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Review

Animal African Trypanosomiasis in Nigeria: A long way from elimination/eradication

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ABSTRACT

Animal African Trypanosomiasis (AAT) is a disease of livestock that directly hinders livestock production and therefore impedes the socio-economic development of sub-Saharan Africa. The establishment of the Pan-African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC) was to enhance the goal of elimination and eradication of tsetse flies and AAT from endemic countries in Africa. In order to achieve AAT eradication, a five-step progressive control pathway (PCP) model has been proposed. The data presented in this report demonstrates that Nigeria is highly endemic of AAT and that it is yet to comprehensively approach the process of eradication as it is at the infancy stage of data gathering and processing. This review is thus presented to serve as a wake-up call to all relevant stakeholders to intensify efforts in approaching the painstaking process of AAT eradication in Nigeria.

1. Introduction

Animal African Trypanosomiasis (AAT) is a disease of livestock caused by trypanosomes and cyclically transmitted by tsetse flies. The disease brings with it huge annual economic losses (Dede et al., 2007). The impact of AAT on a community is the result of complex interactions between environmental, political, socio-cultural, entomological and livestock management factors (Bouyer et al., 2013). It was recently estimated that Nigeria has 19.5 million cattle, 72.5 million goats, 41.3 million sheep, 7.1 million pigs, 28,000 camels and 974, 499 donkeys (National Agriculture Sample Survey, Nigeria, 2010). However, majority of these livestock are at risk of AAT because they are located in tsetse-infested regions. Infection with AAT may result in weakness, lethargy, weight loss, anaemia and sometimes death of the animal.

Control efforts against AAT in Africa have been employed on isolated bases and hence identified as an impediment to effective control because of *trans*-boundary transmission. Thus, the need for a concerted effort was proposed and this berthed the Pan-African Tsetse and Trypanosomiasis Eradication Campaign (PATTEC) programme with the mandate of fostering the elimination of tsetse and trypanosomiasis from the African continent (Kabayo, 2002). For PATTEC-Nigeria to strategically approach elimination/eradication, it has to constantly update information on AAT in relation to parasite's infection rate in livestock, parasite's prevalence in the vectors, tsetse distribution and applied diagnostic methods. Parts of these data are presented in this report, while the challenges of AAT elimination and eradication are discussed.

The progressive control pathway (PCP) is a model that captures the sequence of events that should be rigorously followed before tsetse and AAT elimination/eradication can be achieved (Diall et al., 2017). There are five PCP stages: the first requires the development of a national atlas on tsetse and AAT, while the second is characterised by employing methods that should bring about reduction in tsetse density and AAT burden. Others involve creating sustainable AAT free areas after successful application of appropriate integrated methods in endemic locations. Thus, within the PCP model, it is imperative that AAT endemic countries regularly appraise control efforts and other activities so as to precisely identify its stage in the AAT eradication plan as presented for Nigeria in this report.

1.1. Tsetse distribution, density and infection rate

Nigeria occupies 923,768 km^2 with 36 states and the Federal Capital Territory (FCT), Abuja. These states which are comprised of local government areas are further clustered into six geopolitical zones (North-Central, North-East, North-West, South-South, South-East, and South-West) (see Fig. 1). The rainfall pattern is such that the north

