

**PREVALENCE OF CONTAGIOUS BOVINE PLEUROPNEUMONIA IN BORNO STATE,
NIGERIA.**

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SUMMARY

Epidemiological situation of contagious bovine pleuropneumonia (CBPP) over a ten (10) year period in Borno State of Nigeria was examined. During this period, 1,178 out of 355,745 cattle examined at postmortem had lesions suggestive of CBPP giving an overall prevalence rate of 0.33%. Highest prevalence rate of 0.77% was recorded in 1988 while lowest prevalence rate of 0.08% was recorded in 1994. Total vaccination coverage during the same period was 2,344,520 with highest vaccination coverage of 488,054 (10.8%) in 1988 and the lowest coverage of 66,398 (1.5%) in 1997. A total of 37 outbreaks of CBPP were reported during the period under review with highest outbreak (8) occurring in 1990. Seasonal prevalence of the disease was found to be highest in rainy season (0.20%) than the dry season (0.13%) but was not statistically significant ($P>0.05$). In a related development, a total of 3,875 cattle were examined between January and July 1998 in an attempt to find the incidence of CBPP using agar gel precipitation test (AGPT). Out of 57 suspected lungs, 41 (1.1%) were positive for AGPT. The disease is still endemic in Borno State and vaccination coverage was grossly inadequate.

KEY WORDS- CBPP, cattle, AGPT, prevalence, vaccination

INTRODUCTION

Contagious bovine pleuropneumonia (CBPP) is a highly infectious, contagious (Cassel *et al*, 1985; Terlaak, 1992) and economically important disease of cattle caused by *Mycoplasma mycoides* (Osiyemi, 1981; O.I.E., 1995; Egwu *et al*, 1996) and characterized by severe exudative pleuropneumonia and pleurisy (Provost *et al*, 1987; Done *et al*, 1995). The disease has a worldwide distribution (Provost *et al*, 1987; Blood *et al*, 1995) but has been eradicated in some countries in Europe and North America (Moulton, 1984) and is transmitted by direct contact and inhalation droplets from the expired air from the clinical cases or carriers of infection (lungers)

particularly amongst susceptible animals (Nawathe, 1992). CBPP is spread through movement of trade cattle, seasonal migration and transhumane nomadism (Adegboye and Onoviran, 1978; Nawathe, 1992). In Nigeria, annual incidences of about 200 outbreaks occur until 1953 when active control measures were instituted bringing the outbreak to one (Henderson, 1931). Recrudescence of the disease occurred with increasing outbreaks from 20 in 1981 to 64 in 1988 and 114 in 1989. The highest incidence (229) occurred in the province of Borno (Henderson, 1931). The economic loss due to the disease in Nigeria was estimated to be over US\$1.5 million (Egwu *et al*, 1996).

Various diagnostic methods and control measures has been described by Campbell and Turner (1953), Lindley (1960), Chima and Onoviran (1975), Provost *et al*, (1987), Nicholas and Palmer (1994). Despite the adoption of various control measures (Ezebuoro *et al*, 1964; Griffin and Laing, 1966), CBPP is still endemic in Nigeria (Osiyemi, 1981; Provost *et al*, 1987; Nawathe, 1992; Nwanta and Umoh, 1992; Egwu *et al*, 1996) with frequent reports of outbreaks especially in Borno State. Therefore, the urgent need to control or eradicate the disease in Nigeria especially Borno State should not be overemphasized. In view of the above, the research aims to determine the current prevalence of CBPP in Borno State being the center of focus and to evaluate the various control and preventive measures instituted.

MATERIALS AND METHODS

Source of data

Epidemiological reports were obtained from the Ministry of Agriculture and Natural Resources, Maiduguri and the Federal Department of Livestock and Pest control services, Maiduguri. Such data include the reported outbreaks of CBPP and total animals vaccinated from all the local government areas of Borno State and such figures were added up to give the total figure for both outbreaks and vaccinations for the past decade (1988-1997). Maiduguri abattoir data on all slaughtered cattle with lesions of both pneumonic and those suggestive of CBPP were obtained.

Source of sample

Periodic visits between January and July 1998 were made to the Maiduguri abattoir from which lungs from slaughtered cattle were examined for pneumonic lesions and lesions suggestive of CBPP. Pieces of lungs affected were collected; some portions were frozen until used.

Sample used

The lung tissues suspected of having CBPP lesions were used to test for CBPP antigen using agar gel precipitation test. Each lung sample was homogenized, filtered and the filtrate used to run the AGPT with hyper-immune serum from rabbit as source of antibody.

