



Contagious bovine pleuropneumonia (lungsickness)

Contagious bovine pleuropneumonia (CBPP) or lungsickness is one of the major diseases which pose a threat to cattle in Africa. The disease is mainly characterised by lung lesions in affected cattle.

CBPP is caused by *Mycoplasma mycoides mycoides* SC. *Mycoplasma* spp. mainly affect the mucous membranes and joints. Infections with *Mycoplasma* spp. are invariably associated with the respiratory and urogenital tracts, udder and eye.

The clinical disease only occurs in cattle and water buffalo.



An emaciated bovine with lungsickness

How was CBPP introduced into southern Africa?

CBPP was introduced into South Africa by the importation of infected bulls from Holland in 1853. It has killed many thousands of cattle during the period immediately thereafter. The extensive use of draught oxen has been regarded as the major cause of the rapid spread of the disease.

The whole of Angola was infected by 1914. The occurrence of rinderpest at the turn of the century resulted in the death of many CBPP-infected cattle.

The disease was eradicated in South Africa, Zambia and Zimbabwe, but still persists in Angola, northern Namibia and northern Botswana.

Transmission of the disease

CBPP is transmitted by direct contact (*droplet infection*) with diseased cattle or subclinical carriers. Even under extensive conditions, the gathering of animals at watering places or kraaling at night will lead to outbreaks and will maintain the disease in a herd.

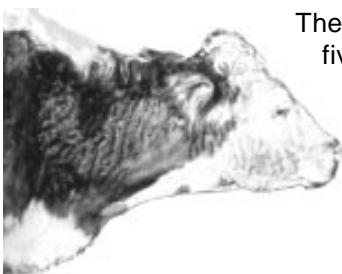


CBPP can be transmitted easily at watering places

This disease may spread insidiously in a herd and may not be detected for several weeks or months after infected animals have entered an area. Some animals also have a degree of resistance to the disease and those surviving CBPP are even more resistant.

Symptoms of CBPP

The symptoms of CBPP are the result of lung lesions caused by the disease. Affected cattle develop a fever, are listless and have difficulty in breathing. Moist coughs and nasal discharge occur.



An affected animal experiencing difficulty in breathing (note the typical extension of the neck)

The incubation period varies from five days to more than three months depending on the severity of the exposure.

Cattle may develop an acute, subacute or chronic form of the disease. Subacute lesions are more localised and less extensive. An infrequent cough may be present. Chronic cases are emaciated and coughing often occurs when the animal rises. Pulmonary lesions do not develop in young animals, but signs of arthritis are often manifested.

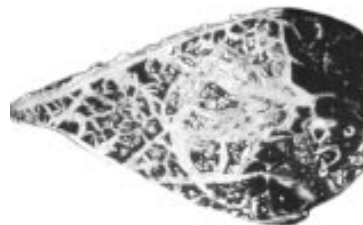


Nasal discharge in a cow with lungsickness

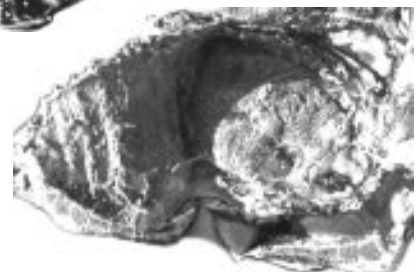
The course of the disease is usually one to three weeks. Recovered animals retain sequestra in the lungs in which the infection remains latent. Stress may cause relapses.

Pathology

- ✦ Emaciation.
- ✦ Pleural effusion may exceed 10 l.
- ✦ Fibrinous pleuritis.
- ✦ Areas of consolidation in the lungs (fibrinous pleuropneumonia).
- ✦ Distension of the interlobular septa with lymphangiectasis.
- ✦ Infarcts in the lungs as a result of thrombosis of intralobular arteries are common.
- ✦ Sequestration of infarcts after encapsulation with connective tissue.



Severe distension of the interlobular septa in a lung section affected with CBPP



Severe fibrinous pleuritis

Serofibrinous pericarditis, polyarthritis and tendosynovitis may also be seen. Kidney infarcts are not uncommon.

Diagnosis

In an outbreak a presumptive diagnosis is based on clinical signs and necropsy findings. The introduction of, or contact with, new animals is also an important consideration in establishing a diagnosis at this early stage.

The following samples should be submitted for laboratory diagnosis:

✚ At necropsy

- pleural exudate and/or affected lung tissue on ice (aseptically collected)
- affected portions of lungs in 10 % buffered formalin.

✚ In the live animal

- serum.

Serology tests, usually the agar gel precipitation test, to detect antigen (Galactan) in CBPP during and for some time after the acute stage of the disease, can be carried out. Other tests include radial immunodiffusion, counter-immuno-electrophoresis and immunofluorescent antibody techniques.

The detection of antibodies is most commonly done by means of the complement fixation (CF) test. This test is highly specific and false positive reactions are rare. False negative reactions may, however, occur because of the low sensitivity of the test. Passive haemagglutination (PHA) is only reliable for a herd diagnosis. The enzyme-linked immunosorbent assay (ELISA) enables antibodies to be detected for up to two years after vaccination. Nonspecific results may occur with this method because of the high sensitivity of the test.

