



Review

Importance of identification and typing of *Brucellae* from West African cattle: A review



Moussa Sanogo^{a,b,c,*}, Emmanuel Abatih^b, Eric Thys^b, David Fretin^d,
Dirk Berkvens^b, Claude Saegerman^c

^a LANADA/Central Veterinary Laboratory of Bingerville, P.O. Box 206, Bingerville, Côte d'Ivoire

^b Unit of Epidemiology and Biostatistics, Department of Biomedical Sciences, Institute of Tropical Medicine (ITM), Nationalestraat, 155, B-2000, Antwerp, Belgium

^c Research Unit of Epidemiology and Risk Analysis applied to Veterinary Sciences (UREAR-ULg), Department of Infectious and Parasitic Diseases, Faculty of Veterinary Medicine, University of Liege (ULg), Boulevard de Colonster 20, B42, B-4000, Liege, Belgium

^d Department of Bacteriology and Immunology, Veterinary and Agro-chemical Research Centre (VAR), Uccle, Groeselenberg 99, 1180, Brussels, Belgium

ARTICLE INFO

Article history:

Received 3 November 2012

Received in revised form 12 February 2013

Accepted 15 February 2013

Keywords:

Cattle
Brucellosis
Identification
Typing
Brucella
Biovar
West Africa

ABSTRACT

Bovine brucellosis is an endemic infectious disease which can impact cattle productivity and welfare negatively, as well as human health. Sufficient knowledge on its epidemiology, particularly on species and biotypes of *Brucella* at national and/or regional scale are important to set up and implement efficient control measures against brucellosis in a “One health” perspective. The main objective of this review was to investigate available literature on strains of *Brucella* in order to provide a state of art-knowledge on species and biovars reported in cattle from West Africa. A literature search was conducted to identify relevant data on species and biovars of *Brucella* in cattle from Western African countries. This search included studies presenting bacteriological and/or molecular results of identification and typing, relied on international classification methods with no time limit and no language restrictions. Studies reporting results of identification at genus level only were not considered for this review. This review revealed that *Brucella abortus* was the most prevalent species in cattle from West Africa, in line with host preference for *Brucellae*. So far, biovars 1, 2, 3, 4, 6 and intermediate biovar 3/6 of *B. abortus* were reported in cattle in the region. Among these strains, biovars 3, recently identified in The Gambia and Ivory Coast, was the most commonly isolated. *Brucella melitensis* and/or *B. suis* have not been mentioned yet in cattle in this part of Africa. The public health significance of prevailing strains is discussed and a regional collaborative control program of brucellosis is suggested.

© 2013 Elsevier B.V. All rights reserved.

Contents

| | |
|---|-----|
| 1. Introduction | 203 |
| 2. Methodology | 203 |
| 2.1. Study area | 203 |
| 2.2. Literature search | 204 |
| 2.3. Data extraction and analysis | 204 |

* Corresponding author at: LANADA/Central Veterinary Laboratory of Bingerville, P.O. Box 206, Bingerville, Côte d'Ivoire. Tel.: +225 07523356.
E-mail address: ssanogomoussas@gmail.com (M. Sanogo).

| | |
|---|-----|
| 3. Results | 204 |
| 4. Discussion | 207 |
| 4.1. Samples and typing methods of <i>Brucella</i> in West Africa | 207 |
| 4.2. Decades of identification and typing of <i>Brucella</i> from cattle in West Africa | 208 |
| 4.3. Public health significance and implications | 208 |
| 5. Conclusion and perspectives | 209 |
| Acknowledgements | 210 |
| References | 210 |