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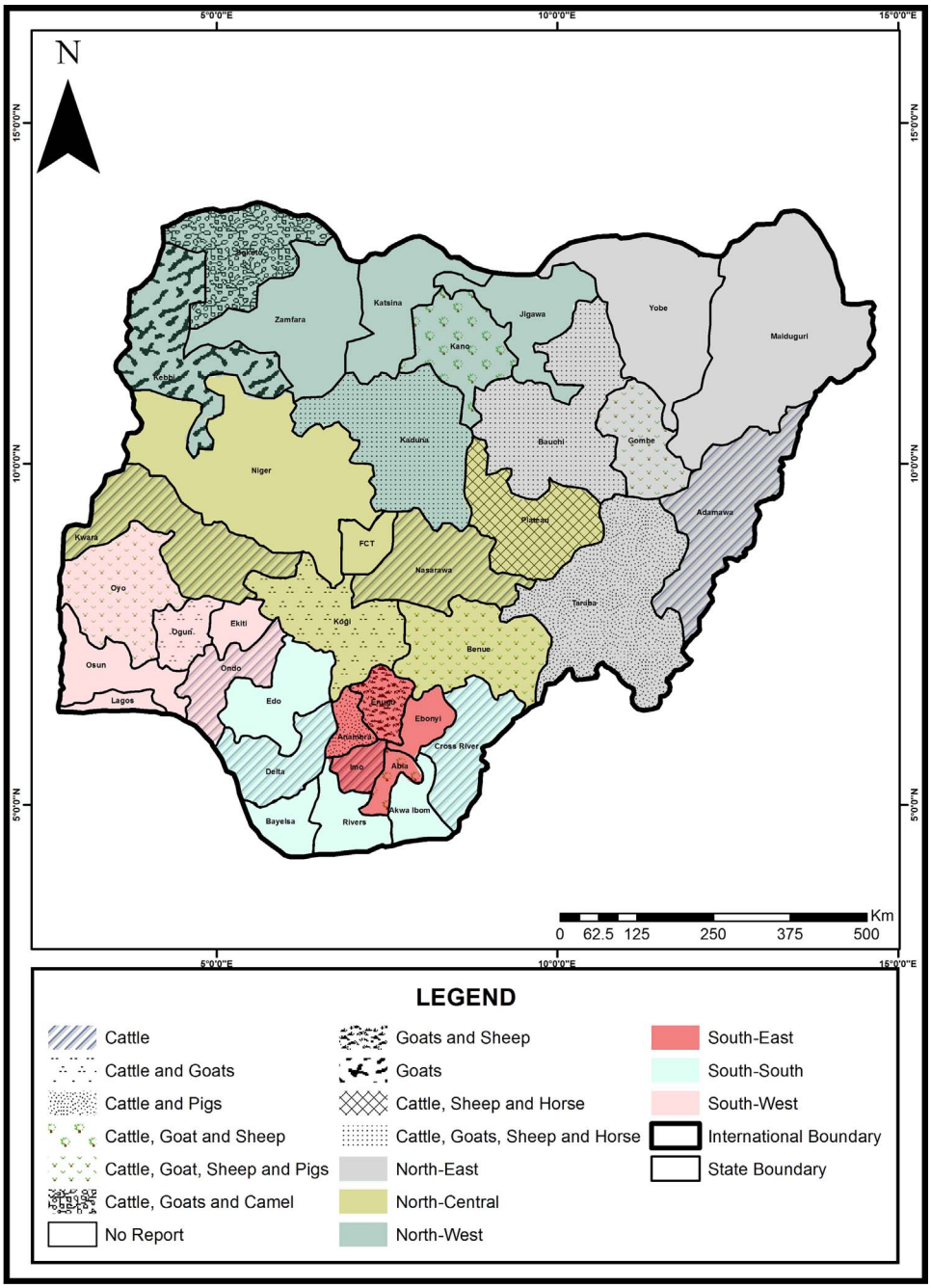

Fig. 1. Map of Nigeria indicating areas of AAT survey on livestock.

receives less rainfall with much shorter wet season than the south. In addition, Nigeria could be zoned latitudinally into: Guinea (majorly South: 8°N) [Lagos, Oyo, Ekiti, Osun, Ondo, Edo, Delta, Bayelsa, Abia, Ebonyi, Anambra, Rivers, Imo, Enugu, Cross River, Akwa Ibom states]; Savanna [Plateau, Kaduna, Bauchi, Kwara, Niger, Nassawara, Taraba, Adamawa, Gombe, Benue and Kogi states with Abuja (8–11°N)]; and Sahel (extreme North: 11–16°N) [Kebbi, Sokoto, Zamfara, Katsina, Kano, Jigawa, Borno, Gombe and Yobe states] (Omotosho and Abiodun, 2007). Annual rainfall ranges from 1400 to 2700 mm in the Guinean zone, 950–1400 mm (Savanna zone) and 450–1050 mm (Sahelian zone) (Ogungbenro and Morakinyo, 2014). Monthly rainfall pattern is monomodal for Savanna and Sahel and bi-modal for Guinea. Agriculturally sufficient rainfall starts in Nigeria in April peaking between August and September in Sahel and Savanna; while in Guinea, the first peak is in July followed by a short dry break in August, then a second peak in September. The dominant vegetation types range from the dense mangrove forests of the Niger Delta and the rain forests of the south to the dry grassland of the north.

About 70% of Nigeria landmass is infested with eleven *Glossina* species (Jordan, 1961) with four (*G. palpalis palpalis*, *G. tachinoides*, *G. morsitans submorsitans* and *G. longipalpis*) commonly seen (Federal Ministry of Agriculture, 1981; Onyiah, 1995). Nigeria tsetse map showed the occurrence of *G. m. submorsitans* in a series of discontinuous belt across the northern region, while *G. longipalpis* are over a wide area in central and south-western Nigeria. *Glossina palpalis* and *G. tachinoides* occur across all geopolitical zones but absent from the extreme Northeast areas with only *G. tachinoides* seen in limited areas on the southern boundary (Onyiah et al., 1983).

As a result of the rise in human population and consequent increase in human activities, significant changes in the availability of suitable habitat and hosts that potentially ensure tsetse survival and sustenance in a given location may have occurred with time (Dede et al., 2007).