

A Kuri Beef (*Bos Taurus*) Imported From The Lake Chad Has Introduced *Hyalomma Impeltatum* (Acari: Ixodidae), An Anthropophilic Tick To Gabon

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Abstract—The cross-border trade cattle, involve the movement of several thousands of animals with the risk of introduction of zoonotic diseases and vector borne-diseases between the countries. It was during a trade transaction that a kuri beef (*Bos Taurus*) coming from the lake chad area in order to cover the needs in meat of the populations of Gabon has introduced *Hyalomma impeltatum* an anthropophilic tick. The risk of introduction in Gabon of pathogens such as the arbovirus Sindbis and Dhor; the virus of Crimea-Congo hemorrhagic fever, *Rickettsia africae* as well as *Rickettsia aeschlimannii* is a real threat for public health. The treatment of cattle with effective acaricides at the frontier before entering to Gabon can prevent the introduction of ticks and tick borne diseases.

Index Terms— Cattle; Public; Health; Kuri; Lake; Gabon.

I. INTRODUCTION

Cross- border trade cattle involve the movement of animals among countries or regions. In West Africa, this movement is oriented from Sahel countries such as Mali, Burkina Faso, Niger to Coastal countries which are Cote d'Ivoire, Ghana, Nigeria. In 2000, the cattle population in this part of Sahel was estimated at 47 million of animals and the financial transactions from these countries in the south west of Africa towards Mali, Burkina Faso and Niger was \$ 150 million for the same period [1]. Regarding Eastern countries, Ethiopia is the main contributor because from 1998-2014 the cross-border trade cattle of this country has reached 60 billion of which 16 billion live livestock was sold to Kenya, Somalia and Djibouti. A part of small ruminants from this trade was shipped to Gulf countries via Somalia [2]. In Central Africa with 127 cattle markets, Cameroon is the cross-road for cross-border cattle trade for ruminants coming from Chad, Centre Africa, and Nigeria sold in Gabon and Equatorial Guinea. Between September 2013 and August 2014, 235,831 cattle have moved through these markets [3]. The movements of several thousands of animals in the cross-border cattle trade among countries or regions are a real risk for spreading zoonotic diseases [3] and vectors of diseases such as ticks [29]. For the first time in Gabon a Kuri beef imported from lake Chad has introduced an anthropophilic tick. The objective of this

study was to characterize this animal and the specie of tick he has introduced in this country and also to present the potential diseases this arthropod could transmit to the populations. In order to protect public health, a preventive acaricide treatment was recommended to cattle imported from Cameroon to Gabon before crossing the frontier.

II. MATERIAL AND METHODS

A. Slaughterhouse of Libreville

The survey was conducted during the month of June 2019 in the municipality of Owendo at a slaughterhouse in the south of Libreville; the first town of Gabon.

B. Animal

A six years old beef imported from lake Chad to Gabon was examined during an ante-mortem examination in the slaughterhouse of Libreville to collect ticks and also to characterize this animal. Factsheets were used for the characterization [4], [5]. In order to identify the site where the imported tick was collected, the body of this animal was divided in 6 parts (head, neck, abdomen, legs, perineum and back.

C. Tick

The tick was collected manually and kept in a tube containing 3 ml of ethanol at 70%. In order to identify the specie to which this arthropod belonged, identification keys [10], [26] and a binocular loupe were used.

III. RESULTS

A. Beef Characterization

The animal (Figure 1) that has introduced an anthropophilic tick in Gabon was a Kuri beef (*Bos Taurus*) belonging to the group of humpeless cattle breeds with longhorns of sub-Saharan Africa [4], [5].



Fig.1. Kuri cattle (*Bos Taurus*)

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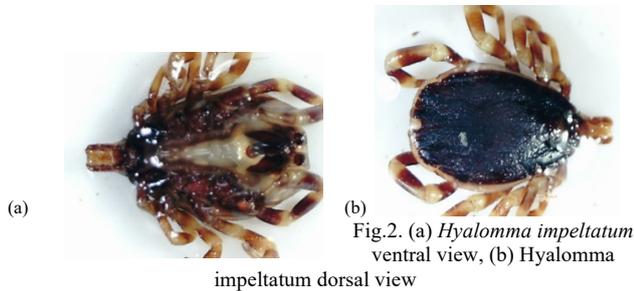
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B. Tick Identification

The tick (Figure 2.A-B) collected from the Kuri beef belonged to the phylum of *Arthropoda*, the class of *Arachnida*, the order of *Acarina*, the Sub-order of *Ixodoidae*, the family of *Ixodidae*, the genus of *Hyalomma* and the specie *Impeltatum* [10], [26].



IV. DISCUSSION

This survey has showed that, a kuri beef has introduced an anthropophilic tick *Hyalomma impeltatum* in Gabon. This animal belonged to the type of African Bos Taurus cattle, more exactly to the group of humpless long horn cattle [5]

Kuri cattle are larger than both West Africa taurins and zebu cattle [4] with mature weight range from 360 -750 kg [8]. These animals have voluminous and bulbous horns with a basal section reaching between 20-100 cm in circumference [8] but these measures were shorter than to those of Ankole-watusi which reach 103.5 cm [7]. The meat yield of these cattle is 50 percent for the beefs of seven years old [27]. With a production of 6-10 liters per day, this breed is a better milk producer than arab zebu representing 90 percent; of the population of cattle in Chad with only 1.5-4 liters per day [27]. Kuri cattle are well adapted to the semi-aquatic environment. These animals live on shores and Islands of lake Chad and are also distributed among Northern Nigeria southern Chad, Nguigni province in Niger and northern of Cameroon. This area was located in Sahel which had a semi-arid climate with annual precipitations between 200mm-600mm, a range of temperatures 24°C-34°C and a relative humidity between 65% to 84% [9]; these climatic conditions were suitable to *Hyalomma impeltatum* [10]. With a population estimated at 110,000 heads [6], kuri cattle are threatened of extinction today because of, drought, the reduction of his habitat, the rinderpest, the difficulties political situation of the countries bordering around this area as well as the retreating of waters of lake [8]. In order to cover the needs of meat for the populations, Gabon has imported cattle from Cameroon [3] for several years, but concerning cattle coming from lake Chad, it was the first time that a Kuri beef was introduced in This country.

