

**NSAP****47th Annual Conference**
(JOS 2022)**CONFERENCE PROCEEDINGS**THEME
SECURING ANIMAL
AGRICULTURE AMIDST
GLOBAL CHALLENGES**MIXED INFECTION OF *MYCOPLASMA MYCOIDES* SUBSPECIES *MYCOIDES* AND *MYCOBACTERIUM BOVIS* IN BUNAJI CATTLE**¹Danbirni*, S.; ²Okaiyeto, S.O.; ³Pewan, S.B., ¹Kudi, C.A. and ¹Sackey, A.K.B.¹Department of Veterinary Medicine, Ahmadu Bello University, Zaria, Nigeria²Veterinary Teaching Hospital, Ahmadu Bello University, Zaria, Nigeria³National Animal Research Institute, Vom, Plateau State, Nigeria.*Correspondence: drdanbirni07@yahoo.com, 08020873698**ABSTRACT**

A herd of 43 nomadic Bunaji cattle in Igabi Local Government Area of Kaduna State were presented for screening with history and signs of persistence coughing, anorexia, fall in milk yield, back arch and head extension towards wind direction. The cattle were screened for *Mycoplasma mycoides* subspecies *mycoides* (MmmSC), a causative agent of Contagious Bovine Pleuropneumonia (CBPP) and *Mycobacterium bovis* (*M. bovis*) that caused Bovine Tuberculosis (BTB) using BoviLAT® Latex Agglutination Test-PA6223 (CFT) and One-Step Anigen® Rapid Bovine Tuberculosis Antibody Test (IQRT), respectively. Of the 43 cattle screened, 53.5% had antibodies to MmmSC while 13.9% had antibodies to both MmmSC and *M. bovis*. Cattle that were positive for MmmSC were confined and administered 20% long acting oxytetracycline (Tridox L.A) at 20 mg kg⁻¹ body weight while those that were negative to both tests were vaccinated with CBPP vaccine obtained from National Veterinary Research Institute (NVRI), Vom. Cattle that were positive to both MmmSC and *M. bovis* antibodies were advised to be cull out. This investigation revealed that under natural condition, concurrent mixed infections of cattle with CBPP and BTB may occur unnoticed in nomadic Bunaji cattle. This may be possible as CBPP may mimic BTB with the consequences of decrease in productivity and high morbidity. Serological tests used in this study may be useful for epidemiological studies while bacteriological culture, postmortem examination and tuberculin skin test (for BTB) need to be carried out to confirm CBPP and BTB. The use of antibiotics in a combined strategy with vaccination and restriction of movement in CBPP out breaks; screening and early culling of animals exposed to *M. bovis* may help in reducing the economic impact of CBPP and BTB in the tropic.

Keywords: *Mycobacterium bovis*, mixed infection, Bunaji cattle, CBPP.**INTRODUCTION**

Contagious bovine pleuropneumonia (CBPP) is an infectious disease of cattle caused by the small-colony type of *Mycoplasma mycoides* subspecies *mycoides* (Masiga and Domenech, 1995). Transmission occurs from direct and repeated contacts between sick and healthy animals. The first incidence of the disease in Nigeria was recorded in 1924 when reliable records were first available (Foluso, 2004). As at today the disease is endemic in Nigeria, Central, East and parts of Southern Africa (Tambi *et al.*, 2006).

It is a major threat for cattle health and production and also the most significant epidemic disease of cattle in Africa where it was reported from 17 countries in 2001 (OIE, 2002) and 27 countries in 2002 (Tambi *et al.*, 2006). From a historical perspective, CBPP was a disease of Europe and Asia (Tambi *et al.*, 2006). A comprehensive historical account of the spread of CBPP in view of the economic significance of the disease in Europe and Africa in the 19th century has been provided by Windsor (2000).

In Nigeria, farmers hardly report cases but resort to treatment with antibiotics like any other bacteria disease (Chima *et al.*, 1999, 2001). Inadequate funding of cattle annual mass vaccination programmes and the refusal of some farmers to allow vaccination of their animals due to post-vaccination reactions experienced, have contributed to the spread of the disease rendering data on infection of the disease within the country inaccurate and subjective (Chima *et al.*, 2001; Molokwu and Nwanepa, 2003).

The traditional way of rearing cattle in Nigeria like in other developing countries have over the years contributed to the spread of diseases (Okaiyeto *et al.*, 2008) especially the interaction of animals during communal grazing and at watering points.

During these interactions, infectious and air borne diseases such as BTB is transmitted between and within herds (Shehu, 1988). Bovine tuberculosis may not manifest clinically except at the chronic stage as a result of stressful conditions such as starvation and concurrent infections like CBPP, trypanosomosis

and helminthosis. This situation allows animals with BTB to continue shedding viable *M. bovis* in milk and other secretions to susceptible animals and humans consuming unpasteurized milk (Neill *et al.*, 1991; Radostits *et al.*, 2003). Bovine tuberculosis has been reported in Kaduna State and other parts of the country (Danbirni *et al.*, 2009). This study reports a mixed infection of Bunaji cattle with contagious bovine pleuropneumonia and bovine tuberculosis.

