STRATEGY OF THE CBPP ERADICATION IN THE WESTERN PROVINCE OF ZAMBIA

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Abstract

Contagious bovine pleuropneumonia (CBPP) is one of the economically most important diseases in Africa, being widespread from west, central and east part of continent. In Zambia which was free from this disease in late 70ties, due to civil unrest and non-observance of veterinary measures, disease was spread especially in the Western Province. Paper describes epizootological activities streamed to eradicate disease by pushing up it to Angola boundaries. Up till now, due to lack of finances 6,620 heads of cattle were examined in the area of lowest incidence. Prevalence 2.05% was found.

Key words: contagious bovine pleuropneumonia, cattle, Zambia, clinical examination, post-mortem examination, ELISA, CBPP eradication.

INTRODUCTION

CBPP is a respiratory illness characterized by the presence of sero-fibrinous, interstitial pneumonia, interlobular oedema and hepatisation giving a marbled appearance of the lung and capsulated lesions termed sequestra in the lungs of affected cattle. The occurrence of subacute, symptomless infections and chronic carriers after the clinical phase of the disease create major problems in the control of this disease. CBPP is present in the Middle East, Asia, and is now considered the most significant disease of cattle in Africa.

The causative agent of CBPP is *Mycoplasma mycoides subspecies mycoides* SC (small colony); the first mycoplasma to be described. Phylogenetically it is a member of the *Mycoplasma mycoides* cluster which are pathogens of ruminants.

The Consultative Group on CBPP was reconvened for the first time in over 25 years in October 1998 by the FAO/OIE/OUA (1998) to discuss the deteriorating situation of the disease in Africa, where an alarming spread of the disease was seen along two fronts: one in the east where it had invaded, the north of Zambia threatening Malawi and Mozambique; and the other on the south-west where CBPP appeared after a long absence in Botswana in 1995 and subsequently in west Zambia. Simultaneously, the incidence of CBPP continues to increase in the endemic areas of West and Central Africa as well as in the Horn of Africa.

In Zambia, there it is as the major cause of disease spread war in Angola considered (Sovják and Hudečková, 2005a). CBPP is now considered as the most important threat to the cattle industry in Africa.

It was noted that the insufficiency of veterinary services which led to a lack of epidemiological knowledge, the inadequacy of control systems and regional coordination at the time of civil unrest contributed to the endemicity of CBPP.

In Zambia, country where CBPP with substantial FAO assistance was eradicated in late 70ties, the reasons for the increase in CBPP incidence relate specifically to reduced funding for vaccination, possibly linked to the success of the rindepest campaign, changes in vaccines and vaccine usage, cost recovery for CBPP vaccination and reduced disease surveillance. In addition, the usual generic problems contribute: severe droughts leading to changes in cattle movements; war and civil unrest; and even reduction in hostilities leading to the destruction of fences and increased border movements of cattle, as seen recently in Botswana and Zambia (Amanfu *et al*., 1998; Sovják and Hudečková, 2005a).

The economic effects of CBPP are enormous, resulting in heavy losses in cattle population. Susceptible herds may show up to 100% morbidity with mortality exceeding 50%. For example, from 1997 to date CBPP has severely devastated livestock production in Western Province reducing cattle population from 650,000 to about 400,000 herds (Sovják and Hudečková, 2005b).

Consideration of the true costs of control and eradication of CBPP in Central and Southern Africa have been detailed recently (Windsor and Wood, 1998).

There is considerable variation in the decree of symptoms seen in cattle affected with CBPP ranging from the hyperacute through acute to chronic and sub-clinical forms. Respiratory distress and coughing, evident on stimulation of resting animals, are the main signs of CBPP (Scudamore, 1995). The incubation period of the natural disease may range from 5 to 207 days although Provost *et al.* (1987) stated 20 to 40 days. In experimental infections, Regalla *et al.* (1994) reported disease symptoms appearing in cattle 40 days after contact with inoculated animals; these symptoms lasted for 20 days.

For the diagnosis and confirmation of outbreaks of CBBP it is essential the isolation and growth of *Mycoplasma mycoides subspecies mycoides* SC. It is

also a requirement of the OIE for countries wishing to declare freedom from CBPP under the recommended standards for epidemiological surveillance systems for the disease (OIE, 1997).

MATERIAL AND METHODS

Investigations leading to a conclusive decision were relied on a combination of the following activities:

1. Epidemiological investigation to obtain a general picture of the way the disease has behaved in the herd;
2. Clinical examination: how the animals of a herd are affected by the disease;
3. Post-mortem examination to observe the characteristic lesions in organs of dead and/or slaughtered animals;
4. Laboratory examination to confirm the presence of infection.

In the course of epidemiological investigation, the following questions were asked.

