

**Letter to Editor**

**The Long Road to Eradicate Rinderpest**

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Rinderpest, which means cattle-plague in German, has been recognized as a distinct clinical entity since the great European epizootic of A.D. 376 to 386. It is an infectious viral disease that is highly contagious, affecting many species of the order Artiodactyla, including ruminants of the families Bovidae, Cervidae, Giraffidae, Tragulidae, and Camelidae, and also wild and domesticated swine. In addition to severe symptoms, fears of rinderpest infection in animals arise because it has a fatality rate of about 80 percent.

The disease is described in ancient Chinese writings, historic Asian drawings, and in documents from the Roman Empire. Because it is associated with ruminants, rinderpest spread when humans transported cattle around, such as when conquerors moved herds to support their armies in the early centuries or through trade routes during colonization waves. For example, in 1889, when it entered Ethiopia, it contributed to famines that killed one-third of the country's human population, even though the microbe did not infect people.

All sorts of diseases have emerged and reemerged throughout history, often accompanying exoduses, military campaigns, and wars. Rinderpest affected the European core in the 18<sup>th</sup> century to great economic and human costs. As it hit Italy, Pope Clement XI appointed physician Giovanni Maria Lancisi to study the disease. Lancisi recommended control methods that are still valid today. In fact, by 1761, the world's first veterinary school was founded in Lyon, France, to teach Lancisi's principles and to train numerous veterinarians.

Two centuries later, in the 1920s, it again reached Europe causing massive herd losses, human deaths, and food insecurity. Even in prosperous communities that did not depend on herding for their livelihood, rinderpest turned out to be lethal because it killed draft animals and disrupted agriculture. In response to rinderpest reintroduction, in 1924, the Office International des Epizooties (OIE) was established in France to deal with rinderpest. Worldwide, the suffering that this animal disease has caused through millennia is incredible.

The world got a break when, in 1956-1957, Dr. Walter Plowright, working in Kenya, grew rinderpest virus in cultures of calf kidney cells. By the 90<sup>th</sup> serial passage the virus was stable, attenuated, and non-infectious. The resulting vaccine was selected for vaccination campaigns around the world. In 1999, Dr. Plowright was awarded the World Food Prize for his work. The 20<sup>th</sup> century saw the introduction of several successful vaccines, including the development of the polio vaccine and the eradication of smallpox.

Mass vaccinations opened discussions and ideas about eradicating rinderpest, given that the eradication of smallpox proved it could be possible to stamp out an undesirable microbe across the entire planet. In 1945, the Food and Agriculture Organization of the United Nations (FAO) was established, with rinderpest control under its remit, and, by 1994, the Global Rinderpest Eradication Programme (GREP) was created to undertake the necessary actions to consolidate gains in rinderpest control and to move towards eradication of the disease.

Vaccinations were accompanied by expansive disease surveillance. Blood samples were collected from herds to determine the extent of immunity. Also, participatory epidemiology allowed veterinarians to meet with herdsmen to ask about herd health and when they last noticed disease symptoms. This is how much of past decades have been spent: looking for new cases in domesticated and wild animals in the African continent. And finally, in 2001, based on country notifications, the last recorded outbreak of rinderpest occurred in Kenya.

Ten years after the last recorded disease event, and after much surveillance, testing, and disease freedom certifications, both FAO and OIE declared on 28 June 2011 the Global Freedom from Rinderpest. But these organizations concede that there is still a lot of work ahead in terms of post-eradication activities such as identification,

compilation, and elimination of existing laboratory samples, as well as documentation of the tasks leading to eradication. There are many lessons learnt for polio and Guinea worm disease.

In the end, there are four factors that contributed to rinderpest eradication: (1) although the virus could infect wildlife it did not have a reservoir of asymptomatic host animals capable of carrying it for prolonged periods, (2) a stable vaccine that provided good immunity was developed, (3) infection surviving animals became immune for life, and (4) there was a concerted, well-funded, and unparalleled international response to eradicate rinderpest. This is probably the most important achievement in the history of veterinary medicine.

### Helpful References

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