillance network of chemoresistance to trypanocidal and acaricides in west Africa (RESCAO) *Somda M.B, Bengaly Z, Zongo A,Vitouley H.S, Teko-Agibo A and Sidibe I*	Somda M.B
08.25 – 08.35	3.15 Preliminary diagnosis on the goats Trypanosoma vivax chemoresistance to aceturate diminazene and isometamidium chloride in the savanah region *Boma S, Dao B, Bengaly Z AND Nuto Y*	Boma S
08.35 – 08.45	3.16 Animal trypanosomosis in Togo in chemoresistance context Talaki E, Dao B, Batawui K. B, Tchamdja E, Dayo G-K, Akoda K	Talaki E,
08.45 – 09.00	Discussion	
SESSION 6 : Poster session		
09.00-10.00	Discussions in the conference hall **Moderator:** Lamine Dia **Rapporteur:** Mbahin Norber	
10.00 - 10.30	***Health Break and viewing of posters***	
SESSION 7a: Biology		
THEME 4 : Glossina Biology, Control and Eradication		
	Moderator: Rajinder Saini (7a), William Shereni (7b) **Rapporteur:** Baba Sall	
10.30-10.50	**Key Note presentation** Maximizing opportunities for integrated tsetse and trypanosomiasis control and elimination-Rajinder Saini	Rajinder Saini
10.50 -11.00	Discussion	

11.00 - 11.10	4.01 Molecular xenomonitoring of trypanosomes in tsetse for prioritizing tsetse control in sleeping sickness endemic areas in Tanzania *Hamis Nyingilili, Eugene Lyaruu, Idrisa Chuma, Imna Malele*	Hamis Nyingilili
11.10 - 11.20	4.02 Increasing the toolbox for trypanosomiasis control : Exploring efficacy of metacyclic antigens for mammalian vaccines *Serap Aksoy, Amy F. Savage, Michelle O'Neill, Aurelien Vigneron, Brian L. Weiss*	Serap Aksoy
11.20 - 11.30	4.03 Infection rates, genetic diversity and population structure of Trypanosoma brucei in Uganda: implications for the epidemiology of sleeping sickness and nagana *Richard Echodu, Mark Sistrom, Rosemary Bateta, Grace Murilla, Loyce Okedi, Serap Aksoy, Chineme Enyioha, John Enyaru, Robert Opiro, Elizabeth Opiyo, Calvin Owora, Wendy Gibson, Adalgisa Caccone*	Richard Echodu
11.30 - 11.40	4.04 Trypanosoma infection modulates the expression of genes from field tsetse flies *Tsagmo Ngoune J. M, Njiokou F, Loriod B, Kame Ngasse G, Fernandez-Nunez N, Rioualen C, van Helden J, Geiger A.*	Tsagmo Ngoune J. M
11.40 - 11.50	4.05 Eco distribution and preferred host of tsetse flies in sleeping sickness focus: interest for vector control *D. Berté, D. Kaba, F. Courtin, BTD Ta, S. Ravel, B. Bamoro, JB Rayaisse, V. Djohan, M Koffi, V. Jamonneau, KE N'Goran and P. Solano*	D. Berté
11.50 - 12.00	4.06 Age-Specific Trypanosome Infection Rates in Tsetse (Diptera: Glossinidae) as a Function of Season *John W. Hargrove and David Tsikire.*	David Tsikire
12.00 - 12.10	4.07 Spatial distribution and trypanosome infection of tsetse flies in the sleeping sickness focus of Zimbabwe in Hurungwe District *William Shereni, Neil E Anderson, Learnmore Nyakupinda and Giuliano Cecchi*	Learnmore Nyakupinda
12.10 – 12.20	4.08 Multiple evolutionary origins of Trypanosoma evansi in Kenya *Christine Muhonja*	Christine Muhonja

12.20 – 12.30	4.09 Tsetse symbiosis: infection prevalence and prospects for application in vector and disease control *Florence N. Wamwiri, Samuel O. Guya and Robert E. Changasi*	Florence N. Wamwiri
12.30-12.40	4.10 The role of population genetics in guiding tsetse control programs, a case of Glossina fuscipes in Uganda	
12.40 - 13.00	Discussion	
13.00 - 14.00	***Lunch Break***	
SESSION: Interactions with the environment		
14.00 – 18.00	Visit to Victoria Falls, Livingstone Game Park, Boat Cruise etc	
Session 7b: Control Friday 15th September 2017		
08.15 - 08.25	4.11 Change in the tsetse and trypanosomiasis situation during the period 1987 to 2015 in a 1,800km2 area in eastern Zambia subjected to tsetse control with odour-baited targets from 1986 to 1999 *Chilongo K1, Mweempwa C, Sikazindu J. and Chupa A*	Chilongo K
08.25 - 08.35	4.12 Glossina palpalis gambiensis selects its larviposition sites *R. Ouedraogo, J.B Rayaisse, E. Salou, J. Bouyer and G. Gimonneau*	G. Gimonneau
08.35 – 08.45	4.13 Responses of riverine tsetse (Glossina fuscipes fuscipes) to 4-methylguaiacol and a blend of specific compounds in waterbuck (kobus defassa) odour at stationary visual attractive traps *Njelembo J Mbewe, Rajinder K Saini, Baldwyn Torto, Janet Irungu1, Abdullahi A Yusuf and Christian Pirk*	Njelembo J Mbewe
08.45- 08.55	4.14 Evaluation of tsetse flies repellents prior to commercialisation and mass release for use on management of trypanosomiasis in Kenya *Kabochi Samuel Kamau, Onyango Irene Awino, Masiga Daniel, Mwasia Peter, Njuguna Daniel Irungu, Ithondeka Peter, Saini Kumar Rajinder*	Kabochi Samuel Kamau

08.55- 09.05	4.15 Chemo-ecological and chemo-sensory responses in tsetse flies *Paul O. Mireji, Benson M. Wachira, Joy M. Kabaka, Sylvance O. Okoth, Grace M. Murilla, Margaret M. Ng'ang'a, Serap Aksoy, Ahmed Hassanali*	Paul O. Mireji,
09.05 – 09.15	4.16 Sustainable application of live bait technology under the stamp out sleeping sickness program of Uganda *Robert Mandela WANGOOLA and Charles WAISWA*	Paul O. Mireji,
09.15-09.25	4.17 Tsetse and trypanosomiasis situation three years after aerial spraying (SAT) in western Zambia *Mweempwa C, Chilongo K and Kgori PM*	
09. 25 - 10.00	Discussion	
10.00-10.30	***Health Break***	
	Side meeting: Manuscript Writing by PLOSNTD Open Access Journal	
SESSION: 7c		
10.30- 11.30	Symposium : New Insights from Tsetse Biology for Evidence based HAT Control	
SESSION: 8		
	Theme:5 Land Use Environment and Socio - economics	
	Moderator: Wisal Elnour M. Elhassan **Rapporteur:** Lisette Kohagne	
11.30 - 11.50	**Key Note Presentation** Impacts of land use, environment and climate changes on the dynamics of T&T and derived socio-economic benefits	Joseph Maitima
11.50- 12.00	Discussion	
12.00 – 12.10	5.01 Trypanomosis as a constraint to goat production in Zambia: a review of available research based information in relation to prospects for increased goat production *Chonde, D, Chilongo K, and Mweempwa C.*	Chonde, D
12.10 – 12.20	5.02 Developing effective public health care delivery policy advocacy communication strategies to empowers african communities for SDG 3 progress *Wilson Okaka, Jonathan Okecha, & Jennifer Apil*	Wilson Okaka

12.20 – 12.30	5.03 Pastoralists knowledge, attitudes and practices of bovine trypanosomosis epidemiology and control in the blue nile state-the sudan *Wisal Elnour M. Elhassan, Fayga Hussein Ballal, & A.H.A/Rahman*	Fayga Hussein Ballal
12.30 – 12.40	5.04 Farmers' perception on gains from the use of SAT for tsetse and trypanosomiasis control in western Zambia *C. Sakala, K. Chilongo, T. Q. Milasi, E,Mbozi*	C. Sakala
12.40- 12.50	5.05 Impact of tsetse and trypanosomiasis control on household income in Pate island of lamu county, Kenya *Seth Onyango, Pamela Olet, Sabina Mukoya-Wangia, Josiah Kinama*	Seth Onyango
12.50- 13.00	5.06 Hidden dimensions of human-wildlife conflict: Do warthog activities provide refuge to tsetse flies during the dry season in Kubo South, Kenya? *Irene A. Onyango, Michael N. Okal, Dan K. Masiga*	Irene A. Onyango
13.00 – 13.10	5.07 Absolute zero – A history of elimination aspirations for sleeping sickness, 1945-present *Pete Kingsley and James Smith*	Pete Kingsley
13.10- 13.20	5.08 Ensuring refugees are not left behind in sleeping sickness elimination *Jennifer Palmer, Okello Robert, Freddie Kansiime*	Jennifer Palmer
13.20 – 13.30	Discussions	
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SESSION 9		
	Moderator: Bruce Mukanda **Rapporteur:** Gift Wanda	
14.30-15.30	Recommendations	
15.30-16.30	Closing Ceremony	
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Wanda Gift and Girmau Urgeacha

1.02 REPORT AND RECOMMENDATIONS OF 15TH PATTEC NATIONAL COORDINATORS AND FOCAL/POINTS MEETING
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1.03 ZAMBIA COUNTRY REPORT 2016-17
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1.04 PROGRESS REPORT ON TSETSE AND TRYPANOAMIASIS ACTIVITIES IN TANZANIA FROM 2015 TO 2017
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1.05 TSETSE AND TRYPANOSMOSIS CONTROL BY PATTEC BURKINA 2013-2016
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1.06 COUNTRY REPORT OF AREA-WIDE TSETSE ERADICATION PROGRAMMES IN ZIMBABWE: 2015-2017
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1.07 CURRENT STATUS OF ON-GOING TSETSE AND TRYPANOSOMIASIS CONTROL OPERATIONS IN NIGERIA THROUGH THE PATTEC INITIATIVE
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1.08 COUNTRY REPORT ON THE CONTROL STATUS OF TSETSE AND TRYPANOSOMIASIS IN SOUTH SUDAN
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1.17 CONTROL STRATEGIES IMPLEMENTED UNDER THE PROGRAM AFTER THE EBOLA EPIDEMIC TO ACHIEVE THE GOAL OF ELIMINATING SLEEPING SICKNESS BY 2020 (111)
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II HUMAN AFRICAN TRYPANOSOMIASIS (HAT)

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1.01

REPORT ON AU - PATTEC COORDINATION OFFICE FROM 2015 TO 2017

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The tsetse and Trypanosomiasis problem is vast and complex as it manifests as human and animal disease, negatively impacts on agricultural development, land use and responsible use of natural resources, limits human settlements and socio-economic development. The problem remains a serious threat to the lives and livelihoods of entire communities and constitutes the greatest single constraint to livestock and crop production in the continent.

Since its inception in 2000 in Lome-Togo by the African Heads of State and Government, the PATTEC Coordination Office has devoted to advance the successful implementation of the PATTEC initiative through its mandated activities: consulting, mediating, reminding countries; drumming up action & informing; advocacy and awareness creation; facilitating development of T&T eradication project proposals; conducting studies; providing capacity building & Trainings; facilitate resources mobilization; assessing T&T implementation progress.

The report summarizes major activities of the PATTEC Coordination Office during the last two years. It highlights achievements and challenges and proposes the way forward to promote implementation of the PATTEC initiative.

1.02

REPORT AND RECOMMENDATIONS OF 15TH PATTEC NATIONAL COORDINATORS AND FOCAL/POINTS MEETING

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The 15th PATTEC Coordinators meeting, with a theme of "Addressing challenges and harnessing opportunities to advance the fight against Tsetse and Trypanosomiasis problems in Africa", was held in the premises of Africa Union Commission Headquarters on 28-29 November 2016. National Coordinators/Focal persons from member states and representatives of partner institutions made presentations towards the implementation of PATTEC initiatives and concluded the meeting with recommendations. (1)The meeting requested the AU-PATTEC to identify specific costed activities which should be submitted to IAEA for technical support – the PATTEC coordination Office had shared a concept note to IAEA with targeted activities that include M&E, resource mobilization, capacity building and advocacy. (2)The meeting recommended to promote the PATTEC objective of concerted action and that efforts should be made to develop Regional Projects that would promote area-wide pest management involving groups of countries – IAEA/PATTEC/FAO collaborated to organise a regional workshop to draft a regional project for ECOWAS member states.The AU-PATTEC got approval of funding for conducting workshops to initiate dialogues among member states, RECs and potential partners. (3) The meeting recommended that there should be an extensive overhaul of the PATTEC strategy with a view to ensuring that set targets are met within the shortest possible time – AU-PATTEC plans to develop a successor Strategic Plan scheduled for 2018 which will include a development of new roadmap to address the issue. (4) The meeting recommended that AU/PATTEC in partnership with Member countries should embark on an intensive sensitization (Advocacy) of national and international policy makers and revive the Policy and Resource Mobilization Committee. The meeting further recommended that the AU-PATTEC should follow up on past pledges made by resource

partners and Member States – a dedicated resource mobilization strategy is under development and support to finalize the document has been made to partners. The ToRs of the current Steering Committee include resource mobilization. (5) The meeting recommended that it is high time the AU-PATTEC took charge to sensitize new office bearers at the levels of Head of States and ministers to support member states plans towards increased commitment and momentum - the Coordination office briefed the new management about the PATTEC Imitative and closely works with the management of Rural Economy and Agriculture to draw a way forward. Member States funds are approved for this activity in the 2018 PATTEC Programme budget. (6) The meeting had recommended that AU-PATTEC in collaboration with International Technical partners should assist and coordinate countries to formulate new bankable Regional programs. It was further recommended that to increase their competitiveness, the proposals should aim to address issues beyond T&T and should include continental and global initiatives such as Agenda 2063, Malabo Declaration, Gender mainstreaming, Climate change resilience and Sustainable Development Goals to attract funding. – the activity has been proposed in the next work plan and member States funds have been approved for this activity in the 2018 PATTEC Programme budget. (7) Recognizing the dwindling funding situation available to finance PATTEC activities, the meeting recommended that next AU-PATTEC action items be prioritized, especially in advocacy at the level of the AUC TO ENSURE THAT THE INCOMING COMMISSIONERS are adequately informed on PATTEC including achievements and future direction of the initiative – the new Commissioner has been well briefed about PATTEC. PATTEC activities have been included in DREA programmatic approach for resource mobilization (CAADP business plan). (8) The progressive pathways and roadmaps approach is being successfully used for the control of FMD, PPR and rabies. An initiative has been recently launched by FAO and partner organizations for the adaptation of the approach to AAT control and elimination. The participants recommended the support of AU-PATTEC, countries and international organizations to this initiative – A joint FAO/AU-PATTEC/Member States proposal has been submitted to BADEA to promote PCP in Eastern African Countries

1.03

COUNTRY REPORT 2016-17 – ZAMBIA

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An estimated 280km2 (38%) of Zambia's land area is tsetse infested, and the country is affected by both the animal and human forms of tsetse-transmitted trypanosomiasis. However, it is largely Animal trypanosomiasis (AAT) that forms the basis for almost all the major interventions against tsetse flies since the colonial era. AAT affects mostly the Southern, Western and Eastern provinces, largely because these provinces have the largest proportion of cattle exposed to the risk of infection with the disease. As a consequence, these provinces have been the focus of most, if not all, of the major interventions (activities) against the tsetse and trypanosomiasis problem in the country. Since the end of 2015, two of the major tsetse and trypanosomiasis control activities have been centered on plans to make a start with eradication oriented tsetse control operations in the eastern tsetse belt, i.e.; (1) Tsetse and trypanosomiasis surveys covering some 4000km2 in four districts in the eastern province, with particular attention given to areas that had been subjected to major tsetse control operations in the 1990s – i.e. with the objective of checking/verifying the current extent and magnitude of the tsetse infestation in the respective area; (2) Baseline surveys in the west-most portion of the eastern tsetse belt, i.e. the Luano valley (proposed first spray block), in preparation for the first aerial spraying operation in the belt, that had been planned for 2017. The other major assignments executed were those associated with the 2014 spray block, i.e. maintenance of the tsetse barrier in the area and, surveys to monitor the situation in the area with regard to tsetse presence and trypanosomiasis prevalence. The report presents, (i) the findings/outcomes through or from these assignments and also the likely explanations for these, (ii) the major challenges that prevailed, and (iii) the proposed way forward.

1.04

PROGRESS REPORT ON TSETSE AND TRYPANOAMIASIS ACTIVITIES IN TANZANIA FROM 2015 TO 2017

Joyce Daffa

Tsetse transmitted Human and Animal African Trypanosomiasis are zoonotic diseases of socio-economic importance and its containment is crucial towards food security in Tanzania. These diseases put at risk about 4 million people in 6 regions and 17million cattle and other livestock species in about 30 regions in human-animal interface ecosystems. During the period under review (2015 to 2017) the reports showed that there is <10 new rhodesiense Human African Trypanosomiasis (rHAT) cases annually. About 3851 Animal African Trypanosomiasis (AAT) cases and 317 deaths from 29 foci in 66 districts (2016) from 20 regions reported from surveillance. Common cattle pathogens are Trypanosoma vivax, T. congolense and T. brucei which also affect horses, donkeys and goats; whereas T. simiae affect pigs. In cognition that the human food chain is continuously threatened by endemic as well as emerging and re-emerging zoonotic diseases; currently, the lead ministries for Health, livestock and Wildlife in collaboration with FAO and One Health Coordination Unit (OHCU) identified 6 Priority Zoonotic Diseases (PZDs), among them is HAT. Tsetse and Trypanosomiasis control (T&Tc) is on - going in National parks and affected regions. Moreover, advocacy materials and surveillance guidelines have been developed for T&Tc. On research, the on-going activities to mention a few include enhancing vector refractoriness to trypanosome infection; assessing human infective Trypanosomes in National Parks and capacity of health system for sustainable management of HAT. This paper highlights on progressive T&T activities in Tanzania.

1.05

TSETSE AND TRYPANOSMOSIS CONTROL BY PATTEC BURKINA 2013-2016

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Community-based control activities were initiated by PATTEC from 2013 to 2016 with the aim of ensuring perpetuation of achievements of the project first phase. Indeed, from 2009 to 2013, 42138 screens and 1320 impregnated traps were laid, tsetse densities and animal trypanosomiasis prevalence were reduced, and 75 village-level control committees (CVS: comités villageois de luttes) were formed. For stocktaking purposes at the end of the project, surveys were conducted on initially infested sites, between January and May 2013, using 824 biconical traps Chalier-Laveissière. After 3 terrestrial fumigation sessions conducted from March to May 2013, 3165 impregnated screens were laid in those infested sites between 17 April and 23 May 2014 with the support of beneficiaries on a voluntary basis. Community meals were shared after each day's activity. In 2015, 151 volunteers were identified from April 26 to May 3, with 2523 screens including 1757 deployed and 536 others in 2016. Correspondence was sent to the Regional Directorates of Animal Resources in order to hand over some activities to departmental officers. Three control activities were carried out by these officers. These controls revealed the low level of re-invasion. Barriers were maintained each year. At the same time, with FAO financial support, control committees were trained in on entomological controls with GPS and equipped with 5 GPS Garmin Etrex 30. An annual session to re-impregnate and redeploy screens was organized by Tiefora CVS (Sideradougou).

Keywords: Community Participation, Sustainability, Tsetse, Control

1.06

COUNTRY REPORT OF AREA-WIDE TSETSE ERADICATION PROGRAMMES IN ZIMBABWE: 2015-2017

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Tsetse Control Operations were focused in the North-Western and Northern districts of Zimbabwe where trypanosomiasis was having an impact on cattle production and human health respectively. In the North-West, tsetse flies were eliminated from 2 300km2 since 2015 using 1 926 insecticide-treated and odour-baited targets deployed evenly in grids and in transects along drainages at 4 targets per km2. The apparent fly density was reduced by approximately 90% from 4.8 flies/trap/day for G m morsitans and 0.9 for G. pallidipes. In addition to the effect of targets, flies were also eliminated from most of this area due to intense human agricultural activities which rendered the area unsuitable for tsetse. Progressive eradication with targets is continuing over 1 050km2 to clear tsetse from areas surrounding the 1 200km2 SIT block in the Matusadona National Park and will be followed by the tsetse suppression phase prior to the release of sterile males in 2019. In Hurungwe, the target operation consisting of 1 200 targets and covering 300km2 in the r-HAT endemic area, commenced in 2015. This operation was aimed to reduce the risk of contracting r-HAT by Safari hunters, National Parks staff and among the local community. Although most cases of r-HAT were recorded in this focal area, tsetse surveys in 2015 using epsilon traps confirmed low pre-treatment fly densities of 0.14573 for G m morsitans and 0.003 for G. pallidipes. The apparent density had declined to 0.10 for G. m. morsitans and 0.0002 for G. pallidipes by 2016 demonstrating a huge impact of the target operation on the fly population.

1.07

CURRENT STATUS OF ON-GOING TSETSE AND TRYPANOSOMIASIS CONTROL OPERATIONS IN NIGERIA THROUGH THE PATTEC INITIATIVE

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Tsetse and trypanosomiasis control operations are being implemented as outlined in the plan of action and proposals for the two project areas (North-west and North-east). For ease of operation, the country was demarcated along its 6 geo-political zones, with the carpet roll-up approach adopted, starting from the North-west and North-east zones. Results of monitoring and evaluation in Jigawa State for three consecutive years in both wet and dry season did not record tsetse presence in all the blocks surveyed in the 27 Local Government Areas (LGAs). However, other biting and non-biting flies of medical and veterinary importance were caught in both seasons with higher catches in wet season. It is obvious from the findings that animal trypanosomiasis prevalence, which ranges from 3.01-4.21 still persist in all the areas survey. Jigawa State has therefore been declared tsetse free and becomes the first State to assume that status in Nigeria. The PCMU has acquired enough equipment and materials for its field operations in the adjourning States of Katsina, Kano and Bauchi, eventhough insecurity remained a major concern and constraint in the implementation of PATTEC activities in these northern States. The entomological team monitored and evaluated on-going tsetse suppression in Yankari Game Reserve (YGR) using insecticides impregnated screens and targets after a period of 4 years, with results showing progressive reduction in the apparent density (AD) of Glossina tachinoides and G. morsitans submorsitans to 20.10 and 15 flies/trap/day (F/T/D) respectively in April, 2017. After M&E, 532 exposed screens and targets were again re-impregnated and 425 new ones erected. Other projects being implemented in line with the overall objective of PATTEC include 1) tsetse and trypanosomiasis survey and control in the International Fertilizer Development Company (IFDC)/ West African Milk Company (WAMCO) phase I operational areas in 9 LGAs of Oyo State, a Public and Private Partnership (PPP) initiative. Activities undertaken include a) entomological, parasitological and

socio-economic monitoring and evaluation that showed progressive decline in population density of Glossina p. palpalis in all the river systems monitored, with AD ranging from 0.65 to 11.4 F/T/D. Altogether 642 screens and 267 targets were re-impregnated with deltamethrin at 0.65ai, while evaluation of trypanosomes infections in livestock showed a decline in prevalence to 9.23%. b) Mapping and delineation of the the IFDC phase II operational areas into 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. Activities undertaken include a) Monitoring and evaluation of the newly introduced tests in all the 57 selected health facilities including reference centres. So far no HAT positive case was found. 3) Management of Outbreak 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 witha great improvement in the health of pigs and reproduction with several healthy piglets being added to the stock daily. 4) Closed colony of G. m. submorsitans is being maintained at 5,000 stock females for future expansion, while G.p.palpalis suffered some setbacks and is being maintained at 2500 with intermittent re-enforcement. 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.