Production of antiserum in rabbits

Two rabbits were used for the production of antiserum. They were bled a week prior to inoculation with the *Mycoplasma* antigen (CBPP vaccine) and Freund's complete adjuvant. A mixture of 1ml antigen (CBPP vaccine 10^8 antigen) with 1ml of adjuvant was injected intramuscularly, divided between four sites for each of the rabbits. Intravenous injection of 0.2ml of the antigen was given after two weeks from the first injection. After further week, they were bled and the serum was separated and stored at -20°C until used. The hyper-immune serum was used to run the AGPT for the suspected lung lesions.

Agar gel precipitation test (AGPT)

The technique described by Hirai *et al* (1972) was followed. The hyper-immune serum which was positive was used to run the lung samples after homogenization. The hyper-immune serum was placed in the central well and the homogenized lung sample or lung exudates with a negative control were placed in the peripheral wells. Precipitation line appeared after overnight incubation in humid chamber at 37°C .

Statistical analysis

The level of significance between the prevalence of CBPP in dry season (November-April) and rainy season (May-October) was determined using the chi-square test at 95% level of confidence and values at $P < 0.05$ were considered significant.

RESULTS

Details of results of the epidemiological situation of CBPP in Borno State examined from 1988 to 1997 and the abattoir results are shown in the Table I.

Out of 355,745 cattle examined at postmortem, 182,840 (51%) were male while 172,905 (49%) were females. A total of 1,178 cattle were reported to have lesions suggestive of CBPP giving a prevalence of 0.33%. Highest prevalence of 0.77% was recorded in 1988 with 243 CBPP cases while lowest prevalence rate of 0.08% was recorded in 1994

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with 30 CBPP cases.

Total vaccination coverage during the period under review was 2,344,520. The highest vaccination coverage of 10.8% (488,058) was recorded in 1988 while lowest 1.5% (60,390) was recorded in 1997. A total of 37 outbreaks were reported during the same period with highest number of outbreaks (8) in 1990 and lowest (1) in 1991 (Table I).

Seasonal distribution of the disease within the review period showed that a total of 482 (0.13%) cases occurred in the dry season while 696 (0.20%) occurred in the rainy season. Highest prevalence rate of 0.60% occurred during the rainy season of 1988 with no reported case during the dry season of 1994 (Table II). Though the prevalence rate of CBPP is higher (0.20%) in the rainy season than the dry season (0.13%), the difference is statistically not significant ($P>0.05$). The number of outbreaks rose from 1988 and

peaked in 1990, then declined sharply in 1992 maintaining a plateau till 1994 from where it rose again in 1995, dropped in 1996 before rising in 1997 (Figure 3).

Meanwhile, a total of 3,875 cattle were examined at postmortem between January and July 1998. Out of this number, 57 (1.5%) had lesions suggestive of CBPP and 41 (1.1%) of these suspected lung samples were positive when tested using the AGPT (Table III). Pleural exudates from the same animals were also tested using the same technique which gave lines of identity showing that the samples were positive for CBPP antigen.

TABLE I. Situation of Contagious Bovine Pleuropneumonia in Borno State (1988-1997).

Year	Total No. of animals slaughtered	Male	Female	Total No. of cattle with CBPP lesions	Total No. of animals vaccinated	Outbreaks reported	Prevalence of CBPP (%)
1988	31,572	17,002	14,510	243	488,058 (10.8)	5	0.77
1989	31,903	17,446	14,457	173	225,705 (5.0)	6	0.54
1990	36,462	18,274	18,188	230	422,851 (8.9)	8	0.63
1991	40,311	20,130	20,181	49	274,525 (6.1)	3	0.12
1992	38,822	17,754	21,068	151	121,381 (2.7)	1	0.39
1993	31,020	14,440	16,580	40	214,640 (4.8)	1	0.13
1994	39,203	19,172	20,031	30	313,913 (6.8)	1	0.08
1995	32,347	15,427	16,920	121	127,530 (2.8)	4	0.37
1996	38,586	19,792	18,794	67	109,519 (2.4)	2	0.17
1997	35,519	23,343	12,176	74	66,398 (1.5)	6	0.21
Total	355,745	182,780	172,905	1,178	2,344,520	37	0.33

() Figures in brackets are the percentage vaccination coverage.

TABLE II. Seasonal prevalence of CBPP slaughtered cattle in Borno State (1988-1997)

Year	Total number of animals examined	Total number of animals with CBPP lesions	
		Dry season	Rainy season
1988	31,572	52 (0.16)	191 (0.60)
1989	31,903	116 (0.40)	57 (0.18)
1990	36,462	113 (0.31)	117 (0.32)
1991	40,311	26 (0.06)	23 (0.06)
1992	38,822	77 (0.20)	74 (0.19)
1993	31,020	17 (0.05)	23 (0.07)
1994	39,203	0 (0)	30 (0.08)
1995	32,347	39 (0.12)	82 (0.25)
1996	38,586	23 (0.07)	39 (0.10)
1997	35,519	14 (0.04)	30 (0.08)
Total	355,745	482 (0.13)	696 (0.20)

Figures in brackets are the percentage prevalence rates

TABLE III. Prevalence rate of CBPP in animals slaughtered in Maiduguri abattoir using AGPT (January to July 1998).