1. What species of animal are present on village? If domestic or wild animals other than cattle were affected a condition other than CBPP was considered.
2. What ages of cattle are affected?
3. Have the cattle been vaccinated against CBPP and when did the last vaccination take place? Which vaccine was used? How many animals were vaccinated?
4. When did the first signs of disease appear? Is this the first time that this disease has occurred? If not, what are the approximate dates of previous episodes?
5. Have other cattle been bought or introduced for any reason during the six months before the disease was first noticed? If so, from where?
6. Were replacement animals vaccinated before or after their entering the herd for CBPP or other diseases?
7. Was the herd exposed to another herd, even for a short time, during the six months before the disease was first noticed. Do nomadic herds pass through the area?
8. Is the disease known to the community?
9. Have the infected animals been treated with antibiotics? If so, which ones?
10. What are the signs observed in diseased animals?
11. How many animals are clinically sick out of the total?
12. How many animals have died since the infection occurred?
13. What is the health state in neighbouring herds?
14. Have animals been transferred in the last six months?
15. Are grazing lands, water holes, drinking-troughs or dipping tanks shared even temporarily with neighbouring farmers?

It was recognized that CBPP eradication requires high level of political commitment contributing to farmers' discipline. Farmers actually form "sanitary defence group" as breeders being first line of early warning and defence system. Therefore Steering Committee put emphasise on enlightenment and traditional government financial support.

Clinical examination

A general examination of the herd was needed to record breeds and age classes, grouping animals as under 6 months, 7 to 18 and adults. A notebook was essential to record all the findings to refer to later.
Observation of the animals at rest – it is necessary to distinguish between CBPP severely affected animals – acute cases and animals with respiratory diseases other than CBPP.
Physical examination – it is necessary to check the rectal temperature, surface lymph nodes, mouth, including to force the animals to run for a few minutes and examine them again.

Post-mortem examination

Lesions are usually confined to the chest where the presence of an accumulation of yellow fluid, uncollapsed lung and marbled lung sticking to the chest wall, are very strongly indicative of acute CBPP. Sequestra indicating the chronic stage of CBPP might not be detected without careful sectioning of the lung. In young calves only a hot painful swelling of joints might be found. Pathological lesions from Mongu slaughterhouse continuously are recorded.

Laboratory confirmation

Laboratory test of choice enzyme-linked immunosorbent assay (ELISA) measuring anti-CBPP antibodies in cattle was used.
Serum, used for antibody tests, was obtained by allowing blood to clot at room temperature and then collecting the clear liquid which was produced when the clot contracted. Separated sera were kept on ice and transported quickly to a laboratory.

RESULTS

Tab. 1. : Results of the CBPP testing

CAMP	MUNKUYE				
Crushpen	**Kraals sampled**	**+ve kraals**	**Cattle sampled**	**Sure +ves**	**Doubt -ful +ves**
Njonjolo	13	4	220	3	1
Kabanga I	10	1	185	1	
KabangaII	13	8	330	16	4
Mawilo	14	7	328	5	2
Kamalende	15	5	602	9	
Mimpongo	8		208		
Shishamba	2	2	42	5	2
Nkeyema	2	1	158	2	
Mukoma	22	5	556	6	1
Shimano	11	2	292	2	
Kankwanda	8	3	273	6	
Kalale	6	3	102	3	
Totals	**124**	**41**	**3296**	**58**	**10**
CAMP	**MBANYUTU**				
Crushpen	**Kraals sampled**	**+ve kraals**	**Cattle sampled**	**Sure +ves**	**Doubt -ful +ves**
Mipulwe	12	3	366	4	
Mulundu	3	2	169	5	3
Ilombe	3	1	129	2	
Katala	2	1	207	1	
Nalulembwe	9	2	580	1	1
Litolokelo	3	2	125	1	2
Naba	7	1	357	2	1
Totals	**39**	**12**	**1933**	**16**	**7**
CAMP	**WINDA**				
Crushpen	**Kraals sampled**	**+ve kraals**	**Cattle sampled**	**Sure +ves**	**Doubt -ful +ves**
Luambuwa	5	2	152	3	
Sibungu	11	7	448	12	
Kabilam--wandi	5	2	93	3	1
Kafwasonyi	17	9	222	13	
Kapela	5	2	74	2	
Lyandia/ Likolomani	8	2	402	10	1
Totals	**51**	**24**	**1391**	**43**	**2**
TOTALS	**214**	**77**	**6620**	**117**	**19**

Note: +ve(s) = positive(s) kraals or cattle

The prevalence of CBPP in the area of lowest incidence was 2.05%.

DISCUSSION AND CONCLUSION

Results published were obtained in relatively short period of time and cover Kaoma District only. Nevertheless they show the evidence that decision of Steering Committee to start eradication campaign from areas of lowest CBPP incidence was corresponding to proper strategy. It was also proven that plan combining marking, testing, vaccination in the Western Province of Zambia, and slaughter of positive animals is the method of choice. Cooperation with traditional government is prerequisite especially in farmers' awareness and training them to recognize disease. They have to be prepared to defence their farms, water troughs, etc. against transhumanic practices and to report any problems connected with preventive measures imported by the State Veterinary Office.

It has also been stated that both farmers and veterinary technicians have to be trained in early recognition of CBPP.

Greater financial support has to be invested into both material and technical requirements of district veterinary laboratories.

Cooperation between Angola and Zambia veterinary services, exchange information and building Veterinary Border posts is required.

Technical problems in 2006 made a great hindrance in continuation of CBPP project and as to authors opinions the best solution purchase of vaccine and test, together with research-survey resulting in data concerning morbidity, mortality, slaughter findings, disease course, outbreak duration, promptness of disease detection and response, clinical picture and losses. Steering Committee meeting should be held as soon as possible to approve plan for 2007.

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