1.08

COUNTRY REPORT ON THE CONTROL STATUS OF TSETSE AND TRYPANOSOMIASIS IN SOUTH SUDAN

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Tsetse and Trypanosomiasis (T&T) cause an impediment to socioeconomic development among the poor rural inhabitants in South Sudan. This report highlights on the control status of T&T in the country. Relevant data from the Ministries of Health and of Livestock and Fisheries, and review papers were collected. PESTEL analysis was incorporated to reveal the impact of political, economic, social, technological, environmental and legal factors on the progress made in the control of T&T in South Sudan. Cases due to human African trypanosomiasis (HAT) were 968 in 2010 – 2014 and only 17 in 2015 but new cases from July 2016 to 2017 are underestimated due to insecurity situations. 15% of cattle population suffering from animal African trypanosomiasis (AAT) developed resistance to the commonly used trypanocides in the former Western Bahr el Ghazal State compared to less than 5% in other nine States. Glossina f. fuscipes and G.m.submorsitans are potential vector tsetse flies. The apparent density of the fly / trap / day increased in the infested areas. This is mainly due to poor and dilapidated health and veterinary facilities attributing from political instability, economic turmoil, social unrest, technological upheaval, environmental change and legal factor. Efforts being made by WHO, FAO and FIND/Maltese International for the control of typanosomiasis in the affected rural areas are appreciated. T&T create an upheaval to sustainable development goals (SDGs). Development partners are urged to strengthen the progressive control path way (PCP) of AAT and inclusion of tsetse in the control strategy of HAT in South Sudan.

Keywords: Tsetse, Trypanosomiasis, Control, South Sudan

1.09

REPORT ON TSETSE AND TRYPANOSOMOSIS CONTROL ACTIVITIES

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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.

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. River Yabus belt: Activities suspended due to insecurity.
B. Radom belt: Additional 3000 heads of cattle treated with pour-on formulations.
C. Non-tsetse transmitted Trypanosomosis: Overall prevalence was 6.5% with new areas investigated.

D. Community-based approaches: Local communities in tsetse-affected areas incorporated in control programmes and assessment of socio-economic impact of the disease is underway.

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.

1.10

REPORT OF MALI

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The livestock sub-sector occupies an important place in Mali's economy (11% of GDP and the third largest export product after gold and cotton). Animal husbandry is practiced by 80% of the rural populations and constitutes an important source of subsistence for them. This is why it occupies a prominent place in Mali's development strategies, of which the Strategic Framework for the Fight against Poverty (PRSP) is the benchmark. Despite this importance, livestock is today confronted with many constraints that limit its development. Among these constraints, trypanosomiasis and tsetse flies which infest 220,000 km2 of regions with high agro pastoral potential. The advent of the Multinational Project "Creating Sustained Free Tsetse and Trypanosomiasis Areas in East and West Africa", sponsored by PATTEC and financed by the AfDB, allowed the control of over 37 000 km2. After PATTEC, and in response to the T & T challenge, the Malian State created the Tsetse Fly Control and Animal Trypanosomiasis Coordination Unit (TLCC) in 2015. T & T interventions in Mali, was endowed with a national strategy which should lead to the eradication of T & T by 2036. It is within the framework of this national strategy that a first action plan (2017-21) containing the former PATTEC area has been developed and is currently being implemented.

I.11

PROGRESS REPORT ON TSETSE AND TRYPANOSOMOSIS CONTROL IN GHANA

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About 60% of Ghana's total land mass is infested by tsetse flies. A major intervention under the AU-PATTEC initiative saw a 98% reduction in the tsetse infested area of the UWR (Adam, Y., et. al 2013). Since 2011 till date, a continuous tsetse suppression and monitoring activities have been on going in the Upper West Region of Ghana, save 2016. The objective of these activities have been to prevent tsetse reinvasion and to further improve gains of the 2010 major intervention. Monitoring results of the 2015 tsetse apparent density were not significantly different from those of the year 2011. Currently (July-August 2017) staff of the tsetse control unit are on the field conducting field activities including: 1) Replacement of broken down tsetse barriers 2) Ground spraying and 3) monitoring tsetse population dynamics in the UWR. Results of these surveys are being awaited to further update our current status. Capacity Building for the implementation of cost-effective interventions in tsetse transmitted trypanosomosis have been mainly driven by two FAO projects in Ghana (Phase1 GTFS/RAF/474/ITA and Phase2 GCP/RAF/502/ITA). FAO and CIRAD gave support for Data Analysis resulting in scientific publications and defence of PhD dissertation on tsetse interventions in Ghana (Adam Yahaya. 2014. Montpellier : UM2, 159 p. Thèse de doctorat). International stakeholders for tsetse control programmes in Ghana include: AU-PATTEC, FAO, CIRDES and CIRAD of France. A plan of activities for tsetse and trypanosomosis control activities in 2018 has been drawn up and presented to the Government of Ghana for support.

1.12

CONTROL OF HUMAN AFRICAN TRYPANOSOMIASIS IN THE DEMOCRATIC REPUBLIC OF CONGO : COUNTRY REPORT OF 2013-2015

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Today, HAT is still a public health problem in the DRC. The number of cases has decreased in the past years but the coverage of the population at risk remains very low. The objective for control in DRC is to reduce HAT-related morbidity and mortality to a level consistent with the productive life of populations at risk (1 case per 10 000 population) by 2020, using a strategy of early detection and treatment of cases. Screening has been carried out by both specialized and non-specialized fixed health centers next to active surveillance with large classical mobile teams and mini-teams who carry out door-to-door screening in endemic villages.

The number of cases have decreased in the past three years from 5624 new cases in 2013 to 2353 in 2015. The total population examined for the same period was 2,139,585 in 2013 compared to 2,132,988 in 2015. The infection rate in active screening was 7 cases per 10.000 persons examined in 2015.

The decrease in the number of cases while the total population examined has been maintained, shows very encouraging results. However, low coverage of the population living in areas at risk of HAT transmission, could hide a more problematic situation.

1.13

TSETSE FLIES AND TRYPANOSOMOSIS CONTROL AND ERADICATION OPERATION IN ETHIOPIA

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The Ethiopian Government agreed to establish the National Institute for Control and Eradication of Tsetse and Trypanosomosis (NICETT) under regulation no. 304/2013 on 27th February 2014. The objective of the institute is to make areas affected by tsetse flies and trypanosomosis free of the problems with the view to increasing the products and productivity of animals and crops providing animals of good quality to beneficiaries and thereby make proper contribution in the process of enabling the society to be self-sufficient in food. Currently four regional Centres are operational hence the remaining two Centres will be opened and operational early next year. The regional Centres are operational on five affected regions. The main activities done during this year were controlled areas 147,833 km² using impregnated targets and ground spray. Pour-on application done to 2,209,024 cattle, and treated with trypanocidal drugs to 44,214 animals. Baseline data collection assessed on 11,740 km² to new areas in order to apply control activities. The colony establishment at Kaliti Centre were reached to Glossina f. fuscipes to 400,000 and G. pallidipes to 490,000. The main objective of the Centre is to produce sterile males to release to areas previously cleared from tsetse flies. Currently the SIT is operational in Deme Valley on 1,000 km² and the release capacity has been reached to 25,000 sterile males every week for each species.

1.14

THE ACTIVITIES CARRIED OUT BY PATTEC-NIGER SINCE 2015

Moumouni HAROUNA

Niger is a Sahelian country with an essentially agro-pastoral vocation. Livestock occupies more than 87% of the population and contributes more than 11% to the national GDP and more than 25% of the household budget.

In order to promote better exploitation of animal potential, improve the health of its livestock and its level of production and valorization of productions, the Ministry of Agriculture and Livestock in the elaboration of the Sustainable Development Strategy, Livestock (SDD 2013 -2035). (Ii) the insignificance of both public and private investments in the sector; (i) the persistence of certain animal diseases; (ii) low productivity; and (iii) insignificance of both public and private investments in the sector.

Sanitary constraints include tsetse flies and African Trypanosomoses (AAP). For all these reasons, Niger has opted to integrate itself in the realization of this continental objective of PATTEC to ensure the protection of its livestock against the tsetse fly and trypanosomiasis, today recognize as one of the causes Main economic backwardness and food industry on the continent.

Within this framework, the Directorate General of Veterinary Services initiated the project to combat the tsetse fly and animal trypanosomiasis (PATTEC-Niger), which has the overall objective of achieving food security and the fight against poverty through a sustainable improvement of animal health.

Thus, from 2015 to date, PATTEC-NIGER has carried out the following activities:

- 1) Complementary entomological surveys;
- 2) Serological surveys on bovine trypanosomosis in Say Department to identify the three pathogenic trypanosome species;
- 3) Setting up and training of the epidemiological surveillance network;

- 4) Bovine treatments for trypanocides;

I.15

EVALUATION OF SITUATION OF TRYPANOSOMIS IN THE NORTH OF CONGO BRAZZAVILLE

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Sleeping sickness or African human trypanosomiasis (HAT) continues to be a public health problem in Congo, despite the regularity of screening and treatment activities carried out by the human trypanosomiasis control program (PNLTHA). A total of 4,756 new cases were diagnosed from 2000 to 2009 (Simarro et al., 2010), mainly in three major outbreaks: Niari Valley, Cuvette and Corridor. In these homes, about 400,000 people are at risk of contracting the disease on a daily basis in five departments. The endemicity of the disease is sustained by the continued presence of the vector Glossina sp or tsetse fly whose species G. fuscipes, G. pallicera and G. palpalis are highly incriminated in the transmission of the disease in humans. The tsetse flies of the palpalis group (subgenus Nemorhina) are not the only species found in the Congo. A total of 11 species and subspecies of tsetse flies belonging to the palpalis and fusca groups (subgenus Austenina) have been identified. In addition to the transmission of sleeping sickness, these tsetse also ensure and maintain the transmission of animal trypanosomiasis which seriously undermine the development of livestock in the Congo. Control of trypanosomoses is mainly achieved by reducing the reservoir of parasites, both in the host and in the vector. However, due to insufficient financial and technical resources, only screening and treatment of patients with a view to reducing the reservoir of human parasites is operational. With the new project that will start in 2018 with the partnership of the IAEA, the veterinary laboratory of diagnostic wishes to carry out activities to eliminate tsetse flies and trypanosomiasis in the departments and to clean up the livestock , An extensive capacity-building program for technicians is being implemented for the success of this challenge.

1.16

THE ERADICATION OF THE TSETSE FLY GLOSSINA PALPALIS GAMBIENSIS FROM THE NIAYES OF SENEGAL USING AN AREA-WIDE INTEGRATED PEST MANAGEMENT APPROACH THAT INCLUDES THE RELEASE OF STERILE MALES

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The "Projet de lutte contre la mouche tsé-tsé et la trypanosomose dans les Niayes" targets a total area of 7,350 km2, of which 1,375 km2 were infested with Glossina palpalis gambiensis (Diptera: Glossinidae) which were solely responsible for the cyclical transmission of trypanosomes, the causative agents of African animal trypanosomosis (AAT). The tsetse population in the Niayes was completely isolated from the main tsetse belt in the south eastern part of the country, which prompted the Government of Senegal to select an eradication strategy of the vector and the disease, as the risk of re-invasion would be minimal or non-existing. The project was implemented in different phases, i.e. following a phased conditional approach, which consisted of (1) training and commitment of all stakeholders, (2) baseline data collection (BLDC) and feasibility studies, (3) pre-operational activities, and (4) operational activities. An extensive entomological monitoring system implemented in the 3 operational blocks indicated the following: no wild fly catches since August 2012 in block 1, while in block 2 et 3 the densities of the wild tsetse populations have been reduced by > 99% at the time of writing. Monitoring data of sentinel herds located inside and outside

the tsetse-infested area indicated already a significant reduction of the AAT prevalence. The environmental monitoring demonstrated a very low impact of the project on non-target species, and the socio-economic

study showed a high cost-effectiveness of the project.

I.17

CONTROL STRATEGIES IMPLEMENTED BY THE PROGRAM AFTER EBOLA EPIDEMIC TO ACHIEVE THE GOAL OF ELIMINATION OF SLEEPING SICKNESS BY 2020

Camara. M ; Camara.o ; Kagbadouno S.m ; Camara.m .L ; Bucheton.b;Solano. P

Since 2003, several efforts have been made in the fight against human trypanosomiasis in Guinea, currently the most affected country by the disease in West Africa, specifically on the coast. The intensification of control activities supported by research and training, led to better control of the disease with less than 100 cases per year observed since 2010, with observation of three distinct aspects, notably historical foci, ancient and active foci on the coastline where cases continue to be detected.

While significant efforts have been made in the fight against sleeping sickness by PNLTHA and its partners, the emergence of the Ebola virus epidemic in 2013 has had a major impact on the health system in general and in particular on PNLTHA and has slowed down and thus the impetus for achieving the goal of elimination of the disease by 2020.

To meet this momentum, Guinea has redefined new strategies adapted to the situation after this epidemic. These strategies are based on strengthening epidemiological surveillance in older foci, strengthening vector control in currently active outbreaks, targeted active screening (door-to-door), strengthening passive screening in centers and Health, involvement of community workers, outreach through theater, community and school activities.

The new strategies have enabled the relaunch of control activities in different epidemiological facies of the country.

HUMAN AFRICAN TRYPANOSOMIASIS (HAT)

ORAL PRESENTATIONS

EPIDEMIOLOGY

2.01

THE STUDY OF TRYPANOSOME SPECIES CIRCULATING IN DOMESTIC ANIMALS IN TWO HUMAN AFRICAN TRYPANOSOMIASIS FOCI OF CÔTE D'IVOIRE IDENTIFIES PIGS AND CATTLE AS POTENTIAL RESERVOIRS OF TRYPANOSOMA BRUCEI GAMBIENSE

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Despite important control efforts that have led to a significant reduction of the prevalence of human African trypanosomiasis in Côte d'Ivoire, the disease maintains in several foci. The existence of an animal reservoir of Trypanosoma brucei gambiense may explain disease persistence in these foci where animal breeding is an important source of income. The aim of this study was to characterize the trypanosome species circulating

in domestic animals in the endemic foci of Bonon and Sinfra. A total of 552 domestic animals (goats, pigs, cattle and sheep) were included. Trypanosomes characterization was done by microscopic observation, species-specific PCR and immune trypanolysis (TL). Infection rates varied significantly between animal species and were by far the highest in pigs. T. brucei s.l was the most prevalent trypanosome species. No T. b. gambiense was identified by PCR while high serological positivity rates were observed with TL using T. b. gambiense specific variants. This study indicates that animal trypanosomiasis (AAT) represents an important constraint for animal breeding in the study areas. This was particularly the case for pigs, possibly due to a higher exposure of these animals to tsetse flies. Whereas T. brucei s.l. was the most prevalent species, discordant results were obtained between PCR and TL regarding T. b. gambiense identification. It is crucial to develop adapted tools towards the identification of such potential animal reservoir for T. b. gambiense. Our study clearly illustrates that a one health approach provides crucial information to reach HAT elimination and contribute to AAT control.

Key words: Human African Trypanosomiasis; Animal African Trypanosomiasis; Trypanosoma brucei; animal reservoir; elimination strategy; Côte d'Ivoire

2.02

FIRST NATIVE HUMAN AFRICAN TRYPANOSOMIASIS CASE IN BURKINA FASO OVER THE TWO PAST DECADES: WHAT IS THE REAL RISK OF THE RE-EMERGENCE OF THE DISEASE?

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Burkina Faso belongs to the group of countries where Human African Trypanosomiasis (HAT) is no longer seen as an important public health problem (no native case was detected since 1993) but where the risk of the re-emergence still exists. Indeed, the important movements of populations between Burkina Faso and the active foci of Côte d'Ivoire ensure a constant reintroduction of the parasite (some imported cases coming from Côte d'Ivoire were detected these last few years) in areas still colonized by tsetse flies. That is why in 2014 Burkina Faso received a support from WHO to implement passive surveillance activities of gambiense HAT. One year after it implementation, the first native case since over two decades was detected through this system. Results from epidemiological, entomological and molecular biology investigations have not allowed to state with certainty an infection by Trypanosoma brucei gambiense or to identify the origin of this infection. If several hypotheses are discussed, this native case confirms the existence of the risk of re-emergence of the disease in the country and should draw attention for the strengthening of the disease passive surveillance mainly in the most at risk areas.

2.03

TRACING THE SOURCE OF INFECTION OF HUMAN AFRICAN TRYPANOSOMIASIS: A STUDY OF RECENT (2015/2016) CASES IN UGANDA

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The Ministry of Health in Uganda in collaboration with the Foundation for Innovative New diagnostics (FIND) and other partners is implementing a T.b. gambiense human African trypanosomiasis (HAT) elimination project that has been progressing well. In 2015 and 2016, only about 4 cases of HAT were detected each year. All cases were geographically isolated from each other suggesting that they did not have a common source of infection. Identifying the possible locations where these cases could have been infected might help in targeting intensified surveillance. Hospital records and semi-structured questionnaires were used to collect data from seven cases diagnosed between September 2015 and March 2016. All cases were under 30 years of age, 50% being children, and 50 % had been symptomatic for over 4 months while 85.7% were diagnosed in the late stage. Both health facilities and non-health facilities were utilized in health seeking including traditional rituals. A majority (83.3%) sought treatment using 3 different options before being confirmed for HAT. All the respondents had a former HAT cases either in their immediate or extended family, or in their immediate neighbour's households. The different villages where the respondents stayed, the rivers/streams where they spent time undertaking various occupations, in the three years prior to their illness are key suspect areas where they may have contracted HAT. Recent HAT cases in Uganda include South Sudanese hence HAT elimination projects in Uganda need to take into consideration a transboundary approach to enable them meet the goal of HAT elimination by 2030.

2.04

BUILDING NATIONAL CAPACITIES FOR THE USE OF THE OF HUMAN AFRICAN TRYPANOSOMIASIS ATLAS

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The Atlas of human African trypanosomiasis (HAT) has been jointly developed by WHO and FAO in the framework of the Program against African Trypanosomosis (PAAT). It compiles data provided by National Sleeping Sickness Control Programmes (NSSCP), NGOs and research institutes. The Atlas is a tool to plan, monitor and evaluate the progress of HAT elimination.

To facilitate the ownership and the use of the Atlas at national level, equipment and training was provided to 10 NSSCP by using Open Source Software (i.e. QuantumGIS) and public domain GIS datasets. Overall, three face-to-face workshops were conducted in French: two for the Democratic Republic of the Congo (DRC) (national and provincial level, respectively in December 2014 and September 2015), and one in December 2016 for nine western and central African countries that have regularly been reporting cases in the last decade (Angola, Cameroon, Chad, Republic of Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Guinea, Central African Republic). Further workshops are coming for English-speaking countries. QuantumGIS projects including geo-referenced data from the Atlas of HAT were created for each country and for different periods of time (3/5 years) to enable a user-friendly display of key epidemiological indicators (e.g. number of HAT cases, observed prevalence during active screening activities, proportion of cases diagnosed in stage 2, etc.). These training sessions were complemented by follow-up of the trainees, which included exercises circulated.

In this first step, NSSCP have been trained in presenting the epidemiological information as tables or maps. A second step, which has started in DRC, includes the analysis of this information to facilitate the planning of HAT control and surveillance interventions and assessing the impact of activities.

2.05

THE SLEEPING SICKNESS CONTROL IN ISANGI, D.R. CONGO: WHERE DO WE STAND?

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The trend of Human African Trypanosomiasis (HAT) in Democratic Republic of Congo (DRC) is characterised by resurgences; in 1970's, in 1990's. In Isangi foci, in eastern DRC, HAT resurgence occurred in 2003. In this foci, 235 villages have reported HAT cases, and activities to combat HAT began late in 2003. Where do we stand after 12 years of fighting HAT in Isangi? To describe HAT control activities over time from HAT re-emergence, in 2003 up to 2015, thus to assess the current situation, we have performed a retrospective review of surveillance data from 2003 to 2015. During these 12 years of fighting HAT, 629,369 people have been screened using a serological test, and 3,224 cases diagnosed. Of these cases, 62.9% were diagnosed during the first 5 years. Despite the timid resumption of activities in 2008, screening activities went increasing gradually to reach its maximum in 2015 where 93,638 people were screened for HAT. The number of diagnosed HAT cases increased too from 47, in 2008, to 226 in 2012, then began decreasing gradually to 71 in 2015. Therefore, the detection rate goes ever-decreasing, from 6,063 to 73 cases per 100,000 screened people respectively from 2003 to 2015, suggesting an impact of control activities on HAT in Isangi. HAT control in Isangi is ongoing. Nevertheless, extra measures have to be taken to sustain and to improve the process, among which creation of light mobile teams to deal with accessibility and resource limited issues, and reinforcement of diagnostic capacities of health facilities.

DIAGNOSIS AND TREATMENT

2.06

CONFIRMATION OF ANTIBODIES AGAINST L-TRYPTOPHAN-LIKE EPITOPE IN HUMAN AFRICAN TRYPANOSOMOSIS SEROLOGICAL DIAGNOSTIC

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Antibodies directed against L-tryptophan epitope (WE - W for tryptophan, E for epitope), a constant epitope borne by variant surface glycoproteins (VSG), have been detected in sera of all 152 Human African Trypanosomosis (HAT) patients from Angola. The WE is present in VSG hydrophobic regions of the C terminal domains. In the assay, L-tryptophan was linked to bovine serum albumin (BSA) with glutaraldehyde to synthesize W-G-BSA conjugate which was used in an enzyme-linked immunosorbent assay (ELISA) to detect the antibodies. A significant difference was found between HAT patients and controls confirming previous results obtained with a lower number of patients in Congo. A diagnostic test based on this synthetic epitope, especially in combination with other tests, might improve the HAT diagnostic test in field conditions.

Key words: Tryptophan, enzyme-linked immunosorbent assay (ELISA), human African trypanosomosis, serological diagnostic.

2.07

PROSPECTIVE EVALUATION OF A RAPID DIAGNOSTIC TEST FOR GAMBIENSE HUMAN AFRICAN TRYPANOSOMIASIS DEVELOPED USING RECOMBINANT ANTIGENS IN THE DEMOCRATIC REPUBLIC OF THE CONGO

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Current rapid diagnostic tests (RDTs) for HAT, such as the SD BIOLINE HAT (RDT1), require the production of native antigens, which is challenging. The objective of this study was to prospectively evaluate the diagnostic accuracy of a new RDT, the SD BIOLINE HAT 2.0 (RDT2), developed using recombinant antigens, in comparison to RDT1. The RDT2 was evaluated in 10 health facilities and 5 mobile teams in the Democratic Republic of the Congo. A population of 57,632 individuals, including 260 confirmed HAT cases, was screened using CATT, RDT1 and RDT2 in parallel. The sensitivity of CATT, RDT1 and RDT2 was 62.5%, 59.0% and 71.2%, and the specificity was 99.2%, 98.9% and 98.1%, respectively. Sensitivity results were lower than previously reported, as some HAT cases were detected by only some of the tests. Sensitivity in passive screening (74.6%, 70.0% and 90.1%) was higher than in active screening (51.8%, 49.2% and 54.8%). This difference might be attributed to differential expression of antigens by parasites as infections progress, resulting in immune responses to multiple antigens. Combining RDT1 with RDT2 in passive screening resulted in a higher sensitivity (98.4%). The improvement in sensitivity was more pronounced in active screening, where it was low in each of the 3 tests, and combining the two RDTs resulted in a significant improvement (83.0%). This study demonstrated the non-inferiority of RDT2 vs RDT1. The observed low sensitivity of all screening tests could be due to each test detecting a sub-population of cases with a different serological profile.