1. Introduction

In Africa, livestock development is continuously being challenged by several constraints among which are many parasitic, viral and bacterial infectious diseases. Brucellosis is one of the major bacterial infectious diseases, affecting domestic animals in many developing countries (Akakpo and Bornarel, 1987; Corbel, 1997; Wastling et al., 1999; McDermott and Arimi, 2002). In sub-Saharan Africa, bovine brucellosis remains the most widespread form of the disease in livestock (Akakpo and Bornarel, 1987; Corbel, 1997; McDermott and Arimi, 2002; Bronsvort et al., 2009). It is responsible for considerable economic losses through its negative impacts on livestock production including late term abortion, birth of weak calf, retention of placenta, metritis, infertility, orchitis or epididymitis with or without sterility and hygroma. Brucellosis is caused by slow-growing, small, Gram negative, cocco-bacilli bacteria composing the genus *Brucella*. These bacteria are facultative intracellular pathogen which can be transmitted to a susceptible host mostly by direct contact, ingestion or via aerosol. When transmission occurs, lymphatic tissues, blood and other tissues and organs of the host are invaded, with a particular tropism for the reproductive tract (Olsen and Tatum, 2010). On the basis of pathogenicity, host preference and phenotypic characteristics, six species of *Brucella* are commonly listed: *Brucella* (*B.*) *neotomae* (desert rat), *B. canis* (dogs), *B. suis* (pigs), *B. ovis* (rams), *B. melitensis* (sheep, goats) and *B. abortus* (cattle) (Osterman and Moriyon, 2006). Besides these six common species of *Brucella*, some strains were newly reported like *B. ceti* and *B. pinnipediae* identified in marine mammals, *B. microti* in the common vole (*Microtus arvalis*), in wild red fox (*Vulpes vulpes*) and in soil and *B. inopinata* in human (Ewalt et al., 1994; Foster et al., 1996; Clavareau et al., 1998; Scholz et al., 2008, 2010; Tiller et al., 2010; Banai and Corbel, 2010; Nymo et al., 2011). Based on their cultural morphology, serotyping and biochemical characteristics, these species may be sub-divided into subtypes (also known as biovars, or biotypes) (Alton et al., 1988).

In cattle, the disease is mainly caused by one of the seven biovars of *B. abortus* (1, 2, 3, 4, 5, 6, and 9) but also occasionally by biovars of *B. melitensis* and *B. suis* (Corbel, 2006; OIE, 2009; Fretin et al., 2012). Among species encountered in cattle, *B. suis* (biovars 1 and 3) and *B. melitensis* can cause disease in human, with more severe cases related to *B. melitensis* (Acha and Szyfres, 2003; Corbel, 2006). In addition to these common zoonotic species, newly reported strains of *Brucella* in marine mammals were also alleged to have a zoonotic potential

but further investigations are still needed (Godfroid et al., 2005).

For a better understanding of its epidemiology in cattle, prevalence of brucellosis has been investigated throughout the years in Africa (Akakpo and Bornarel, 1987; Mangen et al., 2002). Besides these investigations, species and biotypes infecting cattle have also been investigated. By providing information on the actual evidence of the presence of the disease-causing agent, identification and typing of strains are relevant in the “one health” perspective. They are also useful for a better knowledge of the disease epidemiology, for managing outbreaks, for identification of appropriate antigens for testing and for setting up efficient preventive and control measures (Crawford et al., 1979; Ica et al., 2008; Saegerman et al., 2010; Godfroid et al., 2010). Since infected animals and particularly infected cattle may be sources of human brucellosis, knowledge on prevailing strains in these hosts may supply information that can be used to assess potential threats for public health at national and/or at regional levels.

The aim of this review was to determine strains of *Brucella* reported in cattle from West Africa in order to provide a summary of species and biovars reported in that sub-region of Africa, determine geographical distribution of strains, identify samples used for typing and discuss potential implications on public health.

2. Methodology

2.1. Study area

The area of concern in this review included West African countries. West Africa is one of the four major regions of sub-Saharan Africa. It covers almost one fifth of the geographical area of the whole continent with 5,112,903 km² and comprised of members of the Economic Community Of West African States (ECOWAS) (Fig. 1). Four main climatic zones are encountered from south to north in this area namely, humid, sub-humid, semi-arid and arid zones (McDermott and Arimi, 2002). West Africa is an important area of livestock production with the largest population of ruminants after East Africa and ahead of the southern regions (OECD, 2008). About 60 million heads of cattle, representing approximately 21% of the cattle population of the continent, are found in this sub-region of Africa (FAO, 2010). These cattle belong to two subspecies of *Bos Taurus*: the West African humpless breeds (*Bos taurus* type) and the humped zebu of *Bos indicus* type. Compared to the rest of the continent, significant populations of both subspecies of cattle are found in this part of

Download English Version:

<https://daneshyari.com/en/article/5800885>

Download Persian Version:

<https://daneshyari.com/article/5800885>

[Daneshyari.com](https://daneshyari.com)