Differential diagnosis

- Pneumonic pasteurellosis (usually *P. haemolytica*)
- Haemorrhagic septicaemia caused by *P. multocida*
- *Actinobacillus* in lungs
- *Echinococcus* cysts
- East Coast fever
- IBR (bovine herpes I).

Control

The control of CBPP depends on the specific epidemiological situation. The following control measures apply in African countries:

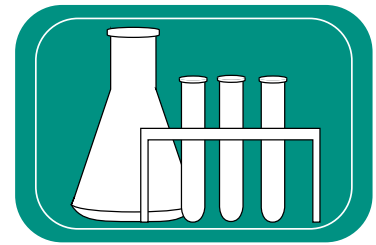
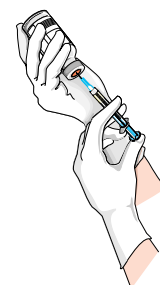


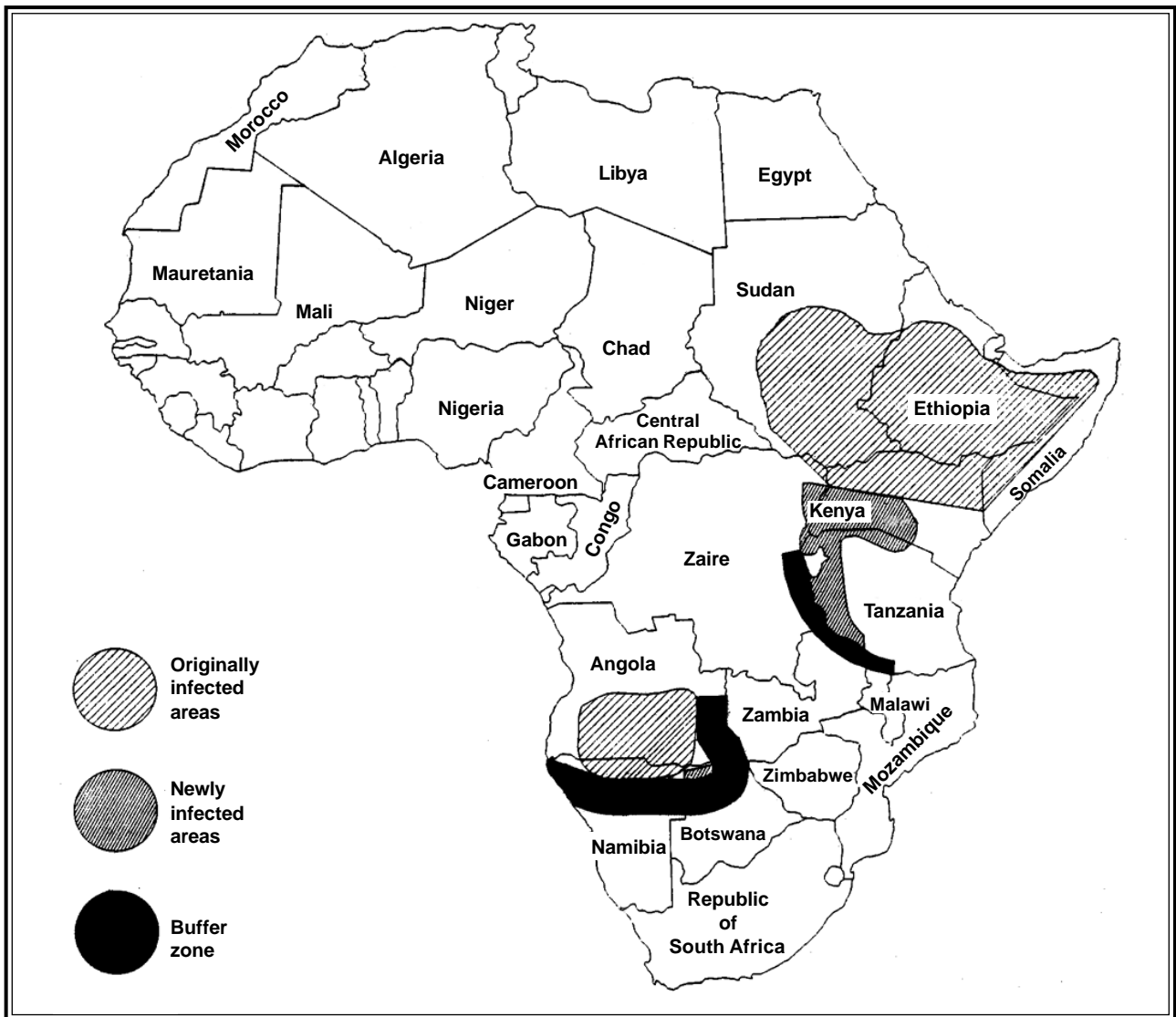
- ✚ Slaughtering of cattle when CBPP spreads to disease-free areas.
- ✚ Vaccination and movement restrictions in endemic areas.
- ✚ Quarantine and serological testing in specially designated control areas.

