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Concurrent Infection of Contagious Bovine Pleuropneumonia and Bovine Tuberculosis in Bunaji Nomadic Cows

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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 arched and head extension towards wind direction. The cattle were screened for Contagious Bovine Pleuropneumonia (CBPP) and Bovine Tuberculosis (BTB) using BoviLAT® Latex Agglutination Test-PA6223 (CFT) and One-Step Anigen® Rapid Bovine Tuberculosis Antibody Test (IQRT), respectively. Of the 43 animals screened, 47% had antibodies to *Mycoplasma mycoides* subspecies *mycoides* small colony variant (Mmm SC) while 14% had antibodies to both Mmm SC and *Mycobacterium bovis* (*M. bovis*). Animals positive for Mmm SC were confined and administered 20% long acting tetracycline (Tridox®L.A) at 20 mg kg^{-1} body weight while those that were negative were vaccinated with CBPP vaccine obtained from the National Veterinary Research Institute (NVRI), Vom. Animals positive to both Mmm SC and *M. bovis* antibodies were advised to be cull out. This investigation revealed that under natural condition, concurrent infection of cattle with CBPP and BTB may occur. 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 developing countries.

Key words: *Mycoplasma mycoides*, *Mycobacterium bovis*, bunaji, Nigeria, postmortem examination, antibiotics

INTRODUCTION

Contagious bovine pleuropneumonia 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, West, 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, a live with the disease attitude has prevailed in the last few years, 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 programme and refusal of some farmers to allow vaccination of their animals due to post-vaccination reactions experienced then 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). However with the CBPP Vaccine Revamp Task Force put in place in National Veterinary Research Institute (N.V.R.I) and the current PACE programme on surveillance, serological monitoring and Rural participatory appraisal, questions about epidemiology of the disease will be clearly understood.

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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 this 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.

MATERIALS AND METHODS

The farm with a herd size of 43 Bunaji breed of cattle is located in Igabi Local Government Area (LGA) of Kaduna State, Northern Nigeria. 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 were shown in Table 1.

Management: Animals positive for Mmm SC were confined and administered 20% long acting tetracycline (Tridox® L.A) at 20 mg kg^{-1} body weight while those that were negative were vaccinated with CBPP vaccine obtained from the N.V.R.I Vom. Animals positive for both Mmm SC and *M. bovis* antibodies were advised to be cull out.

Table 1: Detection of antibodies to *Mmm*SC and *M. bovis* in Bunaji Cattle using CFT and IQRT in Igabi L.G.A., Kaduna State

Sex	No. screened (cattle)	CFT (Mmm SC antibody)	IQRT (*M. bovis* antibody)	(CFT and IQRT
Males	10	3	-	-
Females	33	20	-	6
Total	43	23+	0+	6+

CFT = BoviLAT® Latex agglutination test-PA6223; IQRT = One-Step anigen® rapid Bovine tuberculosis antibody test; +: Positive; -: Negative

RESULTS AND DISCUSSION

Out of 43 Bunaji cattle screened, 47% were positive for antibodies to Mmm SC and of the 47%, 7% were males while 14% out of 43 animals screened reacted positively to both Mmm SC and *M. bovis* antibodies all of which were lactating cows. Although, the herd has never been vaccinated against CBPP yet the animals had antibodies to both CBPP and BTB.

These antibodies might have been developed as a result of exposure of the susceptible animals to the etiological agents leading to a clinical disease observed in some animals in the herd. The prevalence of CBPP obtained in this investigation was 47.0%.

This is >0.29% reported by Aliyu *et al*. (2000) from post mortem examinations of lung lesions of 1,936,015 slaughtered cattle in 81 national abattoirs in Northern Nigeria.

The difference may be attributed to the size, type of samples (Sera verses Lung tissues) tested and the diagnostic method used (CFT verses Post mortem). This may also indicate the epidemiological pattern of the diseases within the country. Animals that were negative to Mmm SC 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, there was no post vaccination reaction on those vaccinated and respiratory signs subsided significantly. This 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 observed in a study of an estimation of the economic impact of CBPP in Africa.

The prevalence of a mixed infection of cattle with CBPP and BTB reporting for the first time in Northern Nigeria as obtained in this study was 14.0%. 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* are 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 to avoid the 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 do occur unnoticed in a cow and CBPP may mimic BTB with the consequences of decrease in productivity and high morbidity in cattle kept under the nomadic management system. Further testing of the herd with tuberculin skin test for BTB and bacteriological culture and postmortem examination need to be carried out to confirm the diseases. 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 the diseases in developing countries.

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