2.08

INTRODUCTION OF RAPID TESTS TO SCREEN FOR HUMAN AFRICAN TRYPANOSOMIASIS IN ELIMINATION STRATEGIES OF THE NATIONAL PROGRAMME IN GUINEA

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The SD BIOLINE HAT rapid diagnostic test (RDT) has been introduced in 90 health centres and health posts in Guinea in early 2014 as part of a project to strengthen passive screening for human African trypanosomiasis (HAT) on the littoral, which until then was relying only on CATT and parasitological confirmation in the three treatment centres of Dubréka, Boffa and Forécariah. The project was successful for a few months, but had to be progressively interrupted due to the Ebola outbreak that struck the country, and was reactivated in late 2016 in the three endemic foci. Considering that communities had lost confidence in the health system due to the Ebola crisis, new strategies needed to be introduced, such as a strategy involving small mobile teams visiting households to perform RDTs. We report here the results that have been obtained using different strategies (passive or active screening) and their suitability to control HAT in Guinea. On an unbiased sample (whole population screening), the positive predictive value (PPV) of the RDT was relatively low (13%). However, the PPV varied significantly depending on the screening strategy (passive or active) and the disease prevalence, and reached 62% using a targeted active screening strategy in high-prevalence areas. The RDT appears to be a useful tool in various diagnostic strategies to be implemented to eliminate HAT in Guinea.

2.09

DIAGNOSTIC TOOLS FOR HUMAN AFRICAN TRYPANOSOMIASIS ELIMINATION AND CLINICAL TRIALS (DITECT-HAT)

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Human African trypanosomiasis (HAT) due to Trypanosoma brucei gambiense has been targeted for elimination by 2020. To reach this goal, some important challenges remain: Integration of diagnosis and case management into the general health system, monitoring of eliminated foci and development of safe and efficacious drugs. The DiTECT-HAT project tackles these challenges and aims to deliver new, cost-effective diagnostic algorithms for gambiense-HAT elimination. For passive case detection, the performance and cost of rapid diagnostic tests (RDT) performed on clinical suspects in peripheral health centres is determined. Molecular and serological reference testing is conducted on dried blood spots (DBS) of RDT positives. Cost-effective diagnostic algorithms with high positive predictive values might open possibilities for treatment without the need for parasitological confirmation. For post-elimination monitoring, health workers performing house to house visits in low prevalence HAT foci collect DBS and send them to regional HAT reference centres for analysis. The feasibility and cost of diagnostic algorithms with RDTs, serological and/or molecular DBS tests are determined to establish an appropriate threshold to trigger active case finding and avoid HAT re-emergence. For early test-of-cure assessment in clinical trials, the accuracy of neopterin and RNA detection is studied. Earlier treatment outcome assessment will speed up drug development for HAT, and improve management of relapses in routine. We will present an update of activities and experiences of the DiTECT-HAT project. The latest project news can also be followed on www.ditect-hat.eu.

The DiTECT-HAT study is financed by EDCTP2, supported by the European Union's Horizon 2020 research and innovation programme.

2.10

DIGITAL RECORDING OF DITECT-HAT STUDY PARTICIPANT DATA, INCLUDING MACROSCOPIC AND MICROSCOPIC IMAGES

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Participants for the EDCTP DiTECT-HAT study (www.ditect-hat.eu) on diagnostic procedures in human African trypanosomiasis (HAT) are recruited in rural health centres in Côte d'Ivoire, the Democratic Republic of the Congo and the Republic of Guinea. Quality assurance is challenging because rapid diagnostic tests (RDT) used for screening need to be read within 20 minutes and because diagnostic confirmation relies on visualising live trypanosomes under the microscope. These preparations cannot be kept for rechecking. Our aim was to use digital technology both for recording case report forms (CRFs) in the field and for assuring quality of diagnostic procedures. We developed an Android 5 compatible application for data entry at the field sites with a personal digital assistant tablet. The application also allows taking pictures of the RDTs with the tablet camera and recording 4 seconds videos with a versatile camera mounted on an ordinary microscope. Confidential participant data are encrypted and transferred via Wi-Fi connection to a network associated server (NAS). Pictures and videos are automatically uploaded separately and have a link to the corresponding record in their filenames. The combined cost of tablet and camera is approximately 600 EURO. The application is implemented from Mid 2017 onwards. Results will be presented during the conference. Quality assurance of microscopy and other diagnostic procedures for HAT through digital applications is feasible and affordable. This technology could therefore also be used for quality assurance in routine HAT case finding programs

The DiTECT-HAT study is financed by EDCTP2, supported by the European Union's Horizon 2020 research and innovation programme.

2.11

TRYPANOSOME DETECTION IN SKIN BIOPSIES FROM HAT PATIENTS AND UNCONFIRMED SEROLOGICAL SUSPECTS IN GUINEA: THE SKIN, A NEW TARGET FOR DIAGNOSIS?

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Parasitological confirmation by microscopy remains pivotal in the diagnosis/treatment of Human African Trypanosomiasis. It is usually done by the direct examination of lymph juice aspirates or of a blood sample. As T. b. gambiense blood parasitaemia are known to be often very low, concentration techniques such as the mAECT are used to increase detection sensitivity. Nevertheless a number of individuals with high and specific serological responses remain negative to parasitological tests. Recent studies in mice have suggested an overlooked anatomical reservoir of T. b. gambiense in the skin. These observations raised the question of whether skin trypanosomes could also be found in humans. To answer this question, skin biopsies were taken from both parasitologically confirmed HAT patients and unconfirmed seropositive individuals (CATT≥1/4) that were identified during a medical survey led in the HAT focus of Forécariah in Guinea. In addition to dermatological signs (such as prurits, skin inflammation…) that were more frequent in HAT patients, direct examination of Giemsa stained smears from skin biopsies revealed the presence of trypanosomes in a number of patients,

but also in some seropostive individuals. Further histological analyses of the biopsies with gambiense specific antibodies are currently underway to confirm this observation and better assess the importance skin dwelling trypanosomes in humans. Importance of these results in terms of both transmission and diagnosis will be discussed.

2.12

NOVEL TBR -PCR PRIMERS FOR IMPROVED DETECTION OF TRYPANOZOON SATELLITE DNA IN HUMAN BLOOD

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Parasites of the subgenus Trypanozoon contain specific satellite DNA sequences of 177 base pairs that are estimated to be present in thousands of copies in the minichromosomal genome. Therefore, these Trypanosoma brucei repeat (Tbr) sequences are often targeted in PCR for the sensitive and specific detection of Trypanozoon parasites in African trypanosomiasis studies.

Surprisingly, we found that the original Tbr sequence reported by Sloof et al. (K00392; J Mol Biol. 1983, 167 (1):1-21) per se does not exist in the Trypanosoma brucei (T.b.) brucei and T.b. gambiense reference genome databases. Instead, the original sequence appears to be a mixture of two main groups of repeats that are either 177-bp or 176-bp long. These sequences are 94,7%, for the 177-bp and 94%, for the 176-bp repeat, identical to the Sloof sequence, but only 89% to each other. Besides differing by an indel, each group has its own associated single nucleotide polymorphisms as well as a 49-mer conserved region.

Based on this new sequence information, we developed several novel Tbr-primer sets for amplification of both repeats, individually or simultaneously, and for use in conventional PCR or in real-time PCR. Initial results show that these novel primer sets are able to detect 1) both repeats in the different T. brucei species; 2) a few femtograms of both repeats in pure trypanosome DNA and, 3) <15 T.b. rhodesiense cells/ml and <an 30 T.b. gambiense cells/ml in spiked human blood extracts. Conclusively, these novel Tbr PCR-primers appear to outcompete the existing Tbr-primer sets.

2.13

RAPID DETECTION OF HUMAN-INFECTIVE TRYPANOSOMES IN CLINICAL SPECIMENS FROM LUANGWA, ZAMBEZI AND KAFUE RIVER VALLEYS USING LAMP

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Trypanosomiasis is one of the re-emerging debilitating diseases of livestock and humans in sub-Saharan Africa, caused by various trypanosome species transmitted by tsetse flies. Several domestic and wild animals act as reservoirs of various trypanosome species. In Zambia, Human African trypanosomiasis (HAT) is endemic mainly in Luangwa valley and there are increasing unpublished cases being reported in HAT old foci. Current available parasitological methods used for trypanosomiasis diagnosis are either less sensitive, unable to accurately identify species and may sometimes be laborious. Loop-mediated isothermal amplification (LAMP) is a relatively novel strategy which amplifies DNA with high sensitivity and rapidity under isothermal conditions. In the present study, the performance of trypanosome-species-specific LAMP including the human serum resistance-associated gene (SRA)-LAMP assay were evaluated using clinical specimens obtained from people, domestic animals and

tsetse flies from the Luangwa, Zambezi and Kafue river valleys.

So far we have detected various animal-infective trypanosome species including Trypanosoma congolense, T. brucei brucei and T. vivax in both parasitaemic and aparasitaemic animals as well as in tsetse flies, by trypanosome-species-specific LAMP. Importantly, we have established a very specific LAMP system which clearly distinguishes T. b. rhodesiense from closely related trypanosome species. We have thus detected the human-infective T. b. rhodesiense in patient blood and cerebral spinal fluid and hence confirmed HAT in the parasitaemic patients. A good correlation between microscopy and LAMP was observed and contributed to staging and successful treatment of the majority of the patients. RIME-LAMP and SRA-LAMP complimented each other well in all the cases. Through LAMP, we have reported unprecedented increased HAT cases in the recent past, mainly from HAT old foci within the Luangwa, Zambezi and Kafue river valleys. By means of SRA-LAMP, we have also been able to detect T. b. rhodesiense in domestic animals and tsetse flies (exclusively involving Glossina morsitans morsitans), suggesting their possible role in HAT epidemiology. Thus our study indicates that HAT is re-emerging in the old foci of Zambia's river valleys and that LAMP is a potential simple, rapid and cost-effective tool for HAT diagnosis, staging and may be useful for making therapeutic decisions. of trypanosomes (and HAT staging) and other infections in resource-limited endemic regions.

2.14

DEVELOPMENT AND EVALUATION OF A NOVEL DRY LAMP KIT FOR RAPID DIAGNOSIS OF HUMAN AFRICAN TRYPANOSOMIASIS

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Two characteristic stages are observed during Human African trypanosomiasis (HAT) i.e. early (hemolymphatic) and late (meningoencephalitic) stages. Early diagnosis and treatment before disease progression into the second stage is crucial for the survival of HAT patients. At present, routine disease diagnosis mainly depends on clinical symptoms and visualization of parasites in body fluids by microscopy that requires trained laboratory technicians. However, the sensitivity of this test is sometime unsatisfactory in naturally infected individuals during low parasitaemic waves. Therefore, the present study aimed at developing point-of-care sensitive HAT diagnostic tests, using the loop-mediated isothermal amplification (LAMP) method.

For the field use, we prepared dried LAMP reagents in a single microtube. This can be stored at room temperature for several months and have greater convenience for transportation. Sample preparation step was also simplified such that uncoagulated blood could be used as a starting material without DNA extraction. Thus the repetitive insertion mobile element (RIME) primers were used for Trypanozoon (both Trypanosoma brucei rhodesiense and Trypanosoma brucei gambiense) detection, while the human serum resistance-associated (SRA) primers were used for specific detection of T. b. rhodesiense. To achieve stable production and supply, we now employ semi-automated process to produce test kits using an inkjet printing machine. To that end, the sensitivity and specificity of our products were evaluated. The sensitivity with lysed parasites were 10 and 100 parasites per reaction mixture for RIME and SRA, respectively. The total time required for the diagnosis after collecting blood is within one hour. Shelf life at an ambient temperature is confirmed to be more than 3 months.

The developed LAMP assay (here refered to as HAT CZC-LAMP i.e. HAT LAMP developed from the Research Centre for Zoonosis Control,

Hokkaido University, Japan) is easy to perform, highly sensitive, rapid, and cost-effective. Therefore, it is suitable for point-of-care detection of HAT at the early stage in the local clinics. The HAT CZC-LAMP offers great promise as a routine simple tool for diagnosis and disease management of HAT.

2.15

DIVERSITY OF AQUAGLYCEROPORIN GENES (TBAQP) IN TRYPANOZOON AND THEIR RELATION TO MELARSOPROL AND PENTAMIDINE CROSS-RESISTANCE

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Melarsoprol and pentamidine cross-resistance (MPXR) is linked to mutations within the TbAQP2 gene, both in laboratory-induced resistant Trypanosoma brucei (T.b.) strains and in clinical isolates of T.b. gambiense. While TbAQP2deletion is sufficient to explain this phenotype, trypanosomes often resort to chimerisation of TbAQP2 by incorporation of different proportions of the highly similar gene TbAQP3 into the TbAQP2 coding sequence. Such TbAQP2/3 chimeric genes are thought to be responsible for the inhibition of both melarsoprol and pentamidine drug uptake. Interestingly, genotyping the TbAQP2-TbAQP3 locus of different Trypanozoon strains revealed the existence of highly diverse forms of these TbAQP2/3 chimeras between and within strains. In this study, we performed in vitro drug sensitivity tests on a panel of Trypanozoon strains that carry either one or multiple TbAQP2/3 chimeras. Indeed, T. b. gambiense strains that have only TbAQP2/3 chimeras, and no wild-type TbAQP2, display various levels of MPXR. However, T. b. gambiense strains that contain a TbAQP2/3 chimera, but also a wild-type TbAQP2 gene, remain melarsoprol and pentamidine sensitive, similar to Trypanozoon strains that harbor only wild-type TbAQP2.Intriguingly, some T. evansi and T. equiperdum strains,organisms that never came in contact with pentamidine or melarsoprol, also carry TeAQP2/3 chimeras, in addition to wild-type TeAQP2, TeAQP3 and even TeAQP3/2 chimeras, and remain fully sensitive to pentamidine, melarsoprol or even diminazene and isometamidium. Therefore, the presence of TbAQP2/3 and TeAQP2/3 chimera(s) in certain Trypanozoon strains does not necessarily indicate a MPXR phenotype.

2.16

THE VALUE OF BASELINE CLINICAL ASSESSMENT IN CASE DETECTION FOR HUMAN AFRICAN TRYPANOSOMIASIS

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DNDi has conducted three clinical trials to assess the safety and efficacy of fexinidazole, the first oral drug for human African trypanosomiasis (HAT), as a single treatment for both stages of the disease. The initial pivotal trial, comparing fexinidazole to NECT, included patients 15 years or older with advanced stage 2 HAT, and two additional cohorts included patients 15 years or older with stage 1 or early stage 2 HAT, or children between 6 and 14 years old and >20 kg with both stages of the disease – in total 749 patients (130 treated with NECT, 619 with fexinidazole). Initial results have not yet been fully analyzed but they allow DNDi to submit the fexinidazole dossier to the regulatory authorities. The baseline profile for the studied population will be presented. Thorough baseline clinical evaluations were performed including obtaining demographic information and asking specific questions on signs and symptoms of HAT and concomitant diseases. General physical and neuropsychiatric examinations were conducted. An adapted HAT diagnostic algorithm including serology and parasitological assessment in lymph, blood, and CSF was followed by a white blood cell count in CSF for staging. Finally, the patients were further examined in the laboratory with haematological and biochemical parameters. This detailed clinical information from a large group of patients can help us understand the value of clinical diagnosis as a complement to laboratory tools to help better target case detection of HAT.

2.17

ENHANCED SCREENING AND DIAGNOSIS OF GAMBIENSE HUMAN AFRICAN TRYPANOSOMIASIS IN NORTH-WESTERN UGANDA - MOVING TOWARDS ELIMINATION

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The incidence of gambiense human African trypanosomiasis (gHAT) in Uganda has been declining, from 198 cases in 2008, to 4 in 2016. A strategy to accelerate elimination of the disease in North-western Uganda has been implemented since 2013. The strategy, which has enabled expansion of passive screening for gHAT to the entire population at risk, comprises of a diagnostic algorithm that is based on using rapid diagnostic tests (RDTs) to screen patients suspected of having gHAT, followed by parasitological confirmation at strategically located microscopy centres. For patients that negative by parasitology, blood samples undergo further testing using loop-mediated isothermal amplification (LAMP). A network of 146 health facilities in the region screen gHAT suspects, reducing the distance that a sick person must travel to be screened to 2.5km, compared to 23km before 2013. The existence of this network has also enabled a rapid response to a recent challenge to the elimination efforts: an influx of South Sudanese refugees who have settled in North-western Uganda. Over 625,000 refugees have settled in the region, both in refugee camps and integrated among local communities. A large number of them come from gHAT endemic areas in South Sudan. Two gHAT cases have been diagnosed among refugees in 2017, by health facilities using the gHAT RDTs. The strategy is supported by epidemiological studies to identify areas where active transmission could be going on. These studies

guide targeted active screening campaigns. Finally, a mHealth approach to data capture and reporting has been implemented to improve the management of the project.

2.18

A TARGETED DOOR-TO-DOOR STRATEGY FOR SLEEPING SICKNESS DETECTION IN LOW-PREVALENCE SETTINGS IN CÔTE D'IVOIRE

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Significant efforts to control human African trypanosomiasis (HAT) over the three past decades have resulted in drastic reductions of disease prevalence in Côte d'Ivoire. In this context, the costly and labor-intensive active mass screening strategy is no longer efficient. In addition to a more cost-effective passive surveillance system being implemented in this low-prevalence context, our aim was to develop an alternative targeted active screening strategy. In 2012, we carried out a targeted door-to-door (TDD) survey focused on the immediate vicinities of former HAT patients detected in the HAT focus of Bonon and compared the results to those obtained during classical active mass screening (AMS) surveys

conducted from 2000 to 2012 in the same area. The TDD that provides a friendlier environment, inviting inhabitants to participate and gain awareness of the disease, detected significantly more HAT cases than the AMS. These results suggest that the TDD is an efficient and useful strategy in low-prevalence settings where very localized transmission cycles may persist and, in combination with passive surveillance, could help in eliminating HAT.

Key words: Human African trypanosomiasis, Trypanosoma brucei gambiense, Diagnosis, Elimination strategy, Côte d'Ivoire, Medical survey.

2.19

A STRATEGY COMBINING PASSIVE SURVEILLANCE AND REACTIVE ACTIVE SCREENING TO CONTROL HUMAN AFRICAN TRYPANOSOMIASIS DURING THE EBOLA CRISIS IN GUINEA

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Introduction: The Ebola outbreak that struck Guinea in 2014-2015 had a dramatic impact on the control of endemic diseases. Routine activities to control human African trypanosomiasis (HAT), and in particular active screening, were largely interrupted, raising concerns about the potential resurgence of this disease.

Aim: Explore the feasibility of combining passive surveillance and a new reactive active screening strategy to control HAT in the context of the Ebola crisis in Guinea.

Methods: The Ministry of Health of Guinea, in a partnership with FIND, initiated in March 2014 a project to enhance passive detection of HAT in coastal Guinea. Three district-level laboratories were upgraded to perform confirmatory diagnosis of HAT by parasitology, and one of them was equipped to perform LAMP, a field applicable molecular test for detecting parasite DNA. Ninety peripheral health facilities were supplied with HAT RDTs and trained to screen and refer suspects for parasitological confirmation. A new reactive active screening strategy was piloted, in which small mobile teams composed of 3 people visited individual households in villages having reported HAT cases during the last two years and screened inhabitants with HAT RDTs.

Results: Between March 2014 and September 2015, 1,968 individuals were tested with an RDT in peripheral facilities, of which 70 were RDT positive. Only 13 RDT positive suspects (19%) were successfully

referred and underwent parasitological testing, and 7 were confirmed as HAT cases. In addition, 44 HAT cases presented themselves directly to parasitology sites. Four villages were visited by small mobile teams in April 2016 and 1,378 inhabitants were actively screened, of which 38 were found positive with an RDT. 31 of the RDT positive suspects (82%) were tested by parasitology, and 4 HAT cases were confirmed.

Conclusion: Although the Ebola epidemic was a major challenge affecting both the health system and communities, it was possible to maintain some HAT surveillance activities. While a significant number of patients were screened in peripheral sites, only a relatively small part of them were eventually tested by parasitology. On the other hand, it was possible to achieve a high referral rate using the reactive active screening strategy.

2.20

INPUTS OF NEW STRATEGIES TO CONTRIBUTE TO THE ELIMINATION OF HAT: THE CASE OF THE MANDOUL OUTBREAK, CHAD

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Chad is one of the countries in Central Africa that continues to report HAT cases. Of the five outbreaks in the country, the Mandoul outbreak, which has annually recorded on average at least fifty new cases notified since 2014, is the area where transmission is highest. Since 2015, new approaches in combating HAT have been introduced in the Mandoul outbreak to help eliminate the disease. These involve:

- Extending passive search for suspected cases to health facilities in Bodo district;
- Strengthening active search for suspected cases in villages through a mobile motorcycle team using rapid diagnostic tests (RDT), followed by a referral system for parasitological confirmation;
- Vector control using small impregnated screens.

To highlight the contribution of these approaches to HAT control in the disease elimination process, 2015-2016 data on reported cases from the Mandoul outbreak were analyzed.

It appears that during those two years, 120 new cases were detected (67 in 2015 and 53 in 2016), of which 72 cases, or 60%, were recorded from Mandoul outbreak alone. Of these 72 cases, 40 or 56% were detected through passive means by health facilities in Bodo District which integrated the use of RDTs. In previous years (2013-2014) health facilities had diagnosed 101 cases through passive methods, accounting for 37% of the cases. During the period 2015-2016, active screening by

the mobile team on motorbikes found 10 cases (14%) in addition to the 32 new cases diagnosed by active screening using CATTwb by the mobile team in vehicles, accounting for 44% of the total number of notified cases. Adaptive strategies incorporating RDT are working together to improve HAT case detection. As a result, these approaches used in Mandoul focus could contribute to eliminating HAT from Chad. Their use in other foci should be sustained.

Keywords: HAT, RDT, CATTwb, Passive search, active search, Mandoul, Chad

2.21

INTENSIVE PASSIVE SURVEILLANCE FOR HUMAN AFRICAN TRYPANOSOMIASIS IN DELTA STATE, NIGERIA

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Human African trypanosomiasis (HAT) in Nigeria caused by Trypanosoma brucei gambiense is chronic with delayed non-specific clinical manifestations, such that patients could be asymptomatic for years before developing clinical signs, and if unidentified and treated, they die from the disease. The last confirmed case of HAT in Nigeria was reported in 2013. In 2014, NITR, FIND and the Ministry of Health of Nigeria initiated a collaboration to eliminate HAT by the year 2020. The specific objective was to determine the feasibility of eliminating HAT in Nigeria by passive intensive screening using a novel strategy that combines use of HAT-RDTs, LED-fluorescence microscopy and LAMP integrated into the primary healthcare system. Fifty- one health facilities were equipped and empowered to use the SD-BIOLINE HAT-RDT to identify suspected cases. In 2016, the number of facilities for confirmatory testing were increased from four (4) to 25, to improve case detection and reduce the distance that RDT positive-suspects have to travel for status confirmation. By March 2017, 7,310 patients had been screened with HAT-RDTs and 211 (2.89%) were positive, of which sixty-five presented for confirmatory testing and were negative for both parasitology and LAMP. Since no HAT case has so far been identified, the strategy has now been reviewed to a more cost-effective and sustainable-one of targeted passive surveillance in 19 health facilities that screen clinical suspects with HAT-RDTs and perform confirmatory testing by microscopy. It is hoped that the new strategy will confirm testing of suspected-HAT cases and generate data to support elimination of the disease in Nigeria.