Month	No. of animals Examined	No. of animals showing lesions suggestive of CBPP	No. of animals positive with AGPT	Prevalence rate (%)
January	503	12	9	1.8
February	883	6	3	0.3
March	487	10	8	1.6
April*	267	0	0	0
May	467	6	4	0.9
June	525	11	7	1.3
July	743	12	10	1.3
Total	3,875	57	41	1.1

*None of the animals examined had lesions suggestive of CBPP.

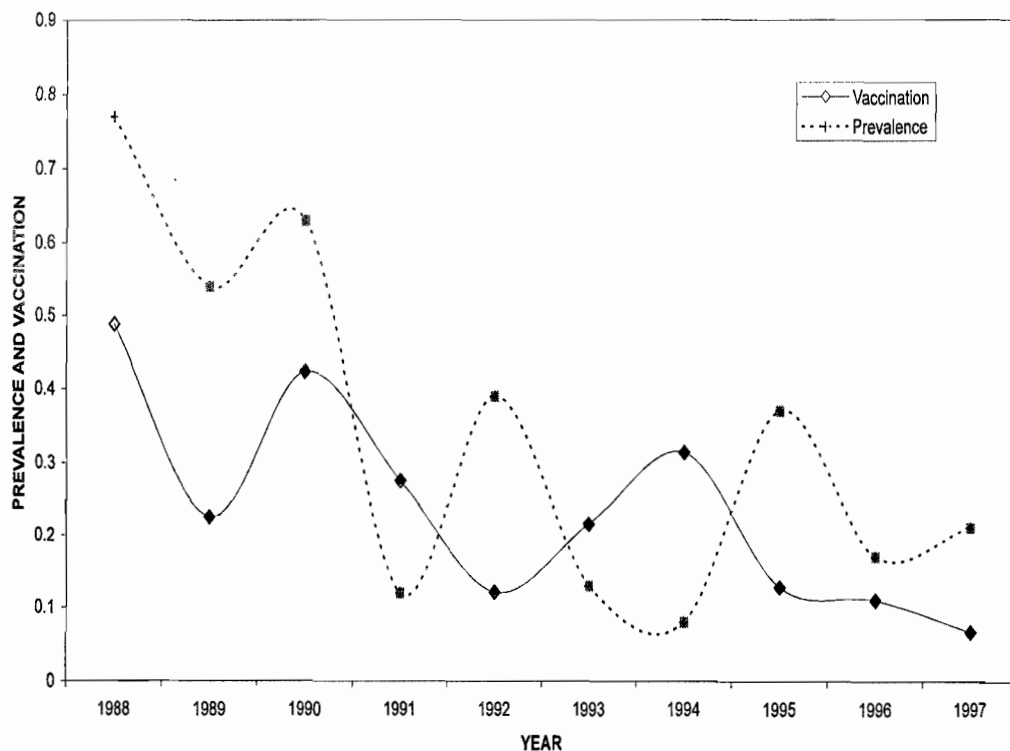


Fig.1 Prevalence of CBPP and total animals vaccinated for the periods (1988-1997)

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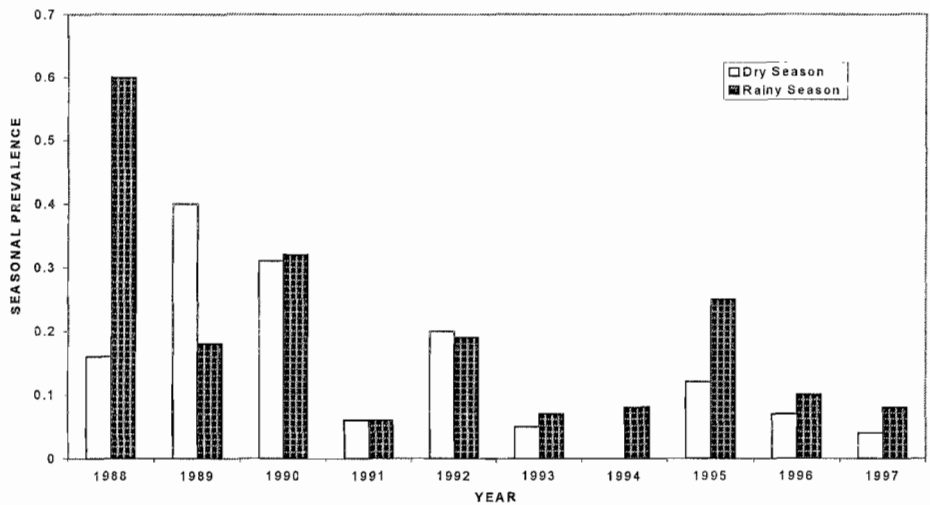