Hyalomma impeltatum was introduced in Gabon attached to the testicles of a Kuri beef coming from lake Chad. Under laboratory conditions, this arthropod has; a three- host life cycle [10]. Arid and semi-arid climates are suitable for this acarian, which is distributed from North African to Middle- Eastern countries, via the Sahel [10]. Usually, adults of this acarian infest Cattle and camels [11]. *Hyalomma impeltatum* carries *Rickettsia africae* a human

infectious pathogen [12] but no transmission associated with this tick has ever been reported to date, in Africa, only both *Amblyomma variegatum* and *Amblyomma hebraeum* are recognized as being the main vectors associated with this bacteria [12]. The symptoms [13] of the infection due to *R. africae* are: Fever, rash, chills, asthenia, anorexia and myalgia Doxycycline therapy remains the best choice of treatment [12]. Other zoonotic pathogens such as: *Rickettsia aeschlimanii* [15], *Ehrlichia chaffensis* [14] as well as both Sindbis and Dhori viruses belonging to the *Togaviridae* and *Orthomyxoviridae* families respectively were detected; but no case of infected human has ever been reported to date, therefore *Hyalomma impeltatum* can be considered as an epidemiological indicator for both rickettsia and viruses cited above. On the other hands it has been showed that *Hyalomma marginatum* [15] and *Amblyomma americanum* [14] were able to transmit the pathogens *Rickettsia aeschlimanii* and *Ehrlichia chaffensis* respectively to human beings; the same goes for Sindbis and Dhori viruses for which mosquitoes belonging to the genera *Aedes* [16], [17], and *Culex* [16], [17] were the main vectors but only those of the genera *Culiseta sp* [17] and *Anopheles sp* [16] are able to inoculate these two pathogens to men. Symptoms due to *Rickettsia aeschlimanii* [18] are similar to those of *R. africae* but *Ehrlichia chaffensis* induces in addition arthralgias, vomiting, cough, abdominal pain, diarrhea, conjunctivitis, peripheral edema as well as pharyngitis [14], doxycycline is also recommended, in the treatment of infections associated with *E. chaffensis* [14]. Regarding both Sindbis and Dhori arboviruses, the symptoms are similar to those cited above linked to *Rickettsia sp* and *Ehrlichia sp*; with other symptoms such as: Giddiness, eyeball pain, scleritis, bradycardia and nervous troubles; specific to the Dhori virus [19]. Because the clinical features of the tick-borne diseases quoted above are similar to those of malaria, influenza and viral infection associated to dengue this can lead to misdiagnosis. Therefore, performing, laboratory diagnostic remains the best way to establish a differential diagnostic. Symptomatic treatments are administrated to patients suffering about the infections associated to both Dhori and Sindbis virus but non-steroid anti-inflammatories are recommended for the troubles due to Sindbis virus [25]. With an average of rainfall between 60-700 mm, arid and semi-arid areas are comfortable biotopes for *Hyalomma impeltatum* but equatorial regions with hydrophilic forests [20] and an average of precipitations between 1400 mm-3500mm like Gabon [22] constitute uncomfortable environment for this arthropod therefore *Hyalomma impeltatum* cannot survive in Gabon because of excess of water but wildlife and domestic animals can play the role of reservoirs from which other arthropods hematophagous could be contaminated before transmitting the zoonotic pathogens to men; that fact could threat public health [28]. Like many other ticks of the *Hyalomma* genus *Hyalomma impeltatum* transmits to humans the Congo and Crimea hemorrhagic fever virus with a range of symptoms such as: fever, myalgia, dizziness, neck pain and stiffness, headache, sore eyes, nausea, vomiting, diarrhoea, abdominal pain, sore throat and other clinical signs including tachycardia, petechial rashes, ecchymoses, and other hemorrhagic phenomena [21]. The case fatality rate reported during the outbreaks can move up to 40% [21]. General supportive care with symptomatic treatments are the main approach to managing CCHF in

people. The antiviral drug ribavirin has been used to treat CCHF infection with apparent benefit. Both oral and intravenous formulations seem to be effective [21]. Because Gabon is not a favorable habitat for *Hyalomma impeltatum*, the risk of transmission of the virus of CCHF to people is low but cattle, sheep, goats, birds, and hares hosts of this acarian considered as potentials reservoirs of this arbovirus, remain a threat for public health [23]. The use of Topline (Fiprolin) pour on at 1% as acaricide treatment performed to cattle crossing the border between Cameroon and Gabon [24] can prevent the introduction of ticks and tick-borne diseases which can threaten public health.

V. CONCLUSION

This survey has showed that the cross-border trade cattle facilitate the movement of ticks and zoonotic borne diseases between countries, veterinary controls and acaricide treatments remain the best way to protect public health when cattle cross frontiers.

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