2.22

GEOGRAPHIC DISTRIBUTION OF HUMAN AFRICAN TRYPANOSOMIASIS CASES IN THE DEMOCRATIC REPUBLIC OF CONGO FROM 2011 TO 2015: ANALYSIS OF THE HAT ATLAS DATA

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Introduction

The Democratic Republic of Congo (DRC) is the country with the largest number of human African trypanosomiasis (HAT) cases in the world, accounting for nearly 80% of cases reported to the World Health Organization. HAT Atlas is a major asset for a better knowledge of the distribution of HAT patients, georeferenced at the village level.

The aim of this presentation is to show, using the atlas, the geographical distribution of patients with HAT for a better understanding of the transmission zones

Methods: A descriptive analysis of the distribution of cases from 2011 to 2015 in the geo-referenced endemic villages was carried out.

Results During this period, 22,764 cases of HAT were detected and reported by the DRC and the developed various maps show the cumulative situation of the cases and their distribution by transmission zones during the 5 years

Conclusion

The establishment of this database and the identification of HAT transmission areas enable the national program to better plan control and surveillance activities

2.23

FEASIBILITY OF HAT ELIMINATION BY IMPROVING SCREENING WITH INNOVATIVE METHODS IN THE DEMOCRATIC REPUBLIC OF CONGO (RDC)

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Introduction

The "TRYPELIM" project aims to assess the feasibility to eliminate HAT in two pilot health zones in DRC by systematically and rationally increasing screening coverage with innovative approaches between 2016-2018.

Methodology

To plan the screening campaigns, a map has been produced with «Quantum QGIS» software for each health zone, which groups all endemic villages over the past 5 years and including the villages without cases located within a radius of 5 km around the cases. We introduced door-to-door screening with mini-teams in addition to the mass screening campaigns with classical truck based teams. Also, RDT's were introduced in fixed health centers. Data collection is done with a mobile application which supports a decision-support system.

Results

The population examined went up from 83,808 to 196,622 in the first year of the project, of which 123.049 (62%) were examined by mini-teams. 3,406 serological suspects were identified including 2,920 (86%) by mini-teams. 50 new cases were diagnosed including 13 (26%) by mini-teams, of which 4 cases came from villages considered non-endemic.

Conclusion

The innovative approaches have improved coverage. To accelerate elimination, it may be necessary to screen non-endemic villages located within a radius close to the endemic villages. Ongoing analyzes will present socio-demographic characteristics and proportions of those screened.

2.24

INTEGRATION OF HUMAN AFRICAN TRYPANOSOMIASIS INTO BASIC HEALTH SERVICES, A SCOPING REVIEW

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Background: Given the decrease in new cases and the limited funding for control, it is necessary to optimize the modalities for integrating HAT into basic health services. We carried out this scoping review to identify the major elements of the literature on the integration of HAT control.

Methods: Using the conceptual framework proposed by Arksey O'Malley, a scoping review was conducted on PubMed from 1977 to 2017 and on gray literature. The documents were evaluated on the basis of the inclusion criteria.

Results: 35 documents were included. the reasons for integrating HAT were either epidemiological or efficiency reasons, or the organization of health care, or the reasons for sustaining the control and elimination of HAT. Three categories of factors influenced the implementation and maintenance of HAT integration: factors related to the clinical course of HAT, factors related to the organization of health services and users, and factors related to diagnostic and therapeutic tools. Some positive results from the experiments were reported and several recommendations found in the literature were formulated for the integration of HAT.

Conclusion: Reasons to integrate, barriers and contributing factors, past experiences and emerging recommendations are key considerations for integrating HAT into health services

2.25

IMPLEMENTING HUMAN AFRICAN TRYPANOSOMIASIS (HAT) INTEGRATED PASSIVE SURVEILLANCE FOR THE DOCUMENTATION OF ITS ELIMINATION.

Diarra A; Priotto G, Grout L, Franco JR

For almost two decades, important efforts have been made to fight against human African trypanosomiasis (HAT) through public-private partnerships (PPP), bilateral cooperation and NGO's in coordination with WHO and endemic countries. This has contributed to the reduction in the number of reported cases, which dropped for the first time in decades below the symbolic threshold of 10000 cases in 2009. During a workshop held in Bamako, Mali in June 2009 on "the intensification of HAT control and surveillance for its elimination in West Africa", a thorough analysis of the situation of the disease in West Africa was done and it was decided to set up a surveillance system adapted to the epidemiological situation and integrated in the existing health care system to ensure its sustainability.

This surveillance system allowed to collect data to provide evidence on the disease transmission.

The implementation of this surveillance begins with the field visit together with national and regional authorities not only to refine the choice of sites but also and especially for the appropriation of the activity. The personnel of the selected sites receive training and specific equipment to start the activity. The sites, their activities and their reports are supervised, analyzed and evaluated constantly by the national authorities with WHO's technical support.

The pilot phase of this surveillance lasted three years from 2010 to 2013 and concerned two countries: Benin and Togo. From 2014 the approach entered a second phase of expansion first in West Africa (Côte d'Ivoire, Guinea, Mali, Burkina Faso, Niger and Ghana) and then in Central Africa (Cameroon, Equatorial Guinea, Congo, Gabon, Chad, DRC) and in East Africa (Rwanda).

After seven years of implementation of the approach, a total of 113 sites are operational in 15 countries for HAT surveillance and more than 7,000 clinical suspects underwent serological examination. Samples of serologically suspected cases were sent to reference laboratories for trypanolysis tests. To date this system permitted to detect cases of HAT often within a context where no cases had been reported for years (as in Burkina Faso). Beyond the diagnosis of cases, the added value of this system is not only the strengthening of country ownership of HAT surveillance and its elimination where the disease is endemic but also the strengthening of the partnership in the elimination of HAT through the implementation of joint projects in Guinea, Côte d'Ivoire, Nigeria, Chad, Uganda and DRC.

2.26

INTENSIFIED SLEEPING SICKNESS ELIMINATION PROGRAMME IN SOUTH SUDAN USING AN INTEGRATED STRATEGY: ROLLING OUT THE COMMUNICATION STRATEGY

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A clear understanding of knowledge, attitudes and practices (KAP) of a particular community is necessary in order to inform effective public health interventions. The government of South Sudan has partnered with among others, Malteser International, Foundation for Innovative New Diagnostics (FIND) and World Health Organization (WHO), to intensify surveillance and control of HAT in a sustainable manner by introducing new screening and diagnostic tools and strategies, as part of integrated delivery for primary healthcare. There is however inadequate information on community KAP on HAT. A survey was therefore carried out among communities living in Yei County, South Sudan, to identify gaps in KAP. This was used to inform the design of a behaviour change communication strategy to support elimination of the disease. The survey utilized quantitative and qualitative methods. Most (90%) of the respondents had general knowledge on causes and risk factors for HAT. However, 10% had some misconceptions on the same, with almost a quarter (21%) of the respondents having misconceptions about prevention and management of the disease. These misconceptions can negatively influence the health seeking behaviour of HAT cases. Additionally, 29% reported that HAT patients would be stigmatized. The three most preferred and effective sources of communication were radio (24%), health workers (15%) and village elders (12%). These findings were used to develop information, education and communication (IEC) materials that are being used for social mobilization, community sensitization and awareness creation, hence playing a crucial role in contributing to the 2020 WHO goal on HAT elimination.

2.27

WHO NETWORK FOR HAT ELIMINATION: UPDATE ON A KEY ELEMENT FOR THE ELIMINATION OF THE DISEASE

Priotto G, Franco JR, Diarra A, Grout L.

Joint efforts by the World Health Organization (WHO) and partners since 2000 have led to the inclusion of human African trypanosomiasis (HAT) on the agenda of neglected tropical diseases targeted for elimination as a public health problem. Since then, important milestones towards elimination have been achieved. Effective collaboration among partners has contributed to building a consistent network of academia, public–private partnerships, nongovernmental organizations, donors and national HAT programmes.

It has been demonstrated that coordination among stakeholders is crucial to advance towards elimination. Following the declaration of the first HAT stakeholders' meeting in 2014, the network established under WHO's leadership is working to ensure coordinated, strengthened and sustained efforts to eliminate the disease. General meetings of stakeholders on HAT elimination are organized biennially and country progress meetings annually. Specific groups are organized to address the various aspects of elimination, including a scientific consultative group and an implementation coordination group (divided into five subgroups on development of new tools; operational research; ad-hoc country coordination; advocacy and financial resource mobilization; and integration of new tools into national and global policies). For rhodesiense HAT, a similar but simpler structure was created.

Between 2014 and 2017 the different groups and subgroups of the network conducted various activities, including country progress meetings involving all endemic countries, the update of the methodological framework for HAT clinical trials, and different meetings of the corresponding subgroup, to promote the implementation of advances in the therapeutic and diagnostic tools.

Ad hoc country coordination meetings were regularly conducted for the Democratic Republic of the Congo, as well as Chad, Côte d'Ivoire, Uganda, Benin and Togo.

Within the Scientific Consultative Group, the Technical Advisory Group for HAT elimination (HAT-e-TAG) is working since 2016 to establish the criteria and procedures to assess HAT elimination.

Partnership is a key element for HAT elimination. Through the Network for HAT elimination, WHO will continue to follow the strategy of collaborative discussion and improving elimination strategies to overcome the anticipated obstacles.

2.28

GLOSSINA AND AFRICAN ANIMAL TRYPANOSOMOSIS: STATUS FOR A ONE HEALTH APPROACH IN THE FIGHT AGAINST AFRICAN HUMAN TRYPANOSOMIASIS (AHT) IN THE MARO OUTBREAK (CHAD)

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The Maro (Chad) sleeping sickness focus is an endemic one, located in southern Chad, at the border with the Central African Republic. In order to implement a vector control campaign in the area, several activities, including human and population census and March 2017, entomological and animal survey and April 2017, were conducted to update the different parameters which may impact the disease occurrence.

The census allowed to count 45 human settlements, with up to 14 532 inhabitants living in 1838 households. The entomological survey (T0) revealed the presence of Glossina fuscipes fuscipes, at a density of 0,55 tsetse/trap/day. Sixty-six (66) tsetse were caught, from which 45 were dissected and 2 found positive, so a prevalence of 4%. For the animals survey, 309 samples of blood were taken from 279 cattle, 21 pigs, 07 horses and 02 donkey. Only cattle (14 of them) were found positive, hence a prevalence of 5, 34%.

All these results, coupled with the relative high number of sleeping sickness cases detected these last years within the area, obviously justify the implementation of the vector control campaign.

Key words: Maro focus – Glossina fuscipes fuscipes – Animal African Trypanomosis – Sleeping sickness – Vector control

2.29

TRANSMISSION OF SLEEPING SICKNESS IN THE HEALTH ZONE OF YASSA BONGA (KWILU, DEMOCRATIC REPUBLIC OF CONGO)

Philémon MANSINSA DIABAKANA and Pascal Grébaut

As part of the disposal of human African trypanosomiasis project in the health Zone of Yassa Bonga, an action against tsetse flies has been undertaken since 2015. This struggle has summarized by the treatment of rivers with mini-impregnated screens (tiny target).

After a year of struggle, a team constituted by a representative of PNLTHA DRC and the Research Institute for Development (IRD, France) went into the Yassa Bonga zone to conduct an entomological assessment.

For this evaluation, nine villages were selected from more endemic, in the west, north, east and treated area.

Sixty-seven traps "Grémansins" were placed along transects from the villages of edges into the shallows where most of the villagers activities take place. Traps were also installed at the edge of Kafi and Lukula rivers.

After 2 days of capture, 167 flies were counted, including 166 Glossina fuscipes quanzensis and Glossina fusca group (Glossina tabaniformis). Daily densities of tsetse flies caught per village ranged between 0.5 and 31.5 flies. Ten teneral tsetse flies were identified. The largest catches were made in the border of the villages, the arrival roads.

The presence of teneral tsetse flies at the village level reflects the installation of small colonies in villages and peri-domestic transmission of HAT.

The limited control device in the rivers does not justify covering 500km². It is therefore essential to think again the control device which could be based on further integration of the actors of the health system and communities

2.30

TSETSE CONTROL OPERATIONS AS AN ELEMENT OF CHRONIC HAT REDUCTION IN BANDUNDU PROVINCE, DRC

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In 2015, there were 2733 cases of chronic HAT and 73 of acute HAT officially reported by W.H.O. The prospects of eliminating HAT as a public health problem are good, especially if all methods of control are employed in an integrated manner. The development of 'Tiny Targets' provides a cost-effective method of tsetse control which can be combined with screening to accelerate progress towards the elimination goal. In Yasa-Bonga, DRC, tiny targets have been introduced by PNLTHA and LSTM as part of the TRYP-ELIM partnership, in spatial conjunction with continuing medical screening activities of PNLTHA and ITM. The deployment of ~8000 Tiny Targets along 100 km of two major rivers of Yasa Bonga has led to a >80% reduction in the apparent density of tsetse. Along with the riverine Tiny Targets deployment we have conducted studies into additional potential habitats identified using remote sensing technology to guide field investigations, learning and adapting as we collect new data from this unique epidemiological and environmental situation. This presentation covers the approaches we have used, what we have learned and how we intend to go forward. Ensuring HAT transmission is reduced as low as possible while screening continues to clear the identified infected cases., in this area that currently contributes heavily to the global HAT burden.

2.31

EVALUATION OF COMMUNITY PARTICIPATION IN VECTOR CONTROL IN THE DEMOCRATIC REPUBLIC OF CONGO (THE CASE OF KATANDA AND KASANSA HEALTH AREAS IN EASTERN KASAÏ COORDINATION)

Dr Crispin Lumbala, Patrice Kabangu, Dr Jullienne Tshiowa, Leon Ilunga, Trudon Luboya, Amand Katende*

The Democratic Republic of Congo (DRC) is the country that reports the largest number of Human African Trypanosomiasis cases. In DRC, sleeping sickness control basic strategy focuses on reducing the human reservoir, through early detection of cases and correct treatment of patients. This strategy is complemented by the reduction of man-tsetse contact through vector control. This vector control can be selective, community-based or systematic, with trappers recruited for this purpose. Given the importance of this strategy, especially the context of elimination of HAT as a public health challenge by the year 2020 as advocated by WHO, we want to present an assessment of the level of community participation in vector control in Katanda and Kasansa health zones in the coordination of Bandundu South, and Katanda and Gandajika in the coordination

2.32

UNDERSTANDING THE DYNAMICS OF SLEEPING SICKNESS THROUGH MATHEMATICAL MODELLING

Kat Rock
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As with many infectious diseases, for Gambian sleeping sickness (human African trypanosomiasis, HAT), understanding disease dynamics is important to be able to evaluate the success of past interventions and improve future control strategies. As we approach HAT elimination goals, with very low case numbers, it is crucial to understand how we can most effectively use the range of interventions available, be these diagnostics, drugs or vector control.

One tool which can aid in assessment of intervention strategy is mathematical modelling. This talk explores how state-of-the-art models have been constructed and matched to case data from various regions in order to investigate the underlying transmission of disease, efficacy of past interventions and simulate possible outcomes from future strategies. Examples include quantifying heterogeneity in exposure to tsetse, inferring the decrease in underlying transmission via medical intervention and calculating the potential benefits of complementary vector control.

In this talk the development and fitting of sleeping sickness models will be discussed for a non-modeller audience. Particular attention will be paid to interpretation of modelling results, including uncertainty in both model selection and model outputs. The talk will highlight the type of policy questions that models can help to answer, whilst stressing their limitations.

POSTER

2.33

COMPARATIVE EVALUATION OF SERO-PARASITOLOGICAL RESULTS IN TRYPANOSOMES (2004 – 2017)

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The National Trypanosomiasis Control Program was established nearly thirty-two years ago. The programme was launched in the 1980s, following an upsurge of Human African Trypanosomiasis (HAT) cases in Equatorial Guinea. It has been in existence since 1985, and is mainly focused on diagnosis, treatment of HAT cases, follow-up and LAV in the 4 historical outbreaks: one in Luba island and the other three on the hinterland (Rio Campo, Mbini and Kogo). In 1998, the last case of HAT was diagnosed in Luba, and no cases have been reported in this outbreak for the past 20 years. Therefore, our efforts have been focused on Mbini, Kogo and Rio Campo outbreaks.

On a regular basis, the Program carries out HAT epidemiological surveillance both at the central laboratory level and in the periphery, or in close collaboration with the Passive Screening Centers (CDP), so that methodologies for diagnosing the disease have been using CATT from the 80s to the present day.

And since 2013, following WHO's initiative that introduced Rapid Diagnostic Tests (RDTs) as the most important diagnostic tool for active and passive detection of the disease.

For years, drugs used within the program have been Pentamidine, Melarsoprol, and Eflornithine. Since 2010, the Program has been using a combination of Nifurtimox, Eflornithine (NECT) plus the other medicines mentioned.

Our observation study here draws our attention to the importance of parasitological diagnosis in trypanosomes. However, examining a patient doesn't mean screening him/her serologically only, but also involves variable methodologies used under the Program to establish a confirmed positive result. Our observation is based on case 1/17 / T from the village of Edjabe, Rio Campo focus straddling the two countries separated from Campo (Cameroon) focus by N'tem River.

This last case died before treatment. The patient had stayed in his home for more than eight months. During the last survey conducted in the focus, he was absent. He had several seizures at home, and had the following symptoms: facial edema, difficulties to walk, fever, intense drowsiness, fatigue. However, he has undergone all serological tests, but these proved to be negative. Through lumbar puncture, cytorachia had 23 elements without evidence of the parasite in the other parasitological examinations, with the exception of the blood smear with Giemsa which revealed a hundred trypanosomes.

2.34

STRATEGIC PLANNING IN APPLIED FIELD RESEARCH AND CONTROL OF HUMAN AFRICAN TRYPANOSOMIASIS (HAT) IN ZAMBIA; A REVIEW AND FUTURE PROSPECTS

Harrisoon Ngalande (Principal Tsetse Control Biologist)- Chipata-Zambia.

Human African trypiasomiasis (HAT), also known as sleeping sickness is a neglected tropical disease (NTD) transmitted by the bite of an infected tsetse fly (Kennedy, 2008) .The disease is caused by protozoa parasite of genus Trypanosome brucei Rhodesiense.

In Zambia, HAT has been sporadically reported in the eastern region of the country between the year1908/1909 to 2017. Despite all these cases being reported, there has not been any systematic programs aimed at addressing the problem through active surveys and surveillance by the Ministry responsible for health and other stakeholders such as the Tsetse Control Section of the Department of Veterinary Services. This signifies the negligence that has been attached to it by several governments world wide in addressing the problem.

In the year 2008 two cases were reported in Mbambanda Zaro Game sanctuary, 1 case was reported in muyombe 2014 ,In 2015 two were reported in kanyerere ,In 2017 1 case was reported in chama central and another was reported in Bambanda zaro. Of these cases reported, two cases received treatment at Chama District Hospital and the rest were referred to Rhumphi Hospital in Malawi.

In Mambwe District, 3 cases have been reported at Kakumbi Tsetse Research Station with more recent case reported in January 2017. A number of cases in the recent past have been diagnosed by the Tsetse control section at the regional laboratory at Chipata Veterinary Office and have been referred to Chipata General Hospital for treatment. In the wake of the above picture, the tsetse control section of the Ministry of Fisheries and Livestock made a formal request to the international Atomic Energy Agency (IAEA),for a PCR for the purpose of research and diagnostics. Fortunately, the Agency responded favourably and donated the equipment in January 2016.

In view of the above developments, a joint collaboration by the Ministry of Health and Ministry of Fisheries and Livestock is being formulated to seek ways of systematically addressing the issues of research, diagnostics and disease management.

A joint collaboration between the two ministries is being formulated in order to undertake active surveys and surveillance and also lobby that Kakumbi Tsetse Research station be designated or recognised as a National HAT diagnostic, research and training centre in view of its geographical location and the interest that has been shown by the station with respect to the vector and the disease, This would in the future adequately address the problem of HAT and shade light on the problem at national level.

2.35

HUMAN AFRICAN TRYPANOSOMIASIS IN THE KAFUE NATIONAL PARK, ZAMBIA

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A 47-year-old man from a tsetse-infested area within Zambia's Kafue National Park (KNP), was hospitalized with episodes of headache, fever, dizziness, sweating, body malaise and erythematous skin rashes. Rapid diagnostic tests for malaria, typhoid and tick fever were all negative. A diagnosis of Human African Trypanosomiasis (HAT) was made by buffy coat smear examination. Loop mediated isothermal Amplification (LAMP) results confirmed the trypanosomes positive for the Trypanosoma brucei rhodesiense-specific human serum resistance-associated (SRA) gene. The patient described herein had no travel history to any other HAT foci, but was only bitten by tsetse flies from within KNP, strongly suggesting that he contracted the disease from that area. This demonstrated the presence of HAT in the area. This is the first reported case of HAT from KNP after more than 50 years since the last documented case and suggests that HAT may be re-emerging in this old foci. This report is a further reminder for the need for continuous surveillance of HAT and that this disease should always be included in the differential diagnosis of reported fever, headache and general body malaise in local health centers in tsetse-infested old HAT foci.

2.36

CAPACITY AND POLICY CHANGE IN MANAGING HUMAN AFRICAN TRYPANOSOMIASIS IN ENDEMIC RURAL HEALTH DISTRICTS OF EASTERN ZAMBIA

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Introduction

- Human African Trypanosomiasis (HAT) is a zoonosis and remains an important public health problem in Africa.
- Governments in affected countries have failed to come up with deliberate policies to manage most diseases including HAT (Simarro et al, 2011).
- WHO estimates over 70million people are exposed to the disease with only a fraction under surveillance
- Zambia has no dedicated structure for surveillance or control of HAT in affected areas (Mwanakasale et al, 2011; Mulenga et al, 2015).
- In 2014, Rufunsa district of Zambia alone reported 9 new cases (University of Zambia, 2014) raising a lot of concern.

Objective

- •To investigate and compare capacities to diagnose and manage HAT at health centres located in tsetse infested Chama and Mambwe districts of Eastern Zambia.

Methodolody

- •Structured questionnaires were used to collect information from 110 health personnel drawn from 23 RHCs in a cross sectional comparative study undertaken between April and July 2013.
- •At least 50% of the total staff present from the sampled districts were to be captured but due to low staffing levels, 79% and 80% of personnel from Chama and Mambwe districts respectively where instead captured
- •Stata/SE version 11.0 was used to analyze collected data.

Results

- Missed opportunities to detect HAT compared to malaria cases between Chama and Mambwe districts (P=0.027).
- Staff from both districts had preference to detect fever related conditions rather than HAT as reviewed in the direction of most Government and private support (P=0.007).
- Staff from Chama district were less likely to miss HAT cases compared to their Mambwe counterparts (P<0.001) due to previous reported cases.

Discussion

- Missed opportunities to detect HAT compared to malaria cases between Chama and Mambwe districts (P=0.027).
- Staff from both districts had preference to detect fever related conditions rather than HAT as reviewed in the direction of most Government and private support (P=0.007).
- Staff from Chama district were less likely to miss HAT cases compared to their Mambwe counterparts (P<0.001) due to previous reported cases.

Conclusion

- HAT has serious social and economic consequences, which far outweigh the cost of maintaining surveillance.
- Elimination of HAT is technically feasible and economically justifiable as one of the important initial steps in Africa's efforts to alleviate poverty.