Fig. 2 Seasonal prevalence of CBPP in Maiduguri, Borno State (1988-1997)

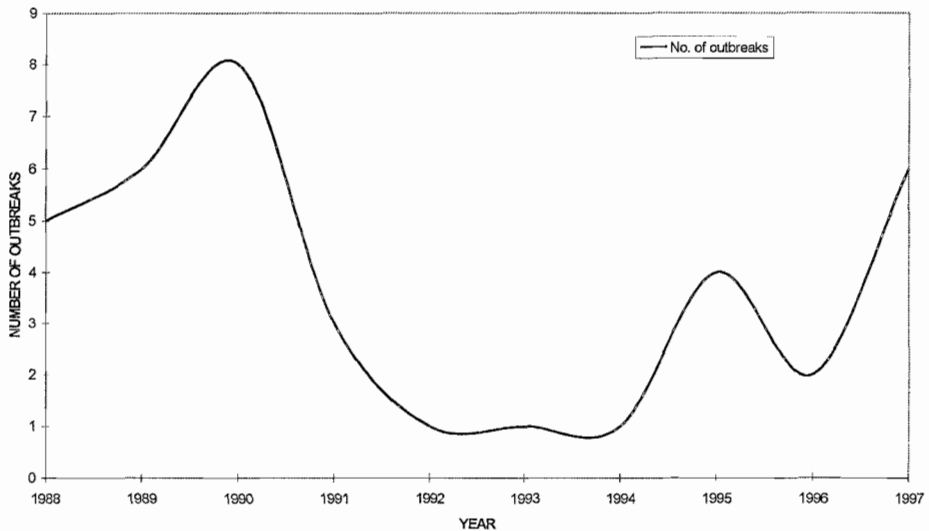


Fig. 3 Reported outbreaks of CBPP in Borno State (1988-1997)

DISCUSSION

The result of the present study shows that CBPP is still endemic in Borno State with an overall prevalence rate of 0.33%. However, a higher prevalence rate of 1.1% was recorded in a study carried out between January and July 1998 using agar gel precipitation test (AGPT). These findings are in agreement with earlier reports by Nawathe (1992) and Ameh *et al* (1995) where they reported prevalence rates of 0.6% and 0.7% respectively. The continuous prevalence of the disease in Borno State can be attributed to poor vaccination coverage (Ameh *et al*, 1988), lack of proper control of the continuous migration of cattle from the enzootic areas of the neighbouring French speaking countries (Chad, Cameroon and Niger) and the insidious nature of the disease which hinders its early diagnosis. The prevalence of the disease has reduced over the recent past though not significantly. This may not be unconnected with slaughtering of affected cattle by owners outside the abattoir or concealment of affected animals due to unpopular control measures.

Generally, more cases occurred during the rainy season (0.20%) than the dry season (0.13%). This is in agreement with the observation made by Egwu *et al* (1996) while in contrast Nwanta and Umoh (1992) showed that more of the cases occur during the dry season when animals come in contact with healthy susceptible animals as they converge at rivers or drinking pools. The higher prevalence recorded during the rainy season may be due to huddling in groups as a result of cold weather especially at nights and the stocking of cattle by the owners which enhances transmission. However, the difference in prevalence rates between the two seasons was not statistically significant. This invariably means that more cases can equally occur during the dry season in Borno State.

The present study has shown the endemic nature of CBPP in Borno State with a total of 37 outbreaks during the period under review despite the control measures adopted. Similar observations were made by other workers (Griffin and Laing, 1966; Nawathe, 1992; Ameh *et al*, 1995). Highest number of outbreaks correlates with high number of

animals vaccinated as observed in this present study. This may be due to the high number of animals being vaccinated in the face of outbreaks. However, post-vaccination reaction can also lead to outbreaks with occasional explosive outbreaks occurring and this can be attributed to synergistic effects of malnutrition and secondary infections of parasitism and dermatophilosis (Osiyemi *et al*, 1985).

Vaccination was grossly inadequate with highest coverage (10.8%) in 1988 while lowest vaccination coverage (1.5%) was in 1997. With this trend, the control of this disease especially in Borno State will be very difficult if not impossible. Finance, logistics and ignorance on the part of herd owners may be responsible for this. Highest vaccination coverage with corresponding high prevalence as observed in 1988 may be due to vaccination failure resulting from improper handling such as exposure to high temperature and agitation (Garba, 1980).

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