Although *Mycoplasma* spp. are sensitive to various antibiotics, chemotherapy is not used in the control of CBPP in order to prevent the development of a carrier state. Contrasting opinions, however, exist on the role of antimicrobial therapy in the control of CBPP. Antibiotics are used to treat postvaccine reactions.

Vaccination

- Live attenuated vaccines are currently used
- Pregnant cows should not be vaccinated
- Calves younger than six months should not be vaccinated (local reactions, arthritis and synovitis)
- Vaccination will only be effective if it is administered to all prescribed animals in a population for an adequate period.





Distribution of CBPP in eastern, central and southern Africa

Status of the disease

Eastern, central and southern Africa are divided into the following areas based on available epidemiological information:

CBPP-infected zone

Angola:	} the whole country
Tanzania:	
Rwanda:	
Uganda:	
Kenya:	Narok and Kajiado districts in the south (the area north of the 1°- parallel)
Zaire:	Ituri district
Sudan:	} mainly the south of the country
Ethiopia:	
Somalia:	

Three areas can be recognised within the infected zone for control purposes:

- active infection areas (the "newly" infected areas)
- old, established, endemic areas
- currently disease-free high-risk areas within the infected zone.

CBPP-free zone

High-risk areas

- ✂ Kenya (central) ✂ Burundi ✂ Zaire (Shaba district)
- ✂ Malawi ✂ Zambia ✂ Mozambique
- ✂ Namibia (south of the cordon fence) ✂ Botswana

Lower-risk areas (still considerable risk)

- ✂ Zimbabwe ✂ South Africa ✂ Swaziland ✂ Lesotho

Future control measures in Africa

In an EMPRES concept paper, *The emergency control of contagious bovine pleuropneumonia (CBPP) in southern and eastern Africa*, the following measures were recommended in accordance with

- proposals for the control of the disease by the subcommittee of the FAO/OIE/OAU expert panel on CBPP
- the OIE recommended standards for epidemiological surveillance systems for CBPP, and
- the FAO EMPRES workshop on CBPP (Tanzania, July 1995).

Buffer zone

The establishment of a buffer zone is necessary to separate the infected areas and those under threat. This buffer zone will consist of two components, namely a surveillance and a control zone.

Surveillance zone

This area covers at least 50 km on the disease-free side of the international border where

- movement of animals is controlled
- intensive surveillance is practised
- animals are not vaccinated, as this will mask the presence of the disease.

During an outbreak

- the affected animals should be slaughtered
- the source of infection must be traced
- contact herds should be tested.

This area might revert to a control zone if outbreaks persist.

Consideration should be given to antibiotic treatment of all cattle moving from the surveillance zone (nonvaccinated) to the clear areas.

Control zone

This area covers at least 100 km on the infected side of the border where

- animals are vaccinated
- surveillance is practised
- movement of animals is controlled.

In case of an outbreak in this zone

- clinically affected cattle should be slaughtered
- surviving animals should be vaccinated and quarantined
- surrounding herds should be inspected and revaccinated if free from clinical disease.

Infected areas

Eradication of CBPP from these countries is a long-term prospect with the first priority to control the disease in infected countries or areas that present an immediate threat to clear areas.

Various areas in a country should therefore be prioritised with regard to control measures, depending on the movement of cattle.

These measures include:

Movement control

- Quarantine
- Health certification (free from clinical disease and current vaccination status).

Vaccination

- Increased resistance but may not prevent individual animals from becoming infected
- It will gradually eliminate infection, but only if vaccination cover of about 100 % is achieved.

Slaughtering of infected herds

- Possibly the quickest way to eradicate the disease if accompanied by effective movement control
- These herds are identified by inspection (clinically affected) and serology (subclinical infection)
- Because of the costs this is usually a last-resort strategy to be used in critical epidemiological situations eg outbreaks in surveillance zone.

Effective standards

National authorities should ensure effective standards for control and eradication.

Disease-free territories

Many areas in Africa are free from CBPP, but are under a continuous threat of the disease because of legal and illegal moving of cattle. Disease awareness, effective surveillance systems and contingency plans are important in these areas. Attention should be given to the following aspects:

- The training of veterinary staff and livestock owners to recognise clinical signs of the disease
- Abattoir inspections remain one of the most effective ways to detect CBPP
- The collection of appropriate samples for diagnostic purposes
- Appropriate monitoring systems to obtain the available information
- Contingency planning (based on the epidemiological characteristics of CBPP).

References

COETZER J.A.W., THOMSON G.R., TUSTIN R.C. 1994. Infectious Diseases of Livestock 1485–1494: Oxford University Press, 1994.
REPORT OF THE JOINT FAO EMPRES AND OAU IBAR REGIONAL WORKSHOP. Contagious bovine pleuropneumonia (CBPP): prevention and control strategies in eastern and southern Africa, July 1995.

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