Recommendations

- Continued education in HAT management for health care providers in HAT endemic areas
- Standardized policy guidelines to be distributed to RHCs to guide in the provision of services in relation to HAT
- Availability of appropriate diagnostic tools for detecting HAT
- Integrating control activities into wider health system reforms

2.37

INTRODUCING THE TRYPANOGEN BIOBANK: A VALUABLE RESOURCE FOR THE ELIMINATION OF HUMAN AFRICAN TRYPANOSOMIASIS

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Human African trypanosomiasis (HAT) or sleeping sickness is caused by two sub-species of African trypanosome. HAT has been considered as an invariably fatal disease. However, more recent studies argue that this is not the case. Indeed, infection by T.b. gambiense and T.b. rhodesiense can result in a wide range of clinical outcomes in its human host and some individuals are able to control the infection, as has also been demonstrated for Trypanosma congolense of cattle. The TrypanoGEN network is a member of the Human Heredity and Health in Africa

consortium and composed of researchers from Burkina Faso, Cameroon, Côte d'Ivoire, Guinea, Democratic Republic of Congo (DRC), Malawi, Uganda, Zambia, France, United Kingdom and Belgium. The aim of the TrypanoGEN network is to study the genetic basis of human susceptibility to trypanosomiasis. In this study, we described the TrypanoGEN Network biobank for human African trypanosomiasis archiving all specimens used in our research and are available to other researchers. This biobank will enable a genome wide association study (GWAS) using the largest and best-characterised specimen collection available to date, it will be available to validate experimental hypothesis developed in the laboratory and also to facilitate the development or evaluation of new tests for the diagnosis of HAT.

2.38

EPIDEMIOLOGICAL SITUATION OF HUMAN AFRICAN TRYPANOSOMIASIS IN CHANGING AREAS DUE TO GOLD MINING: CASE OF THE COMOÉ RIVER AND ITS TRIBUTARIES IN SOUTHWESTERN BURKINA FASO.

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Human African Trypanosomiasis (HAT) is no longer a public health problem in Burkina Faso since the 1980s with only a few cases detected annually from active foci in Côte d'Ivoire. An epidemiological surveillance system recently implemented to prevent possible re-emergence has, however, identified a native HAT case in 2015. In recent years, the exploitation of gold-bearing sites by highly mobile populations partly coming from Côte d'Ivoire has developed considerably in areas infested by tsetse flies. This constitutes a risk for a re-emergence of the disease in Burkina Faso. The objective of this study is therefore to update the epidemiological situation of HAT in Burkina Faso, particularly at the level of populations living in the gold areas along the Comoé river and its

tributaries in the south-west of the country. To achieve this objective, we carried out a socio-geographical survey followed by an exhaustive medical survey in villages at risk. If no case of HAT has been detected, the results show that a risk of re-emergence is still possible in the study area due to gold mining and the very high frequency of migration of miners from one site to another. These results show that passive surveillance activities should be kept to prevent this risk.

Key words: Human African Trypanosomiasis; Epidemiological surveillance; Gold mining; Burkina Faso; risk of re-emergence1.18

2.39

THE HUMAN AFRICAN TRYPANOSOMIASIS (HAT) PLATFORM

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For the last 11 years, the HAT platform has been conducting research based on needs in the field and using an approach adapted to realities on the ground. The HAT platform is composed of representatives of national sleeping sickness control programs(NSSCP) and research institutions in its 9 member countries (DRC, Angola, Sudan, Guinea, Congo, Chad, Central African Republic, Uganda, and South Sudan), and foreign research groups such as DNDi, ITM, FIND, Swiss TPH, IRD, MSF, and University of Edinburgh, with the World Health Organization as an observer. The HAT platform is also collaborating with other African research platforms such as the East African Trypanosomiasis Network (EANETT).

We will present a summary of the advances made within the framework of the HAT platform in the development of diagnostic and therapeutic tools, with the development and update of target product profile for HAT treatments, discovery of rapid diagnostic tests and development of oral treatments for HAT.

Other achievements will be presented in this poster; including an important investment in different trainings, biannual scientific meetings and steering committees, newsletter publication, as well as current advances in clinical and operational trials conducted or in progress.

This approach is adapted to the realities of the field and enables local partners, who are the end users of the results, to be important actors involved in clinical research. During these periods, most of NSSCP have adopted the results of this research to adapt their national policies, with or without the support of the HAT platform.

2.40

DNDI HAT PROGRAM

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DNDi aims to develop field-adapted, affordable, and easy to use treatments for human African trypanosomiasis (HAT) and, ultimately, bring to patients two new oral compounds for g-HAT efficacious against both disease stages and safe for adults and children, ideally also for r-HAT. DNDi contributed to the development of a combination of nifurtimox and eflornithine, NECT, a treatment with a reduced number of intravenous infusions and shorter duration than the previous standard eflornithine alone. NECT has been universally accepted as first line second stage g-HAT treatment, and is included in WHO lists of essential medicines for adults and children. Fexinidazole entered clinical development in September 2009 and three Phase III clinical trials have been recently completed in DRC. Developed in partnership with the National Sleeping Sickness Control Programmes of DRC and CAR, MSF, the Swiss TPH and Sanofi, fexinidazole will be submitted to the European Medicines Agency for scientific opinion and endemic country regulatory authorities for approval, as the first oral, stage-independent therapy for HAT. It has the potential to transform treatment access, particularly in remote areas. If approved, implementation is targeted for 2018. A Phase IIIb study that includes a cohort of out-patients to understand the mechanics of home based treatment was initiated in 2016. Acoziborole (also known as SCYX-7158) started Phase II/III trials in DRC in October 2016. Acoziborole is being developed as a single-dose treatment that if successful will be central to sustaining elimination due to its simple administration, with the aim of delivery by 2021.

ANIMAL AFRICAN TRYPANOSOMIASIS (AAT)

ORAL EPIDEMIOLOGY

3.01

DEVELOPING AN ATLAS OF TSETSE AND AFRICAN ANIMAL TRYPANOSOMOSIS FOR SENEGAL

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Updated distributional maps of bovine trypanosomosis and tsetse fly are essential to estimate the risk and the impact of African animal trypanosomosis (AAT), as well as to design and implement appropriate control strategies. Over decades, a number of surveys have been conducted to determine the geographic distribution of trypanosomes and tsetse fly species in Senegal. However, harmonized and comprehensive geo-referenced information for decision making is not readily available. This gap constrains the planning and execution of interventions against AAT at the national level. In the present study, entomological and epizootic data collected since 2000 were collated, harmonized and geo-referenced. Sources included articles in scholarly journals, MSc and PhD thesis, as well as governmental reports. The assembled data were entered in a database, and mapped with a Geographical Information System (GIS). This was the only tsetse elimination program conducted in Senegal. Three species of bovine-infective trypanosomoses can be found in tsetse-infested areas: T. congolense, T. brucei and T. vivax. The implications of these findings are discussed in the light of future AAT control activities.

3.02

PARASITOLOGICAL PREVALENCE OF BOVINE TRYPANOSOMOSIS IN KUBO DIVISION OF KWALE COUNTY OF COASTAL: BASELINE SURVEY

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Prior to field trials of large scale tsetse repellent technology validation in July 2011, a cross-sectional survey of bovine trypanosomosis and its vectors was carried out to know the disease level in Kwale County of Coastal Kenya. A total of 584 adult cattle were examined at ten different Locations. The trypanosome prevalence in cattle with regard to age, sex, location and apparent tsetse density was investigated. The overall trypanosome prevalence in cattle in Kubo Division of Kwale County was 33.9%. Two types of infections were recorded in various parts of the Division in the following proportions: T. congolense 61.1%, T. vivax 38.9%. Findings from this study indicated that the Location dependent trypanosome prevalence can be stratified in three main levels: high (Mkongani 16.7%); very high in (Kizibe 25%, Zunguluka 25.5% and Mangawani 26.7%) and extremely high in (Katangini 32.2%, Mkanda 34.4%, Msulwa 42.4%, Mawia 46.4% and Kidongo 52.5%). The mean apparent density for G. pallidipes was 30 flies/trap/day while that of G. austeni 0.8 flies/trap/day and G. brevipalpis was 0.4 flies/trap/day. There was a positive and significant correlation ($p<0.05$, $r = 0.82$) between the trypanosome prevalence and tsetse apparent density. In view of the risk of trypanosomosis, the Division was selected for the large scale field trials of the new tsetse repellent technology validation.

Keywords: Kubo division, Kwale Disrtrict, Prevalence, trypanosomosis, Tsetse repellent technology

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3.03

PREVALENCE AND RISK FACTORS ASSOCIATED WITH BOVINE TRYPANOSOMOSIS USING CONVENTIONAL METHODS AND POLYMERASE CHAIN REACTION (PCR) IN THE BLUE NILE STATE, SUDAN

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This study was conducted to determine the prevalence and associated risk factors of bovine trypanosomosis in cattle using conventional methods and Polymerase Chain Reaction (PCR) in the Blue Nile State, Sudan. The study was conducted in five localities (Ad-Damazin, Al- Rosayris, Qissan, Baw and AL- Tadamon) during rainy season and winter in the year of 2014. A total of 300 cattle were selected using random sample method. Hundred samples from resident group (Kennana) (70 females and 30 males), while 200 samples were collected from nomads group (Kennana: 10 females and 20 males and Fulani: 107 females and 63 males). All samples were collected from age groups 1-3 years and greater than 3 years. Blood samples were collected and examined for the presence of bovine trypanosomosis using PCR techniques and parasite detection tests (wet smear, thin smear, thick smear and buffy coat). The apparent prevalence was as follow, 3 (1%) using wet smear, 3(1%) thin smear film, 2 (0.67%) thick smear film , 3(1%) hematocrit centrifugation technique. T. vivax was the only spies recorded using conventional methods. Higher prevalence rate was recorded using PCR 35 (11.67%) and T. vivax and T. conglense were recorded by using this method. During the study, the prevalence rate of bovine trypanosomosis by age was 1.67% for age group (less than 3 years) and 10% for the second group (more than 3 years). Sex revealed that 2.33% were positive for males while 9.33% were positive for females. The prevalence rate by breed were found to be 11% for Flata (Ambararo) and 0.67 for Kenana, the data were analyzed using Statistical Package for Social Science Programme (SPSS) and the difference was significant for abovementioned factors as follow, the age

(x2= 7.019, p_ value .006), and breed(x2= 16.472, p_ value .000), but no significant for sex (x2 =2.110, p_ value .104). The study revealed that the PCR is more sensitive than microscopic techniques. Hence,more studies are needed to determine the types of trypanosomes species in the study area, particularly in tsetse infested areas as well as more research is required to find out the effect of the Rosaries Dam heightening and its effect on trypanosomes vectors occurrence.

3.04

PREVALENCE OF TRYPANOSOME INFECTIONS IN CATTLE AND TSETSE FLIES IN THE MAASAI STEPPE, NORTHERN TANZANIA.

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African trypanosomosis is a disease of public health and economic importance that pose as a major threat to the livelihoods of the people living in the Maasai steppe, where there is significant interaction between the Maasai people, their livestock and various wildlife species. The vulnerability of the Maasai people to the disease is enhanced by the interaction of their cattle, which act as vehicles for trypanosomes, and tsetse flies. Therefore, this study was aimed at establishing the current status of the parasites circulating between cattle and tsetse flies in the area. The prevalence of trypanosome infections was obtained by PCR-based molecular techniques performed on the DNA of 1002 cattle blood collected from five villages and 886 tsetse flies trapped within the Maasai steppe close to Tarangire National park. Overall prevalence of trypanosomes was 17.2% in cattle and 3.4% in tsetse flies. Seasonal analysis of the data revealed a higher prevalence of infections at the end of wet season compared to the dry and wet seasons. The PCR technique detected five trypanosome species which varied with season and location. The magnitude and distribution of trypanosome infections both hosts were attributed to human activities associated with livestock movement

and vector control. Analysis of T. brucei DNA using SRA-LAMP revealed no human infective trypanosomes. However, the prevalence of the trypanosome species and abundance of tsetse flies suggests the risk of spread to other animals and this further calls for continuous surveillance and disease.

3.05

STUDY OF BOVINE TRYPANOSOMIASIS IN SAY AND TORODI DEPARTMENTS (NIGER)

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Summary
Animal trypanosomoses are observed in Niger, especially in the area of the river where they are a real problem for the development of livestock.

The objective of this study is to determine the seroprevalence of this disease in the Say and Torodi areas through an epidemiological investigation.

Thus, 33 cattle herds were selected from 22 village sites. A total of 384 blood samples were collected in dry tubes and EDTA tubes. The diagnostic techniques used were the parasitological method (from blood smear to the GIEMSA dye) and the serology (ELISA -indirect).

The parasitological results showed an overall prevalence of 2.34% while the overall serological prevalence was 55.98% with the respective seroprevalences of Trypanosoma vivax (26.49%), T.congolense (15.58%) and T .brucei (13.76%). However, there are three trypanosome species infecting cattle in the area with the predominance of Trypanosoma vivax.

These results showed that bovine trypanosomiasis is present in these five surveyed communes and that it remains a major concern for breeders.

Key words: Niger, Cattle, Epidemiology, Trypanosomosis, Tsetse flies, Seroprevalence,

3.06

SCREENING CATTLE AS POTENTIAL RESEVOIRS OF SLEEPING SICKNESS AROUND LIWONDE NATIONAL PARK, MALAWI, 2016

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Introduction

In the year 2013, studies were conducted to assess prevalence of Sleeping Sickness in and around Liwonde National Park (MoH, 2013). Through this study, a total of 100 blood samples were collected from people residing inside and around Liwonde national Park. The samples were analysed through {Polymerase chain Reaction technique (PCR). This study identified Serum Resistant Associated (SRA) gene of Trypanosome brucei rhodesiense (Tbr) from 50% of blood samples. This suggested that sero-prevalence of Sleeping Sickness in people around and inside Liwonde National Park was 50% in 2013 which was rather high.It is known that the infection rate of tsetseflies in Liwonde National Park is very high (Musaya et al 2017). However, it is still not known whether cattle are reservoirs of Trypanosome brucei rhodesiense (Tbr). This initiated a pilot study to screen cattle as potential reservoirs of Sleeping Sickness around Liwonde National Park.

Methods

Whole blood was collected from cattle from Masinde and Mikoko dip tanks.. Polymerase Chain Reaction technique was used to identify the Serum Resistantant Associated (SRA) gene of Trypanosome brucei rhodesiense (Tbr). A total of 101 blood samples was collected. Each sample was place into separate eppendorf tubes with phosphate buffered saline (PBS) for DNA extraction. RIME Lamp PCR was used to isolate Trypanosome brucei cases. Finally, blood samples with Tb cases were evaluated using Serum Resistantat Associated PCR to isolate SRA gene.

Results
Of 101 bovine blood samples that were analysed, SRA gene was identied from seven blood samples.

Conclusion
The identification of SRA gene in bovine blood suggests that cattle are potential reservoirs of Sleeping Sickness. However, we need to expand this project to increase the sample size in different Sleeping Sickness endemic foci in Malawi.

3.07

VECTORS AND PARASITOLOGICAL PREVALENCE OF AFRICAN ANIMAL TRYPANOSOMOSIS IN CATTLE IN THE DEPARTMENT OF DJEREM (ADAMAOUA - CAMEROON)

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Trypanosomosis are important human and animal's protozoan (Trypanosoma) infections present in many African countries. A cross sectional survey to determine vectors and the prevalence of trypanosomosis infecting cattle were conducted in the Djerem division, south of Adamawa plateau Cameroon. A total of 360 cattles were examined in 24 herds of six localities (Mbitom, Mbakaou, Danfili, Ngaoundal, Beka Gotto and Laidé Ngouda) in three zones. Fiel examination of the buffy coat, stained thin blood film to observation of Trypanosomes were the diagnostic technique used. The overall prevalence of bovine trypanosomosis was 18,89%. However, the prevalence differed significantly between the infested zone (26,66%) and the tse-tse free areas zone (12,5%), (z= 2,79) between buffer zone (17,5%) and tse-tse free areas zone (12,5%), no significant difference was found (z=1,08). Among the positive animals, 42,64% , 16,17%, 2,94%, 29,41%, 1,47%, 2,94% and 4,41% were from Trypanosoma congolense, T. vivax, T. brucei , T. congolense and T. vivax, T. congolense and T. brucei, T. vivax and T. brucei, T. congolense, T. vivax and T. brucei respectively. In the entomologicale survey, five biconicales traps were put 100 meters away from each other. In six localities of the three zones, traps were observed once daily during five days. Four species were identified with different apparent densities; 0, 26, 0, 49, 0, 29 and 0, 88 for Glossina fuscipes fuscipes, Tabanus bovinus, Atylotus agrestis and Stomoxys calcitrans respectively. Because of the risk of trypanosomosis in Djerem division, appropriate control strategies need to be put in place urgently.

3.08

DETERMINATION OF THE PREVALENCE OF AFRICAN TRYPANOSOME SPECIES IN INDIGENOUS DOGS OF MAMBWE DISTRICT, EASTERN ZAMBIA, BY LOOP-MEDIATED ISOTHERMAL AMPLIFICATION

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Background: Dogs have been implicated in parasite exchange between livestock and humans and remain an important source of emerging and re-emerging diseases including trypanosome infections. Yet, canine African trypanosomosis (CAT), particularly in indigenous dogs remains under-reported. We evaluated the performance of loop-mediated isothermal amplification (LAMP) in detecting trypanosomes in blood from indigenous dogs of tsetse-infested Mambwe district, eastern Zambia. Methods: A cross sectional survey of CAT was conducted within 5 chiefdoms (Msoro, Kakumbi, Munkanya, Nsefu, Malama) of Mambwe district in October 2012. Blood samples from 237 dogs were conveniently collected and screened by microscopy and LAMP. Findings: Twenty dogs tested positive by LAMP 20 (8.4%; 95% CI: 4.9 – 12.0%) and only 14 by microscopy (5.9%; 95% CI: 2.9 – 8.9%). The Infections were caused by Trypanosoma congolense, T. b. brucei and zoonotic T. b. rhodesiense. Although the cases generally didn't manifest clinical illness, occurrence of corneal opacity was associated with T. brucei subspecies infection. Conclusions: In view of the sporadic cases of re-emerging HAT being reported within the Luangwa valley, detection of the human serum resistant associated (SRA) gene in indigenous dogs is indicative of the risk of contracting HAT by local communities and tourists in Mambwe district.

3.09

THE INCRIMINATION OF THREE TRYPANOSOMES SPECIES IN CLINICALLY AFFECTED GERMAN-SHEPHERD DOGS IN SUDAN

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Canine trypanosomosisis a common disease caused by tsetse and non-tsetse transmitted trypanosomes worldwide. The severity of the disease varies and animals may show acute, sub-acute or chronic disease. The clinical signs, which include anemia, loss of weight and abortion, are nonspecific. In the present study, we used serological and molecular diagnostic tools to investigate the incidence and the prevalence of dog trypanosomosis, in order to assess situation and risks dogs and other domesticated animals in Sudan. In a cross-sectional study carried out during July 2016, 50 caged German shepherd dogs in Khartoum State, Sudan were sampled to detect possible trypanosome infections using both serological (CATT/T. evansi) and molecular (KIN-PCR, RoTat 1.2 VSG-PCR and TviCatL-PCR) tests. CATT/T. evansi detected antibodies against T. evansi in 15(30%) dogs, while parasite DNA was detected in 17 (34%) dogs by RoTat 1.2 PCR. In contrast, a KIN-PCR detected the subgenus Trypanozoon, T. congolense savannah, T. congolense Kenya and T. vivax in 36 (72%), 3 (6%), 1 (2%), and2 (4%) dogs, respectively. However, a species-specific PCR for T. vivax detected 7 (14%) positive cases. We concluded that canine trypanosomosis in the study area was caused by at least three species of trypanosomes, namely T. evansi, T. vivax and T. congolense. Trypanozoon other than T. evansi could not be ruled out since other tsetse-transmitted trypanosomes have also been detected and species-specific PCRs were not used. In addition, the disease is highly prevalent in the study area, which strengthens the need to change control

policies and underscores the importance of including dogs in all control measures against the parasite. To our knowledge, this is the first study to use serological and molecular diagnostic methods to show the possible involvement of dogs in the epidemiology of trypanosomosis, including T. vivax infection.

Keywords: Trypanosoma evansi, Trypanosoma vivax, Trypanosoma congolense, dogs, Sudan

DIAGNOSIS

3.10

DETECTION OF RE-EMERGING BOVINE TRYPANOSOMIASIS IN SOUTHERN ZAMBIA BY LOOP-MEDIATED ISOTHERMAL AMPLIFICATION (LAMP)

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Trypanosomiasis is a neglected tropical disease caused by the trypanosome parasites namely Trypanosoma congolense, Trypanozoon subgenus and Trypanosoma vivax. It is transmitted by the tsetse fly vector in Sub-saharan African countries affecting both the humans and animals. In the present study, trypanosome species-specific Loop-mediated isothermal amplification (LAMP) technique, specifically targeting the 18S rRNA gene of Trypanosoma congolense, the repetitive insertion mobile element (RIME) gene of the Trypanozoon subgenus group and the human serum resistant associated (SRA) gene of Trypanosoma brucei rhodesiense, was used to determine the prevalence of bovine trypanosomiasis in the Choma - Kalomo block, an important agricultural area within the Southern province of Zambia. Our data show that out of the 460 cattle sampled, 12.8% (95% CI: 9.7-15.8%) were detected to have trypanosomes in their blood by LAMP, with 9.5% (95% CI: 2.0-17.0%) of infections being caused by T. congolense, 2.4% (95% CI: 1.5-6.3%) caused by T. b. brucei, and 0.9% (95% CI: 1.5-13.3%) being mixed infection of T. congolense and T. b. brucei. No T. b. rhodesiense was detected. Considering that LAMP is a highly sensitive and specific technique and yet user friendly, this test may in future prove to be instrumental in the routine accurate detection of trypanosomiasis in field samples in resource-limited countries such as Zambia.

3.11

UTILIZATION OF CRUDE AND RECOMBINANT ELISAS FOR SERODIAGNOSIS OF CAMEL TRYPANOSOMOSIS IN SUDAN

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A serum-based epidemiological study using ELISA and Card Agglutination Test (CATT/T. evansi) was performed to update the seroprevalence of camel trypanosomosis and to evaluate the application of crude and recombinant antigen ELISAs. The advantage of TeGM6 antigen is that it is 100% identical to T. b. brucei GM6 and is highly conserved among salivarian trypanosomes. Therefore it might be useful in the detection of Trypanozoon, T. congolense and T. vivax. 189 serum samples were collected from the herds in the eastern part of Sudan (148 samples) and from a local slaughterhouse (41 samples). ELISA was performed using crude antigen and rTeGM6-4r. Protein A was used as secondary antibody, while CATT/T. evansi was used as a control test. This resulted in varying degree of prevalence depending on the technique used as follows; CATT/T. evansi 39% (73/189), crude antigen ELISA 39% (73/189) and rTeGM6-4r ELISA 62% (118/189). Kappa value of rTeGM6-4r was 0.369 indicating a fair agreement with sensitivity of 54.24% and specificity 87.32%, while Kappa value of crude antigen was 0.7991 indicating a substantial agreement with sensitivity of 87.67% and specificity 92.24%. In conclusion, we found that camel trypanosomosis is highly endemic in camels in Sudan and that the TeGM6-4r ELISA assays applied in this study has detected a higher number of positive samples confirming that it is not species-specific and could be used as a universal diagnostic antigen

that can detect salivarian trypanosomes including T. evansi and T. vivax . Moreover, crude antigen was efficient for application in the serodiagnosis of camel trypanosomosis caused by T. evansi.

