Contagious bovine pleuropneumonia (CBPP)

Author: Dr. Mary-Louise Penrith


Licensed under a Creative Commons Attribution license.

INTRODUCTION

Since the global eradication of rinderpest was declared in 2011, contagious bovine pleuropneumonia (CBPP) has been considered the most serious disease of cattle. It is an acute, subacute or chronic disease that affects only cattle and occasionally water buffalo (Bubalus bubalis). It is caused by a mycoplasma, Mycoplasma mycoides subspecies mycoides Small Colony (MmmSC). Cattle suffering from the acute to subacute disease develop serofibrinous pleuropneumonia and severe pleural effusion. In animals that develop the chronic form of the disease or recover from acute disease persistent pulmonary sequestra occur but their ability to transmit the disease is uncertain.

Mycoplasma mycoides subsp. mycoides SC is a pleomorphic bacterium that grows under aerobic and anaerobic conditions. It belongs to a group of closely related mycoplasmas known as the mycoides cluster that are all ruminant pathogens. Genetic studies indicated that the cluster became established and spread approximately 10,000 years ago, coinciding with the domestication of livestock.

Contagious bovine pleuropneumonia was first described in Europe in 1564 and has, with the exception of South America and Madagascar, occurred throughout the world. It has been eradicated in North America, Australia, Europe, and probably in Asia, as the last definite reports of CBPP to OIE from Asia were from Afghanistan in 2002 and Saudi Arabia in 2005, although reports of suspicion of CBPP, apparently either not confirmed or negated, emanated from Mongolia in 2005 and Afghanistan in 2009. The two outbreaks in Saudi Arabia may have been linked to importation of live cattle from the Horn of Africa. The reappearance of CBPP in Portugal in 1983 and in Italy between 1990 and 1993 after a lengthy absence caused considerable consternation, and it was only eradicated from Portugal in 1999 after 85,000 cattle had been slaughtered. It is an economically important disease in sub-Saharan Africa, where it has been reported from 29 countries in West, Central, East and southern Africa in the period 2005 to 2014, an increase over the 27 countries that reported it between 1995 and 2001. The southernmost countries currently affected are Angola, northern Namibia, western Zambia, DRC and Tanzania. The presence of
CBPP is a constraint for economic and rural development and most countries lack the necessary resources to achieve control and eradication.

It is believed that CBPP was present in East Africa before the colonial era, but its introduction into South Africa is known to have resulted from a Friesland bull or bulls from the Netherlands landed at Mossel Bay in what is now the Western Cape Province in 1853. From Mossel Bay the disease was disseminated rapidly by trek oxen along transport routes throughout the country, soon reaching the northern provinces. Within two years it had killed over 100,000 head of cattle. By the time rinderpest appeared in 1896 to 1897, CBPP was widespread in southern Africa.

Namibia was infected in 1856 when a localized outbreak occurred at Warmbad in the south. This outbreak was contained by quarantine measures adopted by missionaries in the area, but further cattle introductions from either South Africa or Botswana resulted in the infection reaching the central cattle-raising districts in 1859. Very high mortalities resulted and the Herero people referred to 1860 as 'otjipunga', the year of the lung. In 1861 CBPP moved across the Limpopo River to cause heavy losses among the cattle of the Matabele in southern Zimbabwe.

The presence of CBPP was confirmed in Angola in 1888. It was probably introduced by infected cattle belonging to the Dorsland Trekkers who emigrated from South Africa and settled at Humpata in the Huila Province in the early 1880s. By 1914 the whole country had been infected, probably due to the extensive use of draught oxen. The disease also spread from Angola to Zambia, from which country it was eradicated in 1946, but it was again introduced in 1969 and resulted in 75 per cent morbidity and 68 per cent mortality in affected herds. According to OIE records it was eradicated by 1978 but was reintroduced in 1997, again from Angola, and continues to be reported regularly from the Western Province. While much of East Africa was considered to have been infected before the colonial era, it is reported that Tanzania (then Tanganyika) became infected for the first time in 1916 and the disease was only eradicated in 1964, but it was reintroduced in 1990 and subsequently has become widespread.

The rinderpest pandemic overshadowed the effects of CBPP and killed many CBPP-infected cattle. It was only at the turn of the century that the persistence of CBPP in southern African cattle populations again became evident, and strict control measures were introduced in most countries of the region. These were, however, hampered by other events that occurred about that time, such as the South African War, the introduction of East Coast fever, the Herero War and the 1918 human influenza pandemic. The disease was eventually eradicated from Zimbabwe in 1904, South Africa in 1924 and Botswana in 1939. However, Angola and the adjacent part of Namibia remained infected. Botswana was reinfected in 1995 from Namibia, and the disease was eradicated by 1997 by the stamping out, with compensation, of all the cattle in the northern infected area, a measure considered mandatory in order to allow resumption of beef exports to the European Union.

Angola, DRC, Namibia, Tanzania and Zambia all reported CBPP to the OIE for most years from 2005 to 2013. In Namibia the high risk areas are the districts north of the veterinary cordon fence that separates the southern, foot and mouth disease (FMD) free area from the Northern Communal Areas; the Kunene
and Kavango Districts that share borders with Angola are particularly at risk. The Zambezi District to the east of them experienced no CBPP outbreaks after 1939 until an outbreak occurred there in 2003, in spite of regular vaccination campaigns since 1997 that combine CBPP and FMD vaccination. By 2005 a survey showed that 15 herds were infected in spite of continued vaccination. The outbreak was finally eradicated after treatment of clinically affected and in-contact cattle with an effective antimicrobial was added to the control strategy.

West, Central and East Africa have in the last decades experienced increased numbers of outbreaks of CBPP, which may be the result of cessation of vaccination against rinderpest, as this was combined with vaccination against CBPP. Until that time, CBPP control was reasonably good, with few outbreaks reported. The decline in efficacy of control is also attributed to a decline in the economies of countries in sub-Saharan Africa, weakening of veterinary services and lack of investment in disease control.