CASE HISTORY AND SCREENING METHODOLOGY

A nomadic herd size of 43 Bunaji breed of cattle located in Igabi Local Government Area (LGA) of Kaduna State, Northern Nigeria was visited by a team of Clinicians following a complaint of high morbidity and persistent cough by the cattle owner. On-farm assessment of the animals revealed mucopurulent nasal discharges, shallow, grunting respiration, painful coughing, back arch, head extended towards the wind direction with abducted forelimbs and exercise intolerance. The herd has never been vaccinated against CBPP. Sera samples were obtained from the 43 nomadic Bunaji cattle and were screened on the farm for CBPP and BTB using BoviLAT® Latex Agglutination Test-PA6223 (CFT) and One-Step Anigen® Rapid Bovine Tuberculosis Antibody Test (IQRT), respectively as described by Ayling *et al.* (1999) and Danbirni *et al.* (2009), respectively. The results of the screening are shown in Table 1 below.

SCREENING RESULTS AND CASE MANAGEMENT DISCUSSION

Cattle positive for MmmSC only were confined and administered 20% long acting oxytetracycline (Tridox® L.A) at 20 mg kg⁻¹ body weight and those that were negative for *M. bovis* antibodies were vaccinated with CBPP vaccine obtained from the NVRI, Vom. Animals positive for both MmmSC and *M. bovis* antibodies were advised to cull out.

Table 1: Detection of antibodies to *Mycoplasma mycoides subspecies mycoides* small colony variant (MmmSC) and *Mycobacterium bovis* (*M. bovis*) in nomadic Bunaji Cattle using CFT and IQRT in Igabi L.G.A., Kaduna State

Sex	No. Screened (cattle)	CFT antibodies) (%) positive)	(MmmSC (%) positive)	IQRT antibodies) (%) positive)	(<i>M. bovis</i> (%) positive)	CFT and IQRT (% positive)
Male	10		3(30.0)		0(00.0)	0(00.0)
Females	33		20(60.6)		0(00.0)	6(18.2)
Total	43		23(53.5)		0(00.0)	6(13.9)

CFT = BoviLAT® Latex agglutination test – PA6223; IQRT = One-Step antigen® rapid Bovine tuberculosis test

Out of 43 nomadic Bunaji cattle screened, 53.5% were positive for antibodies to MmmSC, out of which 13.0% were males. The percentage mixed infection with MmmSC and *M. bovis* was 13.9% all of which were lactating cows. This could be attributed to a diminishing immunity due to stress of lactation as both CBPP and BTB are diseases normally triggered by stress. Although, the herd has never been vaccinated against CBPP yet the animals had antibodies to both CBPP.

These antibodies to either MmmSC or *M. bovis* may have developed as a result of natural exposure of the susceptible cattle to the etiological agents leading to clinical signs observed in some of the cattle in the herd. The prevalence of CBPP obtained in this study (53.5%) was <59.4% reported by Anyika *et al.* (2021) from cattle in three South Eastern States of Nigeria. The difference could be attributed to the sample size (438), type of test (c-ELISA) as well as the geographical location (Anambra, Imo, Enugu) of the study. This may also indicate the epidemiological pattern of the disease within the country. Animals that were negative to MmmSC in this study could be incubating the disease because CBPP is primarily an air borne disease of which an infected animal may infect other susceptible animals in the herd either directly or indirectly depending on their immune status (Windsor and Masiga, 1977). About 5 days after vaccinating those cattle that were negative to both MmmSC and *M. bovis*, no post vaccination reaction was observed. Those cattle treated with 20% long acting oxytetracycline, respiratory signs subsided significantly about 5 days post treatment. This observation agrees with the

report of Tambi *et al.* (2006) that the benefit-cost analysis of CBPP control using vaccination and antibiotic treatment was economically beneficial in a study of an estimation of the economic impact of CBPP in Africa.

The prevalence of mixed infection of cattle with CBPP and BTB obtained in this study was 13.9%. Concurrent infection of cattle with BTB and other infections in Northern Nigeria using IQRT has been reported (Danbirni *et al.*, 2010).

Lactating cows that had antibodies to both MmmSC and *M. bovis* as a mixed infection were of great public health significance especially when milk obtained from such cows is consumed without adequate pasteurization. The farmer was advised to cull out these cows before they lose their market value to carcass condemnation during postmortem meat inspection (Danbirni *et al.*, 2009) and in order to avoid further spread of the infection within the herd as BTB is known to be a chronic and progressive disease (National Research Council, 1994).

CONCLUSION

Mixed infection of CBPP and BTB under field conditions may occur unnoticed in cattle. This may be possible as CBPP may mimic BTB with the consequences of decrease in productivity and high morbidity especially under a nomadic management system.

RECOMMENDATION

Further testing of the herd with tuberculin skin test for BTB and c-ELISA for CBPP as well as molecular techniques need to be carried out for confirmation of the agents. The use of antibiotics in a combined strategy with vaccination and restriction of movement in CBPP out breaks as well as screening and early culling of animals exposed to *M. bovis* may help in reducing the economic impact of both diseases in developing countries.

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