3.12

REPERTOIRE AND EXPRESSION OF VARIANT SURFACE GLYCOPROTEINS OF TRYPANOSOMA EVANSI IN EXPERIMENTALLY INFECTED MALAYSIAN PONIES

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Antigenic variation is a mechanism by which trypanosomes enhance its survival in host environment, through successive expression of variant surface glycoproteins (VSGs). Hence in this study, T. evansi VSGs repertoire and its dynamics of expression in infected Malaysian ponies were assessed. Four local female ponies were injected with T. evansi field isolate of 102 live trypanosomes/kg body weight. Blood samples were collected on alternate days for 30 days to examine the infection. Consequently, VSGs sequences were obtained via propagation of cDNA that ligated into a plasmid vector. Four or five VSGs were expressed from each pony corresponding to peaks of parasitaemia. The predominant domains combination of N and C-terminal type in this study was A2. The pairwise identity revealed by multi-alignment analysis was 15.70% for the N-terminal domains and 35.30% for the C-terminal domains. Very low identity was observed among the N-terminal domains expressed by the same pony, which range between 13 to 10%. The phylogenetic tree inferred from the pool 19 VSGs distinguished the N-terminal domains and failed to address diversity among the C-terminal domains in lineages with a bootstrap value of 82% and 13% respectively. In addition, High score of similarity among the N-terminal domains expressed by different ponies was noticed. About 58% (11/19) of the examined N-terminal domains revealed an identity above 60% with the published T. brucei and T. evansi VSG database curated at the NCBI. In conclusion, the VSG N-terminal domains used to trigger the host immunity against T. evansi infection as they are highly varied within the host. Certain VSGs provided an early protection for T. evansi in the host during the acute phase of the infection. Based on the earliest VSGs expressed, further works regarding the potentiality of these proteins as a vaccine candidates or diagnostic antigens should be tackled.

3.13

ASSESSMENT OF VIRULENCE IN TRYPANOSOMA EVANSI ISOLATES FROM CAMEL TRYPANOSOMIASIS ENDEMIC REGIONS

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Camel trypanosomiasis, caused by Trypanosoma evansi, transmitted by biting flies, is a debilitating, economically important disease affecting camels, and presents itself either as an acute or chronic disease. Although T. evansi was first isolated in Dera Ismail Khan District of Punjab India in 1880 from infected camels and equids, it is also believed to have originated from Africa and therefore endemic in many tropical and subtropical countries wherever biting-fly vectors are found. The disease, sometimes known as Surra, is controlled mainly through chemotherapy. Morbidity of up to 30.0% and mortality of 3% has been reported in Ethiopia. In Kenya, prevalence of up to 50% has been reported. We examined virulence in Swiss White Mice of 10 T. evansi isolates from camels in endemic regions of Kenya and 7 from Asia and South America. High parasitaemia levels were recorded in all animals 1-3 days post infection, rising rapidly to peak scores of 9 within 3 days. Results also demonstrated presence of two types of T. evansi in Kenya, Types A & B based on presence or absence of RoTat 1.2 VSG. Assessment of changes in parasitaemia, live body weight, packed cell volume (PCV) and survivorship in the mice, revealed three categories of virulence; low (survival 31-60 days), medium (survival 11-30 days) and high (survival 3-10 days). These findings may pose challenges to diagnosis and effective control of Surra in camels.

CHEMOTHERAPY AND DRUG RESISTANCE

3.14

DRUG QUALITY ANALYSIS OF ISOMETAMIDIUM CHLORIDE HYDROCHLORIDE AND DIMINAZENE DIACETURATE IN THE FRAMEWORK OF EPIDEMIOLOGICAL SURVEILLANCE NETWORK OF CHEMORESISTANCE TO TRYPANOCIDAL AND ACARICIDES IN WEST AFRICA (RESCAO)

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Isometamidium chloride hydrochloride (ISM) and diminazene diaceturate (DA) are among the three main molecules used to treat African Animal Trypanosomosis (AAT) in West Africa. There are two circuits to purchase trypanocidal drugs: non-official (including sellers mostly in local markets) and official chain whereby drugs are sold in veterinary pharmacies. The sub-standard quality of these trypanocides is partly at the origin of trypanocidal drugs resistance. Our objective was to examine the quality of the trypanocidal drugs sold in West Africa. In total, 308 samples including 26 of ISM and 282 samples of DA were collected in both sources in Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger and Togo, under the auspices of RESCAO network. All the samples were analyzed at LACOMEV (Dakar, Senegal), a reference laboratory of the OIE, by galenic and HPLC techniques as standard reference analysis methods. The overall results showed that 51.90% of the trypanocides collected were non-compliant with lower quantity of the active ingredient compared

to the concentration on the packaging. The rates of the non-compliant trypanocides drugs were different between countries (p=0.0293). Both supply chains showed drugs of bad quality (p=0.5461). A significant difference was found with DA as compared to ISM (p=0.0277). In conclusion, the results of this study showed a high proportion of non-compliant products used for the treatment of AAT. This high rate value of the non-compliance could compromise the efficacy of the therapeutic strategies and allow the development of chemoresistance in West Africa.

Keywords: African Animal Trypanosomosis, trypanocides, drug quality and West Africa

3.15

PRELIMINARY DIAGNOSIS ON THE GOATS TRYPANOSOMA VIVAX CHEMORESISTANCE TO ACETURATE DIMINAZENE AND ISOMETAMIDIUM CHLORIDE IN THE SAVANAH REGION

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Trypanocidal drug resistance was suspected in the Savannas Region at the north of Togo. In order to verify this, laboratory experience was carried out on four stocks of Trypanosoma vivax collected in this region. Three hundred bovine blood samples was collected into 6 villages of breeding and examined by the buffy coat technique. By village, only positive samples with T. vivax were infested to one sahelian goat by intravenous inoculation in order to make stabilats. Each stabilat was reactivated on one goat which parasitic blood was infected to four goats of the same batch. By batch, the intramuscular alternative curative treatments with diminazene and isométamidium were successively applied. The average prevalence of trypanosomoses recorded was 6.66 %. The infestations were unique, T. vivax (75 % of) and mixed, T. vivax and with T. congolense (25 %). Relapse rate, was 25 % with the amount 3.5 mg/kg bw of diminazene and 71.42 % with the amount 0.5 mg/kg bw of isometamidium. No case of relapse to 7 mg/kg bw of diminazene was not recorded, showing that the recommended curative amounts (i.e. 3.5 mg/kg bw of diminazene and 0.5 mg/kg bw of isometamidium) seem ineffective with certain populations of T. vivax in the Savannas Area of Togo.

Key words: Drug resistance, Trypanosoma vivax, sahelian goat, Togo.

3.16

ANIMAL TRYPANOSOMOSIS IN TOGO IN CHEMORESISTANCE CONTEXT

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In Togo, the importance of African Animal Trypanosomosis (AAT) is due to the fact that the country is fully seated in the area of distribution of tsetse flies which are the main vectors of the disease. Previous works revealed that more than 85% of the country is tsetse infested and 95% of cattle are under threat of animal trypanosomosis. The national average prevalence was estimated at 10% in 1999. In spite the fact that the spatial distribution of tsetse flies and trypanosomosis in Togo are known, data on AAT are very old and need to be updated. Some projects has been undertaken to know to better understand and update the epidemiological situation of animal trypanosomosis in a chemoresistance context to better define effective control strategies against the disease and the vector. The results showed heterogeneity in the distribution of the disease. The prevalences ranging between 0 and 5.66% in Savannah region whilst the prevalence varied between 0 and 21.57% in Kara region and between 32.56 and 43.59 in Plaine de Mô (Region Centrale). Three species of animal trypanosomes (Trypanosoma vivax, T. congolense and T. brucei brucei) were found with a clear predominance of T. vivax infections and the possibility of mixed infections. Entomologically, three species of tsetse flies were caught: : Glossina tachinoides, G., palpalis palpalis and G. morsitans submorsitans. Chemoresistance have been identified in some localities.

Keywords: Animal Trypanosomosis, prevalence, tsetse flies, Togo.

POSTER

3.17

SERO-PREVALENCE OF TRYPANOSOMIASIS IN CAMELS IN SHARKIA GOVERNORATE ,EGYPT

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In the present study, Two hundred and seventy randomly selected dromedary camels at different age from different localities and abattoirs of Sharkia governorate, Egypt were examined for natural infection with Trypanosoma evani. The samples collected from animals were whole blood and serum.

All serum samples were examined by serochemical by formol gel test and serology by using ELISA. Determination of circulating antigens was done by using Suratex test and PCR.

The formol gel test indicated that 22 sera sample out of 270 were positive (8.1%).The result of detection of Trypanosoma evansi antibodies by ELISA revealed that 36 was positive (13.3 %). Suratex test showed that 26 (9.6%) camels gave positive results for circulating antigens of Trypanosoma evansi.While result of PCR which done on positive ELISA was positive(36samples).

Sero-prevalence of the disease among camels in Sharkia governorate, Egypt indicate that ELISA is highly sensitive and specific for diagnosis of Trypanosomiasis in camels.It could be used as a screening test in sero-prevalence study.

3.18

A PCR BASED SURVEY OF ANIMAL AFRICAN TRYPANOSOMES AND SELECTED PIROPLASM PARASITES OF CATTLE AND GOATS IN ZAMBIA.

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We screened cattle and goats in Zambia for the presence of animal African trypanosomes, Babesia bigemina and Theileria parva from the districts of Chama, Monze and Mumbwa using PCR assays. 38.1% of the samples tested positive for at least one of the parasite species. The commonest parasite was Trypanosoma vivax (19.8%) which was significantly higher in goats than cattle, ($p<0.05$). B. bigemina was found in all the three areas making it the most wide spread of the parasites. Among the positive samples 12.0% were mixed infections. There were significant differences in T.vivax infection rates with Mumbwa having a significantly higher infection rate 39.6%($p<0.0001$), Th. parva with Monze having the only cases ($p<0.0004$)and B.bigemina with Monze having a significantly higher infection rate 40.5%($p<0.0001$). According to the hematocrit values, there was significantly lower PCV among cattle with mixed infections compared to the others. The presence of multiple parasite species and mixed infections among the cattle and goat populations is of both clinical and economic importance to livestock farming. The absence of trypanosomosis among the samples collected from Monze

can be attributed to tsetse eradication around Lake Kariba. This shows prevention and control of vectors can cause a significant difference in the disease status which can directly translate to improvement of the livestock sector in Zambia.

3.19

THE EFFICACY OF SULPHADIMIDINE, GENTAMICIN, OXYTETRACYCLINE AND THEIR COMBINATIONS IN NUBIAN GOATS EXPRIMENTALLY INFECTED WITH TRYPANOSOMA EVANSI

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The objective of the present study was to evaluate the efficacy of sulphadimidine, gentamicin, oxytetracycline and their combinations in Nubian goats experimentally infected with T.evansi. Eight groups were used in this study. All experimental groups were infected with T.evansi except group (1) uninfected and untreated. While group (2) was infected and untreated, groups (3, 4, and 5) were treated with single i/m dose of sulphadimidine (200mg/kg), gentamicin (4mg/kg) and oxytetracycline (20mg/kg) respectively. Groups (6, 7 and 8) were each treated with single i/m dose of combination of sulphadimidine (200mg/kg) + gentamicin (4mg/kg), sulphadimidine (200mg/kg) + oxytetracycline (20mg/kg) and gentamicin (4mg/kg) + oxytetracycline (20mg/kg) respectively. No clinical signs were shown on goats of groups (3#8) post treatment. No significant changes were observed for the temperature, respiratory rate, pulse rate and heart rate in groups (2#8) and for the RBCs count, PCV, haemoglobin concentration and the red blood cells indices and WBCs count, eosinophils, basophils and serum total proteins concentrations compared to the control group 1. Significant decreases were recorded in glucose and albumin serum concentration, while significant increases in the neutrophils, monocytes, lymphocytes, globulins, urea serum concentration and in the activity of GOT in most treated groups. Doses of sulphadimidine, oxytetracycline and their combinations cleared the peripheral blood from the parasite since week 4 post treatment to the end of the experiment, while single i/m of gentamicin and its combinations with sulphadimidine and oxytetracycline cleared the parasitaemia of the peripheral blood at week 8 and 9 post treatment respectively.

The present results concluded that, the drugs tested and their combinations had trypanocidal efficacy. The study recommended the possibility of treatment of trypanosomiasis with sulphadimidine, gentamicin, oxytetracycline and their combinations.

Keywords: Trypanosoma evansi, Efficacy, Sulphadimidine, Gentamicin, Oxytetracycline.

3.20

PROTECTIVE PERIOD FOR ISOMETAMEDIUM CHLORIDE (SAMORIN) AGAINST TRYPANOSOMIASIS IN AREAS WITH VARYING TSETSE CHALLENGE IN MAMBWE DISTRICT

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Background: African Animal Trypanosomiasis (AAT) caused by Tsetse flies is a major constraint to livestock production in settled parts of tropical Africa. Zambia has not been spared as livestock farmers in affected areas are heavily dependent on use of drugs to manage the disease. However, for prophylaxis to be achieved administration of drugs must be done properly which is not the case in most remote setups.

Objective: To determine the efficacy of Samorin for prophylaxis in cattle in areas with different Tsetse infestation density.

Method: Three areas were purposely selected with 3 levels of infestation; low, medium and high. Monthly follow-ups where conducted for six months were animal blood samples from sentinel herds were analysed using Quantitative Buffy Coat, thick and thin smears and Packed Cell Volume.

Results: There was no significant difference in the period of efficacy of Samorin in the 3 selected areas of Mambwe district. Animals maintained the protective level of the prophylactic drug for the 6-month period.

Conclusion: Samorin to be administered once or twice per year in Mambwe district and this to be done 2 weeks after treatment with Berenil to reduce costs for farmers on trypanocide purchase.

GLOSSINA BIOLOGY, CONTROL AND ERADICATION

ORAL BIOLOGY

4.01

MOLECULAR XENOMONITORING OF TRYPANOSOMES IN TSETSE FOR PRIORITIZING TSETSE CONTROL IN SLEEPING SICKNESS ENDEMIC AREAS IN TANZANIA

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Tsetse flies (Glossina) transmit the blood-borne trypanosomes that cause Human African Trypanosomiasis (HAT) and African Animal trypanosomiasis (AAT). Diagnostic tools appropriate for undertaking interventions to control trypanosome infections are key to their success; however, many have unsatisfactory performance and are not well suited for their use in the parasite control programme being implemented. Monitoring trypanosomes infections in wild tsetse flies in a given area is important in prediction of epidemic outbreaks of the diseases and spread; and could help focus control programs in areas requiring immediate attention to halt the disease transmission especially trypanosomiasis of zoonotic importance. The objective of this study was to rollout the use of RIME LAMP for screening of large number of tsetse flies for trypanosomes found in Serengeti areas in order to predict the outbreak and spread of HAT for immediate attention and institution of control programs. Flies were collected from Simiyu, Kirawira, Moru, Birila and Serena during the dry and wet seasons, sundried and DNA extracted using Qiagen Kit and analysed by RIME-LAMP followed by SRA LAMP for identification of human infective pathogen. A total of 250 pooled tsetse samples (each pool containing 5 tsetse flies) were analysed; 125 for each season. Results showed that 6.4% (n=16) (4 from Serena; 4 from Kirawila and 8 from Simiyu) of the samples were positive to RIME-LAMP test of which 87.5% (n=14) were Trypanosoma brucei rhodesiense. 28.6% (4/14), 21.4% (3/14) and 50% (7/14) of the identified T. b. rhodesiense were from Serena, Kirawila and Simiyu blocks respectively. Although no statistical difference in T. b. rhodesiense infections was observed between seasons (P=0.7844), 57.14% of the cases were from flies collected during the dry

season. The study shows that carrying out RIME LAMP tests in the field provides the simplest and quickest means to estimate Trypanosomes of T. brucei types infection in tsetse for decision support to implement intervention programmes.

4.02

INCREASING THE TOOLBOX FOR TRYPANOSOMIASIS CONTROL : EXPLORING EFFICACY OF METACYCLIC ANTIGENS FOR MAMMALIAN VACCINES

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To date, most vaccine efforts that target the mammalian bloodstream (BSF) stages have been unsuccessful. At the same time, knowledge on the metacyclic (MC) parasites present in tsetse saliva, which the host is initially exposed to during the infection process is sparse. In other vector-transmitted diseases as well as HAT and AAT, prior efforts that have targeted attenuated salivary gland stages of the parasite has provided promising results. Transcriptomics studies identified a family of T. brucei spp. Specific surface proteins (Trypanosoma brucei Salivary Gland Metacyclic, tbsgm2), which are preferentially expressed by the mammalian infective mature metacyclic parasites present in tsetse saliva, and in the mammalian blood for at least 24 h post introduction via the bite of an infected tsetse. Immunohistochemistry and immunogold labeling withantibodies against recombinant rTbSGM2 localized the protein to the surface of the metacyclic cells. ELISA analysis detected high levels of antibodies for Tbsgm2 in sera from experimental mice challenged by infected tsetse bites, as well as in sera from T. b. gambiense patients, but not in sera of endemic controls. Passive transfer of rTbSGM2 specific IgG to naïve mice demonstrated protective efficacy against trypanosome infections acquired through a fly bite. In the first experiment, parasitemia was significantly delayed while in the second experiment, one of the three animals had no parasitemia, while the other two had significantly reduced parasite numbers 3 days post fly challenge. Future studies are warranted to investigate the efficacy of TbSGM2 as a potential transmission blocking vaccine candidate antigen to complement ongoing efforts to control African trypanosomiasis.

4.03

INFECTION RATES, GENETIC DIVERSITY AND POPULATION STRUCTURE OF TRYPANOSOMA BRUCEI IN UGANDA: IMPLICATIONS FOR THE EPIDEMIOLOGY OF SLEEPING SICKNESS AND NAGANA

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Background

While Human African Trypanosomiasis (HAT) is in decline on the continent of Africa, the disease still remains a major health problem in Uganda. We conduct tsetse infection rates in five regions of Uganda covering 24 districts and screened for infections rates. We also genotyped 269 new and old Trypanosoma brucei isolates collected from different parts of Uganda and southwestern Kenya at 17 microsatellite loci. We also checked for the presence of SRA gene that confers human infectivity to T. b. rhodesiense.

Results

The tsetse infections rates in northwest and northern ranged from 0-3.3%. Tsetse infections rates in western ranged from 0 - 24.12% while in central region 0 -2.4%. Both Bayesian clustering methods and Discriminant Analysis of Principal Components partition Trypanosoma brucei isolates obtained from Uganda and southwestern Kenya into three distinct genetic clusters. Clusters 1 and 3 include isolates from central and southern Uganda, while cluster 2 contains mostly isolates from

southwestern Kenya. These three clusters are not sorted by subspecies designation (T. b. brucei vs T. b. rhodesiense), host or date of collection. The analyses also show evidence of genetic admixture among the three genetic clusters and long-range dispersal, suggesting recent and possibly on-going gene flow between them.

Conclusions

There is still active transmission on Nagana in all the five regions of Uganda. Our results also show that the expansion of the disease to the new foci in central Uganda occurred from the northward spread of T. b. rhodesiense (Tbr). They also confirm the emergence of the human infective strains (Tbr) from non-infective T. b. brucei (Tbb) strains of different genetic backgrounds, and the importance of cattle as Tbr reservoir, as confounders that shape the epidemiology of sleeping sickness in the region.

4.04

TRYPANOSOMA INFECTION MODULATES THE EXPRESSION OF GENES FROM FIELD TSETSE FLIES

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A comparative transcriptomic analysis has been previously performed on experimentally Glossina palpalis gambiensis infected vs non-infected with Trypanosoma brucei gambiense. The aim was a) to detect differentially expressed genes associated with infection, and finally to select candidate genes expected to govern tsetse fly vector competence, and b) in the frame of an anti-vector strategy, to use such genes to control human and/or animal trypanosomiasis. The present study was crucial since its objective was to verify whether field tsetse fly gene expression was modified in response to natural infection with trypanosomes such as they were when insectary-raised flies were experimentally infected. This check was carried out on G. p. palpalis flies naturally infected with Trypanosoma congolense, and on non-infected G. p. palpalis flies, both sampled in trypanosomiasis foci in Cameroon. Using the RNA-seq approach, we observed differentially expressed genes in infected versus non-infected tsetse flies. Down-regulated genes were mainly involved in transcription/translation processes, while up-regulated encoded genes governing amino acid and nucleotide biosynthesis pathways. We also confirmed that data on the molecular cross-talk between the host and the trypanosome recorded when using an experimental biological model, have their counterpart in field flies which in turn validates the use of experimental host/parasite couples.

4.05

ECODISTRIBUTION AND PREFERRED HOST OF TSETSE FLIES IN SLEEPING SICKNESS FOCUS: INTEREST FOR VECTOR CONTROL

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Human African Trypanosomiasis (HAT) is a parasitic, neglected disease that affects generally remote people. Ivory Coast is the second most affected country in West Africa. Tsetse control is now currently use for HAT control. The aim of this study was to assess entomological and parasitological parameters before implementing vector control using impregnated tiny targets. An entomological survey was carried out using Vavoua traps during 48 hours and biotopes were described. Tsetse captured were identified by species, then dissected using microscope for the determination of trypanosomes infection rate. Blood meals were analysed and host preferences were assessed by sequencing segment of vertebrate host mitochondrial cytochrome b. All the flies captured were identified as Glossina palpalis palpalis, the major vector of Trypanosoma brucei gambiense in Ivory Coast. The apparent density per day and per trap (ADT) observed was 3.42 tsetse/day/trap. It was significantly higher in villages compared to the others biotopes ($p<0,05$). The infection rate in tsetse was 21.5% of trypanosome infection and no salivary gland was found infected. Blood meals analysis revealed that all tsetse with undigested blood had fed on pigs. Combining vector distribution and infection rates with blood sources allowed us to target villages as area of important risk. Pigs should be included in disease control strategy. These results allow us to prioritize intervention areas in tsetse control framework that will be implemented using tiny targets.

Key words: Human African Trypanosomiasis, Glossina palpalis palpalis, tsetse control, blood meals, Ivory Coast.

4.06

AGE-SPECIFIC TRYPANOSOME INFECTION RATES IN TSETSE (DIPTERA: GLOSSINIDAE) AS A FUNCTION OF SEASON

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The study sought to establish trypanosomal infections in Glossina morsitans morsitans and Glossina pallidipes in the Zambezi valley for the periods 1990-1999 and 2015. Tsetse flies were captured using epsilon traps, age was estimated using wing fray and ovarian-ageing methods. Microscopic examination for trypanosomal infections in the mouthparts, salivary glands and the midgut was conducted and Trypanosoma vivax was most prevalent. Trypanosoma congolense and T. brucei cases were also detected. Trypanosomal infections increased with age. Infections were 14.2% in female G. m. morsitans, 6.9% in female G. pallidipes, 12.2% in male G. m. morsitans and 4.8% in male G. pallidipes. G. pallidipes is more susceptible to T. brucei than G. m. morsitans. There is a curvilinear relationship between age and prevalence for vivax and congolense-type infections. No apparent difference existed between sex and susceptibility to trypanosome infections. In winter, T. vivax infections in male G. m. morsitans and female G. pallidipes peaked. Trypanosoma congolense prevalence was much lower in summer than winter. T. brucei infections in female G. m. morsitans was highest in winter. Temperature and rainfall variations over time resulted in a significant change in trypanosome infections between the late 1990s and 2015.

