

LETTER TO THE EDITOR

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Challenges facing the elimination of sleeping sickness in west and central Africa: sustainable control of animal trypanosomiasis as an indispensable approach to achieve the goal

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Abstract

African trypanosomiasis are infectious diseases caused by trypanosomes. African animal trypanosomiasis (AAT) remains an important threat for livestock production in some affected areas whereas human African trypanosomiasis (HAT) is targeted for elimination in 2020. In West and Central Africa, it has been shown that the parasites causing these diseases can coexist in the same tsetse fly or the same animal. In such complex settings, the control of these diseases must be put in the general context of trypanosomiasis control or “one health” concept where the coordination of control operations will be beneficial for both diseases. In this context, implementing control activities on AAT will help to sustain HAT control. It will also have a positive impact on animal health and economic development of the regions. The training of inhabitants on how to implement and sustain vector control tools will enable a long-term sustainability of control operations that will lead to the elimination of HAT and AAT.

Keywords: Sleeping sickness, Animal African trypanosomiasis, Vector control, Disease elimination

Letter to editor

Trypanosomiasis are infectious diseases caused by trypanosomes, mainly transmitted by tsetse flies. African Animal trypanosomiasis (AAT), one of the most important diseases of livestock, causes major constraints to livestock production in sub-Saharan Africa. As a consequence of these infections, about 34 % of livestock keepers must subsist on less than 1.24 USD per day [1]. In regions of extensive livestock production, control measures have been implemented to reduce the disease burden. However, the epidemiological status of AAT in HAT foci of the forest regions where animal breeding is practiced at small scale is not well understood.

Human African Trypanosomiasis (HAT) is a neglected tropical disease that remains an important public health problem in sub-Saharan Africa. It has been included into

the WHO “roadmap for elimination” by 2020. However, the very low prevalence of HAT has led to three types of demotivations that do not plead for this elimination: (1) inhabitants’ demotivation due to their repetitive participations to medical surveys without being infected; (2) technicians’ demotivation due to thousands of people examined without patients, and (3) donors’ demotivation with thousands of US dollars spent for few or no patient(s) detected. To currently achieve the set goals, events that jeopardized the elimination in 1960’ must be avoided. A growing body of evidence indicates that asymptomatic carriers remain after medical surveys [2, 3] and cannot be detected passively [4]. The animal reservoirs of *T. b. gambiense* reported in west [5–9] and central [10–15] Africa are additional factors to be taken into account for the elimination. To achieve elimination of the disease, sustainable control and surveillance measures must be developed to ensure complete interruption of the disease transmission.

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African animal trypanosomiasis in HAT foci of west and central Africa

Various trypanosome species including *T. b. brucei*, *T. congolense*, *T. vivax* and *T. simiae* have been identified in tsetse and animals of HAT foci of west and central Africa. Remarkably, mixed infections consisting of *T. b. gambiense* with other trypanosomes were reported in tsetse and animals. The global infection rate of animal trypanosomes in animals and tsetse flies of HAT foci is generally high and sometime above 70 % (Table 1) [13, 16]. Controlling AAT is becoming urgent, especially, with the prohibition of hunting activities, the socio-economic and environmental mutations observed in most foci and the stimulation of inhabitants to practice animal breeding. In HAT foci where control activities on HAT is ongoing, it is important to see how AAT control will not jeopardize HAT control, and how associated control measures could help to achieve the elimination of these diseases.

Need to support AAT control for the elimination of HAT in west and central Africa

In *T. b. gambiense* foci, only human health professionals are involved in HAT control. With the asymptomatic patients and animal reservoirs that remain in these foci after medical surveys, the unilateral activities of health professionals cannot enable sustainable control which is necessary to achieve HAT elimination. In HAT foci, the data generated on AAT plead for its control, at least, to improve animal health and peasant economy. Controlling AAT will be beneficial for HAT because the two diseases can be transmitted by the same tsetse and the parasites causing these diseases are often found in the

same tsetse fly or the same animal. In such context, HAT control must be put in the general context of trypanosomiasis control or “One health” where strategies put in place must ensure both the control of HAT and AAT, and where AAT control will generate real societal benefits on human health than a single action on HAT. To achieve the elimination or interrupt trypanosomes’ transmission, medical surveys must be associated to the treatment of animals and also vector control that can ensure the elimination of infected tsetse as well as flies susceptible to get infection on asymptomatic carriers or infected animals. With new tools developed recently, vector control costs have been considerably reduced [17, 18] and their implementation has been very promising in some foci [19]; showing that money is being put in HAT control, both by medical surveys and tsetse control. In foci where tsetse control is being done to stop HAT transmission and where animals are bred, there is also, and already, an impact on AAT transmission. Once the tsetse flies would have been killed, the transmission of human and animal trypanosomiasis could not occur anymore. Hence, for just “a few dollars more” than those spent already, significant impacts on AAT are also expected in areas where both HAT and AAT coexist and animal trypanosomiasis would no longer be a problem in such areas. The challenge faced by the sustainability of vector control can be overcome by integrating control activities of both diseases. The sensitization of inhabitants on the pathological impacts of AAT on animal health and peasant economy will ease their cooperation for control activities that will guarantee and ensure sustainability and success of control measures. Current data on AAT are useful arguments to

Table 1 Prevalence of animal trypanosomes in some HAT foci of West and Central Africa

HAT focus	Countries	Prevalence of animal trypanosomes	References
Nditam	Cameroon	24.5 % ^b	[23]
Bipindi	Cameroon	62.6 % ^c ; 21 % ^b	[23–26]
Campo	Cameroon	55.7 % ^c ; 11.7 % ^b	[23, 25, 26]
Doume	Cameroon	12.5 % ^c ; 10 % ^b	[23, 25]
Fontem	Cameroon	73.7 % ^c	[13]
Bafia	Cameroon	25.5 % ^a	[27]
Malanga	DRC	22.4 % ^a	[28]
Mandoul	Chad	22.9 % ^c	[29]
Luba	Equatorial Guinea	28.6 % ^a	[15]
Mbini	Equatorial Guinea	52.6 % ^c	[14]
Kogo	Equatorial Guinea	36.1 % ^c	[14]
Bonon	Côte d’Ivoire	72 % ^c ; 28 % ^a ,	[16]
Sinfra	Côte d’Ivoire	14 % ^a	[30]

^aTrypanosomes’ prevalence reported in tsetse flies

^bTrypanosomes’ prevalence reported in wild animals

^cTrypanosomes’ prevalence reported in domestic animals

sensitize inhabitants and Governments on the threats and impacts of AAT on peasant economy in HAT foci. Showing the need of long term control of AAT for animal and human health, actors of different ministries could cooperate and join their efforts to achieve the elimination of these diseases. Improvement of trypanosomiasis control in HAT foci requires close cooperation between technical structures in charge of AAT and HAT control. This is a critical step for the maintenance of sustainable control activities that will provide mutual benefits for human and animal health and could lead to the elimination of African trypanosomiasis. Monitoring of trypanosome prevalence in animals and/or tsetse, as well as human exposure to tsetse bites [19–22] could constitute interesting and reliable indicators to evaluate the success of control operations.

Conclusion

HAT control can be sustained through AAT control; by putting the control of these diseases in the “one health” concept. Implementing control activities on AAT will help to sustain HAT control and the sensitization of inhabitants on AAT and their training will enable to sustain control operations that will interrupt trypanosomes’ transmission.

Competing interests

The authors declare that they have no competing interest.

Authors’ contributions

GS conceived, designed and wrote the manuscript; JBR corrected the manuscript. Both authors read and approved the final version of the manuscript.

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