Key Words: Tsetse, Trypanosomal infection, Curvilinear, Zambezi Valley, Zimbabwe

4.07

SPATIAL DISTRIBUTION AND TRYPANOSOME INFECTION OF TSETSE FLIES IN THE SLEEPING SICKNESS FOCUS OF ZIMBABWE IN HURUNGWE DISTRICT

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In Zimbabwe, cases of human African trypanosomiasis (HAT) are caused by Trypanosoma brucei rhodesiense. Tsetse-transmitted trypanosomes, particularly T. congolense and T. vivax, also cause morbidity and mortality in livestock. Two tsetse species, Glossina morsistans morsitans and G. pallidipes, are present in the Zambezi Valley. The study aimed to provide insight into the dynamics of tsetse and trypanosomiasis in humans and livestock. Tsetse distribution and trypanosome infections were studied using traps and fixed fly rounds located at 10 km intervals along a 110 km long transect straddling the southern escarpment of the Zambezi Valley. Three km long fly rounds were conducted on 12 sites, and were repeated 11 times over a 7-month period. Microscopic examination of 2092 flies for trypanosome infections was conducted. Surveys confirmed presence of G. m.morsitans and G. pallidipes in the Zambezi Valley floor. Moving south, the apparent density of tsetse peaked in the vicinity of the escarpment, then dropped on the highlands. Only one fly was caught south of the old game fence. A trypanosome infection rate of 6.31% was recorded in dissected flies. Only one T. brucei-type infection was detected. Tsetse distribution in the study area appears to be driven by ecological factors such as land use and altitude-mediated climatic patterns. The study confirms the usefulness of collecting and analysing spatially-explicit information on African trypanosomiasis. Contextually, this study has considerable policy implications in identification of appropriate areas

for tsetse control interventions. Targeted interventions can maximise the benefit-cost ratios in integrated programmes against tsetse, HAT and AAT.

Keywords: Tsetse, Glossina, Sleeping sickness, human African trypanosomiasis, Zimbabwe, Trypanosome

4.08

MULTIPLE EVOLUTIONARY ORIGINS OF TRYPANOSOMA EVANSI IN KENYA

Christine Muhonja

Trypanosoma evansi is the parasite causing surra, a form of trypanosomiasis in camels and other livestock, and a serious economic burden in Kenya and throughout the world. Trypanosoma evansi transmission can be sustained mechanically by tabanid and Stomoxys biting flies, whereas the closely related African trypanosomes T. brucei brucei and T. brucei rhodesiense require cyclical development in tsetse flies (genus Glossina) for transmission. We investigated the evolutionary origins of T. evansi. We used 15 polymorphic microsatellites to quantify levels and patterns of genetic diversity among 41 T. evansi strains and 66 strains of T. b. brucei (n=51) and T. b. rhodesiense (n=15), including many from North Eastern Kenya, a region where T. evansi may have evolved from T. brucei. We found that T. evansi strains belong to at least two distinct T. brucei genetic units and contain genetic diversity that is similar to that in T. brucei strains. Results indicated that the 41 T. evansi strains originated recently from multiple T. brucei strains from different genetic backgrounds, implying independent origins of T. evansi from T. brucei strains. This finding further suggested that the acquisition of the ability of T. evansi to be transmitted mechanically, and thus the ability to escape the obligate link with the African tsetse fly vector, has occurred repeatedly. These findings, if confirmed, have epidemiological implications, as T. brucei strains from different genetic backgrounds can become either causative agents of a dangerous, cosmopolitan livestock disease or of a lethal human disease, like for T. b. rhodesiense.

4.09

TSETSE SYMBIOSIS: INFECTION PREVALENCE AND PROSPECTS FOR APPLICATION IN VECTOR AND DISEASE CONTROL

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Tsetse flies, Glossina sp are the main vectors for trypanosomiasis in humans and livestock. Vector control, a highly effective means of reducing transmission, remains an important feature in disease control. However, commonly used bait-based methods have proven to be unsustainable. This has led to enhanced research into tsetse symbiosis, in the quest for alternative biotechnology-based approaches to disease and/or vector management. For effective translational application of such research, it is important that the state of tsetse-symbiosis in natural populations be well understood. Therefore, the objective of this study was to determine the bacterial symbiont status in natural tsetse populations. Tsetse flies from six (6) spatially-distinct populations of five (5) Kenyan Glossina species (G. pallidipes, G. austeni, G. longipennis, G. brevipalpis and G. f. fuscipes) were analysed for infection with bacterial symbionts. Genomic DNA was extracted from individual ethanol-preserved flies using the Qiagen DNeasy® Blood and Tissue Kit according to the manufacturer's instructions. DNA quality was assured using 12S rRNA gene arthropod universal primers. The presence of Wolbachia, Sodalis and Spiroplasma was determined using specific PCR primers. Further, multi-locus strain typing (MLST) was performed for Wolbachia using five conserved genes (ftsZ, gatB, coxA, hcpA, and fbpA). The results indicate different infection frequencies of all the assayed symbionts from apparent absence (0%) to apparent fixation (100%) among populations and species. The MLST-typing revealed low Wolbachia strain diversity in the sampled populations. The results are discussed in relation to the prospects of application of tsetse symbiosis in vector and disease management.

4.10

THE ROLE OF POPULATION GENETICS IN GUIDING TSETSE CONTROL PROGRAMS, A CASE OF GLOSSINA FUSCIPES IN UGANDA.

Background:
African Trypanosomiasis is a vector-borne disease transmitted by the tsetse fly to both humans and animals in sub-Saharan Africa. Trypanosomiasis prevalence is maintained by the inter-relationship of a vertebrate host, the trypanosome parasite and a vector responsible for transmission. In Uganda, the main vector is the tsetse species Glossina fuscipes fuscipes (G.f.f). It is increasingly recognized that vector control should play an important role. Despite concerted efforts to control tsetse, Uganda has a history of tsetse re-emergence. The government has initiated an Area-Wide tsetse control campaign. The critical pre-requisite is identification of the most appropriate zoning for sustainable attainment of tsetse-free zones. We analyze data from extensive entomological surveys with population genetics data to guide control activities.

Method:
The distribution of tsetse from recent tsetse surveys of 40,000 km2 along the Lake Victoria basin is examined in light of the microsatellite and mtDNA population structure, gene flow and evolutionary divergence observed from the population genetics studies of G.f.f in Uganda.

Results:
Entomological surveys indicate that G.f.f is more likely to be present in areas with a greater proportion of riverine vegetation and forest cover. Population genetics analyses suggest that at larger scales Uganda has two divergent mitochondrial lineages currently partitioned to northern and southern Uganda. The two lineages co-occur only in a narrow zone of contact extending across central Uganda. Microsatellite structure within the southern lineage indicates that gene flow is currently limited between populations in western and southeastern Uganda. At smaller scales, microsatellites data identified 4 genetic clusters, with exchange of genes among neighboring populations increasing from west to east across the basin. Demographic tests provide evidence of locality-based demographic history.

Conclusion

Implications of these findings are important for the Area-Wide tsetse control campaign being advocated in Uganda, particularly regarding creation of sustainable tsetse-free zones.

CONTROL

4.11

CHANGE IN THE TSETSE AND TRYPANOSOMIASIS SITUATION DURING THE PERIOD 1987 TO 2015 IN A 1,800KM2 AREA IN EASTERN ZAMBIA SUBJECTED TO TSETSE CONTROL WITH ODOUR-BAITED TARGETS FROM 1986 TO 1999

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In the late 1980s the Eastern tsetse belt in Zambia was estimated to cover approximately 127,000 km2 - parts of the Eastern, Muchinga, Central, and Lusaka Provinces. The belt also extends into three of the country's neighbours, i.e. Malawi, Mozambique and Zimbabwe, and this was the basis for the creation of the Regional Tsetse and Trypanosomiasis Control Programme (RTTCP) through funding from the then European Economic Community (EEC) (now European Union (EU)), with the objective of eradicating tsetse flies from this belt. In Zambia, the RTTCP implemented tsetse control operations in two blocks covering about 1800km2 during the period 1988-1999 as a trial to test the effectiveness of odour-baited Targets. Tsetse and trypanosomiasis (in cattle) surveys were conducted accordingly - i.e. baseline and throughout the duration of the operations. Inside the control area, the results showed that the operations had effectively diminished the tsetse apparent density from 25-60 flies/fly-round on average, to zero (0), and the trypanosomiasis prevalence from an average of 15 – 45% to zero (0). However, locations in the edges and outside the control area, particularly in the northern sections of the blocks, continued to record tsetse presence and prevalence/incidence of trypanosomiasis. Since discontinuity of the operations in 1999, the government has, over the years, has over the years facilitated tsetse and trypanosomiasis surveys in the area now and again to facilitate monitoring of the status, and the latest such surveys undertaken in 2015 did not detect any tsetse presence or prevalence of trypanosomiasis within and well beyond the boundaries of the former tsetse control area. The paper examines the survey results obtained over the years and, the results and possible explanations are discussed.

4.12

GLOSSINA PALPALIS GAMBIENSIS SELECTS ITS LARVIPOSITION SITES

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Tsetse fly control is currently achieved through methods that focus on a unique behavioural target, "host seeking behaviour". Other basic life history, behavioural or ecological traits remain largely unexplored despite their importance to tsetse biology and parasite transmission such as larviposition. Gravid tsetse females deposit a single larva in specific sites but little information is available on biotic and abiotic factors that govern site selection. Here, we study the larviposition site selection of Glossina palpalis gambiensis according to the presence of conspecific and heterospecific larvae buried in substrates. In a first experiment, two larviposition sites were presented to individual gravid female: autoclaved sand and conditioned sand with G.p.g. larvae. In a second set of experiments, four larviposition sites were offered to grouped (n=50) gravid female G.p.g: an empty control tray, autoclaved sand, sand conditioned with G.p.g. larvae and sand conditioned with G. morsitans submorsitans larvae. Gravid females could either or not enter in contact with the substrate. Individual females selected significantly more often for sites conditioned with G.p.g pupae ($P < 0.05$). In grouped larviposition experiments, females selected significantly more often for sites with pupae ($P < 0.05$), but were not able to discriminate between sites containing conspecific and heterospecific pupae ($P > 0.05$), either with or without substrate contact. These results present the first indication of an aggregation effect of tsetse pupae in G. p. g. The selection of sites containing larvae without any contact with the substrate suggests the implication of volatiles compounds. Isolation of such semio-chemicals would allow the development of larviposition traps to attract gravid females.

4.13

RESPONSES OF RIVERINE TSETSE (GLOSSINA FUSCIPES FUSCIPES) TO 4-METHYLGUAIACOL AND A BLEND OF SPECIFIC COMPOUNDS IN WATERBUCK (KOBUS DEFASSA) ODOUR AT STATIONARY VISUAL ATTRACTIVE TRAPS

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A blend of specific compounds in waterbuck (Kobus defassa) odour referred to as waterbuck repellent blend (WRB) and a synthetic repellent (SR) 4-Methylguaiacol have previously been shown to repel savannah tsetse. However, these repellents have not been evaluated on riverine tsetse. This study evaluated the effect of these repellents released at different rates on catches of G. fuscipes fuscipes at stationary visual attractive traps. Randomised block designs with adjacent days at a site considered as a block, were conducted in western Kenya on some islands of Lake Victoria. Different releases rates as treatments of the repellents were randomly allocated to days in a block. The catches at biconical traps for each treatment were modeled using a negative binomial regression to determine their effect. At release rates of 1.4 and 2.4mg/h, SR significantly reduced catches of males by 18% and 16% while catches of females were significantly reduced by 25% and 19% respectively. At a release rate of 5.8mg/h, SR only significantly reduced the catches of females by 26%. WRB released at 1.5 and 6.0 mg/h only significantly reduced female fly catches by 29% and 27% respectively. However, when released at 3.0mg/h WRB significantly reduced the catches of males and females by 23% and 37% respectively. The repellents SR and WRB reduce fly catches of G. fuscipes fuscipes attracted to stationary visual attractive traps. This suggests that they have the potential to also reduce flies attracted to animals and human hosts; therefore there is need to investigate this further.

4.14

EVALUATION OF TSETSE FLIES REPELLENTS PRIOR TO COMMERCIALISATION AND MASS RELEASE FOR USE ON MANAGEMENT OF TRYPANOSOMIASIS IN KENYA

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Several products including insecticides and traps for tsetse flies control and management of Animal Trypanosomiasis are today commercially produced and available in the market. There are other products that have been researched on but are unavailable to the farmers due to lack of clear processes of commercialisation before availing them to stakeholders through Research-Private Institutions venture. Since the year 2005, International Centre for Insect physiology and Ecology (icipe) has been researching on repellents for tsetse flies extracted from Waterbuck (Kobus ellipsiprymnus) and refining the collar dispensers. However, the release of the repellents for use by farmers is legally not allowed in Kenya without undertaking its' efficacy trial by the appointed regulator of pest control products. As a legal requirement prior to commercialisation, an evaluation study was undertaken to evaluate the protection the repellents produced by icipe would confer to the livestock against trypanosomiasis under field conditions. The efficacy trials were conducted in Shimba Hills of Kwale County, Kenya. Three differently treated experimental herds and in replicate, each with seven animals, totalling to 42, were selected for the trials. Biconical traps were used to monitor tsetse flies. The data obtained was then subjected to statistical analysis for any significance.

4.15

CHEMO-ECOLOGICAL AND CHEMO-SENSORY RESPONSES IN TSETSE FLIES

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Tsetse control is a promising means of disease control/suppression. We undertook structure-activity comparison to determine effects of length of side chain and ring size of lactone on responses of adult Glossina pallidipes and Glossina morsitans morsitans in a two-choice wind tunnel and in the field. We also evaluated differential expansions and/or expressions of chemosensory genes among tsetse fly species and relative to other insect vectors of human pathogens. Increasing the chain length from C3 (□-octalactone) to C4 (□-nonalactone) enhanced repellency of lactone to G. pallidipes and G. m. morsitans, while increasing the ring size from six (□-octalactone) to seven members (□-nonalactone) changed the activity from repellency to attraction. Blending □-nonalactone with 4-methylguaiacol significantly raised repellency to at least 86.7%. We observed significant conservation of chemosensory genes between tsetse flies and stables flies among insect vectors. Most tsetse gene families were contracted, relative to Drosophila melanogaster, and were differential distributed, duplicated and expressed among the tsetse fly species. Our results show that 1) subtle structural changes of olfactory signals can either shift their potency, or change their activity from repellence to attraction and 2) differential expansions, duplications and expressions of chemosensory genes are potentially functionally associated with differences we observed in the field in olfactory responses among tsetse species to odors. Our results also lay down useful groundwork in the development of 1) more effective control of tsetse by 'push', 'pull' and 'push-pull' tsetse control tactics and 2) genomics based tsetse control strategies.

4.16

SUSTAINABLE APPLICATION OF LIVE BAIT TECHNOLOGY UNDER THE STAMP OUT SLEEPING SICKNESS PROGRAM OF UGANDA

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Since 2006, the Stamp Out Sleeping Sickness consortium has been promoting Live bait technology in the control of sleeping sickness in Uganda where acaricide/ insecticide application on cattle to kill the tsetse fly using the locally trained youth supervised by qualified veterinarians has been on-going (Waiswa and Rannalette, 2010, Waiswa and Kabasa 2010). While promoting the live bait approach, COCTU works with Local Government structures more specifically the District Veterinary office. The technical team comprising of Veterinary Officers, Entomologists and Environment Officers at the district who are briefed about the approach first to make them more acquainted with the technology. The promotion of live bait and ownership of the program by the Uganda Trypanosomiasis Control Council is greatly contributing to the reduction of sleeping sickness transmission and putting Uganda towards the elimination of sleeping sickness agenda and hopes to achieve this by the year 2020 are high. Much as this trend looks very promising, Uganda should regularly check the threat of resurgence that may occur mainly from the conservation areas like the National Parks and cross border challenges especially from Democratic Republic of Congo and Southern Sudan

4.17

TSETSE AND TRYPANOSOMIASIS SITUATION THREE YEARS AFTER AERIAL SPRAYING (SAT) IN WESTERN ZAMBIA

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Background: Zambia has adopted the PATTEC initiative approach in combating the menace of tsetse and trypanosomosis. Recently in 2014 the same method was used over an area of 6,300 km2. This paper reports on the status of tsetse and trypanosomosis three years after SAT operation of 2014.

Methods: A SAT operation of five cycles was carried out over an area of 6,300 km2 in Western Zambia. 0.35% deltamethrin (ulv) was applied at 0.3g/ha in the first three cycles and at 0.26g/ha in the last two cycles. The operation was carried out from June to September 2014. Pre-spray, during spray and post-spray tsetse population and trypanosomosis situation monitoring was undertaken within and outside the block.

Results: A total of five cycles were successfully carried out with an "operational efficiency" in the range 76.7% to 77.1%.A total of 250,514.06 litres of insecticide was used. Tsetse catches in the block dropped from 40 flies/fly-round before spraying to 0 flies/fly-round in the 5th cycle. No fly was caught later in 2015 and 2016. Infection rate in sentinel cattle dropped from 39% prior to spraying to 8% in the middle of the spray period. No trypanosomosis cases were found later in 2015 and 2016.

Discussion and Conclusion: The good operational efficiency of the operation was attained because of favourable weather conditions despite the operation starting late. The absence of tsetse catches and trypanosomosis cases in 2016, suggests a successful SAT operation. This is another example validating SAT as a viable option for eradication of tsetse flies.

Keywords: SAT 2014, Operational efficiency, Activity rate, Tsetse and Trypanosomosis situation, Zambia

POSTER

4.18

COMPARATIVE STUDY OF WINGS AND PUPAE'S SYSTEMATIC OF GLOSSINA SPECIES USING GEOMETRIC MORPHOMETRICS.

This study aims to show the ability of geometric morphometrics (GM) to identify tsetse flies from their wings and pupae. It explores the potential of landmarks of the wings and outlines of pupae in order to provide a quick and inexpensive alternative to tsetse species diagnosis. Our sample consisted of three known species of tsetse reared at the insectarium of the CIRDES of Bobo-Dioulasso: G. p. Gambiensis, G. tachinoides and G. m. submorsitans. The results show a good level of species recognition. However, the level of recognition was slightly higher by the wings than by the pupae. Indeed, the reclassification score of the wings was between 97 and 100% for the males and between 95 and 100% for the females, while that of pupae was between 92 and 100% in males and 76 and 100% in females. In addition, wings analysis confirmed the known sexual dimorphism in all tsetse species. On the other hand, there is no dimorphism of size between males and females regarding pupae. This study shows that wings can better distinguish tsetse flies than pupae. This observation makes wings a good biological organ for the study of the systematics of tsetse by geometric morphometry.

Key words: geometric morphometrics, systematic, G. p. Gambiensis, G. m. Submorsitans, G. tachinoides, sexual dimorphism, outline, Landmark.

4.19

DISTRIBUTION AND POPULATION GENETICS OF TABANID SPECIES IN EASTERN AND NORTHERN STATES OF SUDAN

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University of Khartoum, 2016

Introduction

Horse flies (Diptera: Tabanidae) are of economic, veterinary and medical importance due to the blood-feeding habits of their females. Most species are proven as mechanical vectors of animal trypanosomosis. No large scale surveys were conducted for the determination of tabanid species and prevalence of animal trypanosomosis throughout the Sudan. In addition, no molecular studies were conducted on the Horse flies up-to-date.

Objectives

As the result of this study I will identify, classify and determine the distribution of the tabanid species in Sudan, estimate the infection rate of trypanosomosis species inside the flies and conduct proper population genetics analysis.

Methodology

The collection of flies using Nzi trap and hand net, classification of collected species and extraction of the genomic DNA will be happened in the first level of the study. Next generation sequencing will be used to generate baseline genetic data that will aid in the tabanids control.

Results:

After two missions to Elgadarif State and the Red Sea State from 20-26th Nov. 2016 and from 06-17th April 2017 respectively, I have identified three species of tabanids with stomoxys spp in Elgadarif State and just two species of tabanids with stomoxis spp in the Red Sea State.

Conclusions

This is an ongoing research study so; I am still working in the collection and classification of samples. These data, along with the molecular techniques, provide new insight to tabanid species.

4.20

MAPPING OF TSETSE CONTROL IMPACT USING OPEN SOURCE GIS TOOLS: POSTGRESQL, POSTGIS, GRASS AND QGIS.

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Introduction

A mapping of the impact of integrated control on tsetse densities and trypanosomiasis was carried out at the Institute for Environmental Management and Land Use Planning, Université Libre de Belgique, with the financial support from ARES, from 20 June to 19 December 2016. The objective was to contribute to the use of data sets collected by PATTEC-Burkina, from 2006 to 2013 (baseline surveys: 3189 biconical traps laid, 42138 impregnated screens deployed, 1988 traps laid: periodic entomological checks from 2010 to 2012, etc.)

Methodology

After a critical analysis of the data, databases were created with Postgres-Postgis for spatio-temporal analyses, vector analyses carried out with GRASS, mappings with Qgis 2.16.

Results

The analysis reveals 27613.4 km² of watersheds surveyed in 62 departments, 23 of which are infested. The maximums for prospected sites per department and DAP were 103 and 15.13 tsetse / trap.

764 grids in total were covered with impregnated screens, with a maximum density of 61.5 screens / km² and 14.27 / km of river. Reduction rates were significant and variable over time. In 2013, a western part of the area remained heavily infested. Parasite prevalence increased in tsetse emergence pockets during control.

Conclusion
The results were consistent with the reality on the ground. Open source GIS holds a considerable advantage in control assessment.

Keywords: Open source GIS, Mapping, Impact, Tsetse, Trypanosomosis

4.21

EFFECT OF TRANSPORT OF IRRADIATED PUPAE OF GLOSSINA PALPALIS GAMBIENSIS ON THE QUALITY OF STERILE MALES

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Since 2007, the Government of Senegal has been implementing a campaign to eradicate the only tsetse fly species (Glossina palpalis gambiensis Vanderplank) present in the Niayes area (target area of ~1,000 km2). The fly population of the Niayes was isolated from other tsetse populations in Senegal. The campaign is implemented following an area-wide integrated pest management strategy that includes a sterile insect technique (SIT) component. The success of the technique involves the use of sterile

males of good quality which is ensured by a good aptitude for flight and survival. The effect of long distance transport of irradiated male pupae of G. palpalis gambiensis and its impact on sterile male production was evaluated. The pupae were produced in Burkina Faso and Slovakia, blocked at 10°C and then transported by air to Dakar (Senegal). At the Dakar insectarium, the pupae were placed in the emergence room and the flies were followed for 3-6 days. The results showed that the system of isothermal box with packs S8 allows keeping the temperature around 10°C. It blocks the emergences during the transport. The performance of the pupae was better with those of lot 2 compared to the pupae of lot 1 (cooled 1 more day compared to lot 2), that is to say an average emergence rate of 76.1 ± 13.2% and 72.2 ± 14.3%, respectively. The productivity of sterile males usable for the sterile insect technique in relation to the total number of pupae received was 65.8 ± 13.3% for lot 2 and 61.7 ± 14.7% for lot 1. This study showed that the temperature of the pupae during their shipment should be controlled at around 10°C with a maximum variation of 3°C in view of maximizing their viability and the sterile male production.

4.22

AN EVIDENCE-BASED CASE FOR USING SPATIAL REPELLENTS TO PREVENT TRYPANOSOMIASIS TRANSMISSION

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The use of spatial repellents to create "safe zones" and prevent contact between vectors and their vertebrate hosts has been shown to be effective. Recent evidence suggests that tsetse repellents can prevent tsetse bites and reduce the transmission of animal African trypanosomiasis in livestock thereby significantly improving their health and production. Despite this, the use of tsetse repellents is neither widely endorsed nor recognized as a part of national and multilateral disease control strategies. We review the discovery, development and validation of the waterbuck tsetse repellent blend and demonstrate that the repellent is a consistent and effective tool against tsetse and trypanosomiasis. Further, we examine factors that constrain the effective use and adoption of the repellent technology and make recommendations for the integration of the repellent blend and other spatial repellents in the control of trypanosomiasis in Africa.

4.23

PERFORMANCE OF A METHOD PROPOSED TO TEST IN THE FIELD THE EFFECTIVENESS OF INSECTICIDES APPLIED ON CLOTH TO CONTROL TSETSE FLIES

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Background
Most tsetse control operations make use of insecticides. In most cases insecticides are not tested for effectiveness by end users before and during use largely because most standard testing methods pose challenges to them. In this study the performance of a proposed field bioassay method for testing the effectiveness of insecticide applied on cloth to control tsetse flies was assessed.

Methods
The study was carried out on Glossina morsitans centralis in western Zambia. Hand-net caught male tsetse flies were exposed briefly (45 seconds) or continuously to cloth treated with insecticide as routine tsetse sampling fly rounds were carried out. Flies were inspected for mortality every 10 minutes. Regression analysis and Kaplan-Meier curves were used to analyze the data.

Results
A total of 83 flies were caught out of which 74 males were used in the trials. 94% and 100% of flies continuously exposed to alphacypermethrin and deltamethrin, respectively, died by the 52th and 60th minutes of exposure, respectively. 13% and 0% of their respective control counterparts started dying by the 100th and 147th minute, respectively. The median survival times of flies exposed to insecticides were 35.5 and 35 minutes for alphacypermethrin and deltamethrin, respectively. Significant differences in survival probabilities between control and treatment groups were observed in both insecticides, ($P<0.001$).

Conclusion
The field method showed considerable potential at testing in the field the effectiveness of insecticides applied on cloth to control tsetse flies in the absence of laboratory facilities. The method exhibits notable accuracy but still requires further improvements.

Keywords: Field bioassay method, Insecticide effectiveness, Median survival time, Zambia

4.24

DISTRIBUTION OF TABANID FLIES IN SUDAN: AN EPIDEMIOLOGICAL UPDATE

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Updated distributional maps for trypanosomosis vectors in Sudan are essential to estimate the risk impact as well as to design and implement appropriate control strategies according to the vectors distribution and abundance. Tabanid flies act as mechanical vectors for trypanosomosis; for decades there are no data on tabanids distribution in Sudan, since Lewis (1953) no data were available.

In the present study, tabanid flies data base were collected since 1960, harmonized and geo-referenced. Sources included articles in scholarly journals, M.Sc and Ph.D theses, as well as governmental reports. Additional field datasets were also recently collected during targeted surveys, aimed at complementing and updating previous available information. The assembled data were entered in database, and mapped with a Geographical Information System (GIS).

Past and recent Tabanids surveys were conducted in 10 states (Khartoum, Gezeira, Sinnar, Blue Nile, White Nile, North Kordofan, South Kordofan, South Darfur, Kassala, and Elgadarif).

Out of 4 genera, 8 species were identified (Tabanus taeniola, T. sufis, T. gratus, T. biguttatus, Atylotus agrestis, A. fuscipes, Philoliche magrettii and Ancala latipes).

The most abundant of species caught all over Sudan according to the apparent density were, A. agrestis (14.52), T. taeniola (2.95), T. sufis (2.08), T. gratus (0.15), A. fuscipes (0.063), T. biguttatus (0.004) and Ph. Magrettii (0.0003). For Ancala latipes there is no data for their apparent density.

The high prevalence of trypanosomosis in the presence of tabanid flies was associated with irrigated agricultural areas and around River Nile in arid zone.

4.25

FISH, BIRD AND TERRESTRIAL INVERTEBRATE SPECIES OF THE LUANO AND LUANGWA VALLEY IN EASTERN ZAMBIA

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Background
In tsetse control operations that involve application of insecticide in the environment, it is desirable to understand the likely impact on non-target species to enable institution of mitigation measures. The envisaged aerial application of insecticide in Luano valley necessitated the collection of fauna data.

Methods
The study was carried out in Luano and Luangwa valley (reference site). Gillnets were used to sample fish species. Birds were sampled from points five kilometres apart along main roads by recording those seen and heard. Malaise, Pitfall, Pan and Epsilon traps were used to sample terrestrial invertebrates.

Results
A total of 232 invertebrate morphospecies were identified: 113 and 193 in Luangwa and Luano valley, respectively. 104 morphospecies were caught only in Luano and 39 only in Luangwa valley. 74 were common to the two valleys. A total of 22 fish species were caught: 15 and 20 in Luano and Luangwa valley, respectively. 12 species were common to the two valleys. 3 species were caught only in Luano and 7 only in Luangwa Valley. A total of 68 bird species were recorded: 42 in Luano and 37 in Luangwa valley. 11 species were common to the two valleys. 31 species were seen only in Luano and 26 only in Luangwa valley.

Discussion and conclusion

By use of methods mentioned a baseline inventory of faunal species prevalent in Luano and Luangwa valley at that point in time was established. The data collected will form part of the database used to evaluate the dynamics of species in future investigations.

4.26

EFFECTS OF VECTOR CONTROL ON THE POPULATION STRUCTURE OF TSETSE (GLOSSINA FUSCIPES FUSCIPES) IN WESTERN KENYA

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This study compared the population structure of Glossina fuscipes fuscipes on two islands where vector control had previously been undertaken and reduced fly apparent density by over 90% from over 3 flies/trap/ day to < 1 fly/trap/day with those from two other islands where no control was previously undertaken. A survey was undertaken on Small Chamaunga (no control), Big Chamaunga (previously controlled), Manga (previously controlled) and Rusinga (no control) Islands of Lake Victoria in western Kenya. Average G. fuscipes fuscipes catches in biconical traps were estimated on each island. Wing centroid size (CS) and shape as indicators of population structure of flies from the four islands were compared using geometric morphometric analyses. The apparent density of G. fuscipes fuscipes were found to be over 9 flies /trap/day on the previously controlled islands. Irrespective of sex, wing shape did not isolate tsetse flies based on their islands of origin. However, male flies from previously vector controlled islands had significantly smaller CS than those from islands where no control was previously done ($P<0.008$). The study showed that no separation of populations of G. fuscipes fuscipes from the four islands was evident based on wing shape and that vector control could induce the diminishing of CS, thereby leading to structuring particularly in males that recover. Therefore an investigation on effect of CS on the vectorial capacity of tsetse is recommended as it could give more insights in the epidemiology of African trypanosomiasis in previously controlled areas where recovery of populations has occurred.

4.27

TEMPORAL GENETIC DIFFERENTIATION IN GLOSSINA PALLIDIPES TSETSE FLY POPULATIONS IN KENYA

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Glossina pallidipes is a major vector of both HAT and AAT in Kenya. The diseases impose economic burden on endemic regions in Kenya, including south-western Kenya, which has undergone intense but unsuccessful tsetse fly control measures in the 1960s to 1980s. Our objective was to understand the role of time on the genetic structure of G. pallidipes and how such genetic changes can influence control efforts in Nguruman Escarpment and Ruma National Park. We genotyped 387 G. pallidipes flies collected between 2003 to 2015, at 10 microsatellite loci. Our results showed similar levels of allelic richness in Nguruman Escarpment and in Ruma National Park, which suggests that genetic diversity is similar between the two regions, and to what was found in previous studies of G. pallidipes in Uganda and Kenya. However, temporal Ne estimates averaged 341 and 1191 respectively. We also found differences in temporal genetic patterns between the two regions as indicated by clustering analyses, pairwise FST, and Fisher's exact tests for changes in allele and genotype frequencies. In Nguruman Escarpment, findings indicated differentiation among samples collected in different years, and evidence of local genetic bottlenecks. In contrast, there was no consistent evidence of differentiation among samples collected in different years, and no evidence of local genetic bottlenecks in Ruma National Park. In

conclusion, the different levels of temporal differentiation between the two regions highlights the importance of understanding the temporal dynamics of genetic variation of vector populations for the successful design and monitoring of species-specific control measures.

LAND USE, ENVIRONMENT AND SOCIO-ECONOMICS

ORAL

5.01

TRYPANOMOSIS AS A CONSTRAINT TO GOAT PRODUCTION IN ZAMBIA: A REVIEW OF AVAILABLE RESEARCH BASED INFORMATION IN RELATION TO PROSPECTS FOR INCREASED GOAT PRODUCTION

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Tsetse-transmitted trypanosomosis is a major constraint to ruminant livestock production in Africa. Although the impact of the disease is largely associated with cattle, natural infections with parasitic trypanosomes do occur in goats and sheep as well. Clinical manifestation of trypanosomosis is rarely observed in these small ruminants, particularly goats, and this appears to have contributed to the common belief among farmers that these animals do effectively tolerate trypanosome infection and as such the disease does not affect them. Research findings indicate that trypanosome infection could lead to significant negative effects on reproduction and hence productivity in goats. In Zambia, about 37% of the land area is tsetse infested such that, depending on level of risk to infection with trypanosomosis, rearing of cattle is usually either sustained through effective use of trypanocides or it is not feasible at all. In most such areas, farmers turn to rearing of goats as the best alternative ruminant livestock species. Indications are that there is currently increased demand for goats in the local and international market, and this entails goat production could contribute much more to income generation, improved livelihoods and rural development. The paper provides a review of available research based information on goat production and trypanosomosis in general and in the context of Zambia, with particular reference to tsetse infested areas in the country. Prospects and recommendations for improved/ increased goat production in relation to trypanosomiasis, through particular interventions, are proposed and discussed.

5.02

DEVELOPING EFFECTIVE PUBLIC HEALTH CARE DELIVERY POLICY ADVOCACY COMMUNICATION STRATEGIES TO EMPOWERS AFRICAN COMMUNITIES FOR SDG 3 PROGRESS

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This paper uses lessons learned, best practices, and a national health policy case study to show case how effective policy advocacy communication can promote community empowerment for quality public healthcare service delivery in Africa by 2030 SDGs. Effective policy awareness advocacy communication campaign could address community health challenges among the individuals and communities in Africa. The paper seeks to highlight the issue of the poor quality of community health experiences as some of the most persistent and widespread societal challenges. The objectives are to: explain the role of the media in public policy advocacy communication campaign can enhance health professionals', public, and policy makers' awareness of their roles in promoting individual, community, national, regional, and global health; present an overview of key community public health issues and experiences based on Uganda; describe the role of effective policy advocacy communication campaign in creating, raising, and sustaining health communication to promote community prevention of health risks; and illustrate the role of policy awareness advocacy communication outreaches in promoting public awareness for community empowerment, well-being, wellness, and sustainable development. This review is based on government policy documents, research findings, a case study, and internet searches conducted on effective policy advocacy communication in promoting widespread awareness of community health research and policy innovations for societal health and wellbeing. The results show that lack of effective public communication strategy, awareness and knowledge of health issues, uncoordinated stakeholders' communication, conflicting and unsynchronized messages, ineffective dissemination strategies, unethical practice, and unsuccessful outreach strategies. Lack of local participatory

undermines community empowerment, policy and research innovations, and national development due to the rising apathy; information, knowledge, and practice gaps, lack of access to quality services and products, low staffing levels, and low staff moral. Policy advocacy communication is vital for achieving the desired awareness, attitudes, and behaviour change among all the community health stakeholders. Effective public advocacy communication is result-oriented. This approach is participatory, theory driven, ethical; well coordinated, and gender sensitive. Deep and broad public awareness alone is the biggest African public health solution in Africa.

Keywords: Africa, communication, resilience, outreach, health, SDGs, well-being

5.03

PASTORALISTS KNOWLEDGE, ATTITUDES AND PRACTICES OF BOVINE TRYPANOSOMOSIS EPIDEMIOLOGY AND CONTROL IN THE BLUE NILE STATE- THE SUDAN

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A study using a structured questionnaire was conducted among pastoralists in the Blue Nile State (BNS) to evaluate their knowledge, attitudes and practices about bovine trypanosomosis epidemiology and control. Using descriptive methodology a total of 60 pastoralists were selected by purposive non random sampling technique and interviewed. Concerning the production systems in the area it is clear that 70% of the villagers are mixed farmers, more than 90% of cattle are migratory and kept under transhumance system and the main causes of migration is lack of water, poor pasture, drought, disease outbreaks and insecurity. As revealed from 43.3% of respondents cattle are important as means of storing wealth. 97% of respondents recognize tsetse fly as vector for trypanosomosis and use certain vernacular name for it in the tribal dialects. All cattle owners are familiar with biting flies specially tabanids and declare that they are responsible for spreading of the disease among cattle herds in the wet grazing areas. 63.3% of respondents ranked trypanosomosis as important livestock diseases affecting their cattle herds. The result of this study showed that 71.7% of respondents recognized trypanosomosis as most economically and serious disease among cattle and decreases their productivity. Cattle owner are aware about the disease and the clinical signs and know how to make proper diagnosis, they admitted that there are two peaks of the disease one in summer grazing areas when cattle herds come into contact with tsetse flies and other during the rainy season when the abundance of tabanids and other biting flies is high. Trypanosomosis control strategy depends on application of trypanocides for both Curative & prevention treatment. The source of trypanocides is veterinary stores in the local market. 95.0% of pastoralists use Dimenazine aceturate which is most preferable trypanocides with a combination of Ethidium bromide and Quinaoyramines, from this survey Isometamedium is completely absent from the state and cattle owners have never heard

about it. 38.3% of owners use trypanocidal drug in blanket treatment before entering tsetse areas and 38.3% treat only clinically sick animals. This study admitted that cattle owners are familiar with trypanosomosis, its vectors and its impact on cattle productivity. They believe that it is the main constraint to livestock development, according to their knowledge.

The study recommended the advocate should be concerned of Isometamedium by the extension.

Key words: pastoralists, bovine trypanosomosis, knowledge

5.04

FARMERS' PERCEPTION ON GAINS FROM THE USE OF SAT FOR TSETSE AND TRYPANOSOMIASIS CONTROL IN WESTERN ZAMBIA.

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The Western part of Zambia has for a long time been infested with Tsetse and hence Trypanosomiasis in animals had been endemic to the area. As part of the PATTEC initiative 2 Sequential Aerosol Techniques (SAT) were carried out in 2009 and 2014 to eradicate Tsetse in the Kwando-Zambezi belt. No documented socio-economic surveys were undertaken since the first SAT operation, as such a study was carried out to establish the benefits of the control operations as percieved by farmers in Western Zambia. This was done through focus group discussions with farmers whose animals were part of the sentinel herds used for sampling before, during and after SAT as well as other farmers nearby. The discussion questions looked at the knowledge of purpose of, perceived benefits in terms of livestock management and production, as well as land use after the control operations. The findings revealed that farmers thought the SAT operation had indeed achieved its purpose of clearing the Tsetse flies. They said their cattle were calving down compared to before, milk was readily available and some increased crop hectarage. Some farmers however, continued stocking of trypanocides saying they helped the general condition of livestock. It was concluded that in order to consolidate the perceived benefits, the findings had to be compared with actual livestock numbers after the SAT operation. Further more awareness on drug use had to be carried out in the area to reduce unnecessary costs for the farmer.

5.05

IMPACT OF TSETSE AND TRYPANOSOMIASIS CONTROL ON HOUSEHOLD INCOME IN PATE ISLAND OF LAMU COUNTY, KENYA

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The Pan African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC), the Government of Kenya and the farming communities in Pate Island in the Northern coast of Kenya have been participating in the control tsetse flies and the disease that it spreads in livestock. The impact of the interventions in the island had however not been quantified making it necessary to carry out this study. The objective of the study was to evaluate the impact of tsetse and trypanosomiasis control on household income in Pate Island of Lamu County, Kenya. The study applied proportional random sampling method to draw a sample of 254 farm households from Pate Island where interventions were carried out and 282 farm households from Amu and Hindi divisions of the county where the PATTEC initiative had not been implemented. Using structured questionnaires administered through household interviews, the study collected socio-economic data including household characteristics, livestock (cattle, sheep, goats, donkeys and poultry) production, ownership of durable assets and living conditions in the household. Preliminary findings have characterized households by different tsetse and trypanosomiasis control methods that they applied and the type of durable assets owned including livestock in project and non-project areas. Using Principal Component Analysis (PCA), the household wealth index would be constructed as an outcome to measure the well-being of project households versus non-project households in Lamu County, Kenya.

5.06

HIDDEN DIMENSIONS OF HUMAN-WILDLIFE CONFLICT: DO WARTHOG ACTIVITIES PROVIDE REFUGE TO TSETSE FLIES DURING THE DRY SEASON IN KUBO SOUTH, KENYA?

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Farmlands near wildlife protected areas in Africa are often invaded by wild animals. In Kubo South, Kenya, wildlife invasion intensifies during the dry season when many small ruminants and suides from the Shimba Hills National Reserve (SHNR) steal into farmlands in search of food before retreating into the reserve. The exact influence of these invasions on the movement and distribution of tsetse flies is little described. It is however expected that with little vegetation and shade during this time, tsetse that follow animals out of the reserve die off. This study monitored wildlife invasion and assessed its impact on tsetse distribution in a 0.3km x 1km strip in Mlafyeni village in Kubo South. There was extensive invasion by diverse wildlife species with a total of 286 cases recorded within a period of 4 days. The most common species were dik-diks (53%), warthogs (24%), bush pigs (11%) and bushbucks (4%) yet this frequent movement was found to be less associated with the presence of tsetse. However, unlike other animals that retreated into the SHNR daily, warthogs were shown to establish themselves beyond the reserve. Their active holes that occurred in high densities were linked to 'islands' of high tsetse densities in the area. About 90% (n=267 flies) of all the flies caught (N=297 flies) were trapped near the holes with 20% of these being gravid suggesting that the holes are potentially tsetse breeding sites. It also suggests that warthog activities probably establish refuges for these vectors of trypanosomiasis during the dry season. These findings highlight a new dimension to human-wildlife conflict in Kubo South and stresses the importance of considering wildlife invasion in the economics and epidemiology of trypanosomiasis.

5.07

ABSOLUTE ZERO – A HISTORY OF ELIMINATION ASPIRATIONS FOR SLEEPING SICKNESS, 1945-PRESENT

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In recent years, global health actors have given increasing prominence to the goal of eliminating – as opposed to merely supressing or controlling – certain diseases. Such ambitions in part reflect the current global health climate, where grand targets simultaneously appeal to philanthropists, and play a vital role in organising and motivating new kinds of partnerships and coalitions. Aspirations to eliminate particular diseases, however, have a long and often patchy history. Studying such past attempts highlights the hubris of planners and policymakers and, more importantly, the acute technical challenges of pursuing an absolute goal. When actors debate the wisdom of control vs elimination, a wider set of strategic questions are stake. Plans must resolve the tensions between working at scale and adapting to local contexts, focussing on specific, cost effective tools or pursuing a broad suite of approaches, and faith in technology alongside a recognition of political and social contingencies. Above all, the viability of elimination is judged through the use of evidence – typically incomplete and open to competing interpretations. This paper draws on extensive interview and archival research in various African countries to put current efforts to eliminate trypanosomiasis in historical context. Trypanosomiasis has been discussed as a potential target for eradication for almost a century, however, elimination discussions have been intermittent, coming and going as epidemics rise and fall, and as scientific and policy contexts have shifted. Often such aspirations have found greater purchase at the level of global rhetoric and planning, rather than with national and local practitioners. We argue that exploring the different ways in which elimination have been discussed highlights the changing connections between science, medicine, and planning in Africa, and shifting balances of power between actors in different locations within the global health landscape.

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5.08

ENSURING REFUGEES ARE NOT LEFT BEHIND IN SLEEPING SICKNESS ELIMINATION

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Humanitarian agencies, while important historical providers for populations forcibly displaced by war, are decreasingly involved in sleeping sickness control as we approach elimination. We studied Uganda's response to a refugee influx from South Sudan (2013-16) to identify key governance and operational lessons for national sleeping sickness programmes working with displaced populations today. The availability of rapid diagnostic tests (RDTs) to detect sleeping sickness in primary healthcare facilities and a refugee policy which favours integration of primary healthcare services for refugee and host populations makes Uganda well-placed to integrate refugees into sleeping sickness activities. Using ethnographic observations of coordination meetings, interviews with sleeping sickness and refugee authorities, and group discussions in refugee settlements, we nevertheless identified some key challenges: (i) weak political mandate for vertically-organised national control programmes to engage refugees, (ii) contradictory donor accountability norms on spending, (iii) unclear guidance on the quality of surveillance to demonstrate elimination, (iv) additional training needs during humanitarian surge responses, and (v) provider-refugee cultural differences which frustrate providers' syndromic decision-making. Although understandable with hindsight, early in the response, these combined challenges led to the incongruous situation where sleeping sickness RDTs, a key surveillance tool, were removed from facilities serving high concentrations of refugees whom the programme feared posed a threat to elimination. In 2016, the programme re-introduced RDTs and conducted active screening

in some settlements. Government bodies, donors and international organisations should incentivise programmes to anticipate refugee needs and disaggregate reporting to discourage elimination programmes from unwittingly marginalising forced migrants and maintaining transmission.

POSTER

5.09

PERCEPTION OF THE AFRICAN TRYPANOSOMIASIS IN THE FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA

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The information about the spread of the African trypanosomiasis in the Federal Capital Territory Abuja, Nigeria is quite necessary to help the farmers in getting adequate precaution, protection and to cure the diseases. The rate in which the diseases spread in different areas council of the Federal Capital Territory are not documented and the control measure are lacking, because of the shortage of Vertinary Doctors that are necessary to proffer solution, unavailability of drugs, Animal clinics, Health professionals and most of the cattle's herds men are finding it difficult to get information, technology to address those problems and the perception of them is that the trypanosomiasis affect cattle's during the transhumance, when they are searching for pasture for their cattle's and there are confusion over, because of the similar persistent, headaches, insomnia, behavioral changes, mood swings, depression and Loss of appetite, wasting syndrome, and weight loss related to other cattle's diseases, which have reduce cattle production and meat availability in the markets.

The data for this paper were obtained and from the questionnaire's administer and collected from the Fulani Herds men, of which some farms that was visited and some of the Extension Agent with the Federal Capital Territory were contacted and some farmers that were interviewed.

All agreed that the African trypanosomiasis (sleeping sickness) of the first symptoms of state include, painless skin chancre, intermittent fever, general malaise, myalgia, arthralgias, and headache and some of the ecological conditions may have being resulted into the epidemic outbreak of the trypanosomiasis and there are needs to provides health clinics and professional health officers and some Extension Agent that

will disseminate information about control and for the need of the documentation of the infection rates. This paper suggest that an adequate information should be disseminated to the farmers, cattle's herdsmen and urgent attention needs to be taken to avoid catastrophe and the necessary provision of drug to address the issues.

Keywords: Cattles, African, trypanosomiasis, cattle herdsmen, farmers, Federal Capital Territory.

5.10

PRE AND POST WAR SITUATION OF TSETSE AND TRYPANOSOMIASIS RESEARCH IN SOMALIA

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Somalia has been one of the richest area for Tsetse and Trypanosomiasis research in East Africa before the civil war of 1990s. The available few but important recent Governmental and nongovernmental reports were not shared properly due to lack of participation and publication in regional and international conferences such as ISCTRC. T&T Research activity has just restarted again in Somalia after some kind of community and governmental settlement in the country. The present work was planned to review and discuss the previous, present and the future way forward of T&T research and control in Somalia. Scientific research projects on the current situation of T&T is recommended.

Key words: Glossina, Trypanosomiasis, Cattle, Camel, Somalia.

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