

# Animal Plagues, Pestilence and Pandemics

Many diseases have a devastating impact on wild and economically important animals. Deliberate or accidental introduction of animals such as cats, mice, rabbits and rats into new habitats has led them to become plagues in their own right; as predators or sources of disease. The use of animals for biological control has also produced massive unforeseen adverse effects.

## African Swine Fever

- Endemic to sub-Saharan Africa in wild pigs and warthogs. Managed by slaughter. Now spread worldwide, causing massive losses of farmed pigs.
- 1957: Established on the Iberian Peninsula, with outbreaks in France and Belgium. Spread to wild boar, and found across the Caucasus, Eastern Europe, Greece, Russia, Iran and Azerbaijan.
- 2018: Reached China in August and by September more than 38,000 pigs had been culled.
- 2020: Reached India and continues to spread.



West Nile virus has been detected in 48 species of mosquito.

## Bat White Nose Syndrome

- 2006: Found near New York and then spread across Northern America. Nearly six million bats have died and some species have declined by up to 99%.
- Caused by *Pseudogymnoascus destructans*, it disrupts bat hibernation. They rapidly deplete their fat reserves and starve to death. In Europe it does not seem to harm bats.



Rinderpest, only the second global viral disease to have been eradicated.

## Chlamydia Infection of Koalas

- Sexually transmitted, *Chlamydia pecorum* causes infertility, urinary and respiratory infections, blindness and death. Combined with drought and a concurrent retrovirus infection, it has massively reduced Koala populations.

## Chytridiomycosis

- Infections by the chytrid fungi *Batrachochytrium dendrobatidis* and *B. salamandivorans* have been linked to dramatic population decline and extinctions of amphibians in the Americas, Australia, East Africa and the Caribbean. Over 200 species have been affected and in Panama 30 species have been lost.

- American bullfrogs and African clawed toads seem to be resistant and trade in these is blamed for the spread of the disease.

## Ebola in Apes

- Ebola kills about 95% of the Great Apes it infects.
- Early 1990s: Ravaged chimpanzees in Côte d'Ivoire.
- Repeated outbreaks in the Democratic Republic of Congo have taken a heavy toll on the gorilla population.
- 2002–2003: Around 5000 Western Gorillas died.

## Facial Tumour Disease of Tasmanian Devils

- A rapidly fatal contagious cancer transmitted by bite. Causes tumour growths on the Devils' faces, which then metastasise. In some areas has killed >90% of Devils.
- 1996: First record; believed to have begun in a mutated Schwann cell in a single animal.

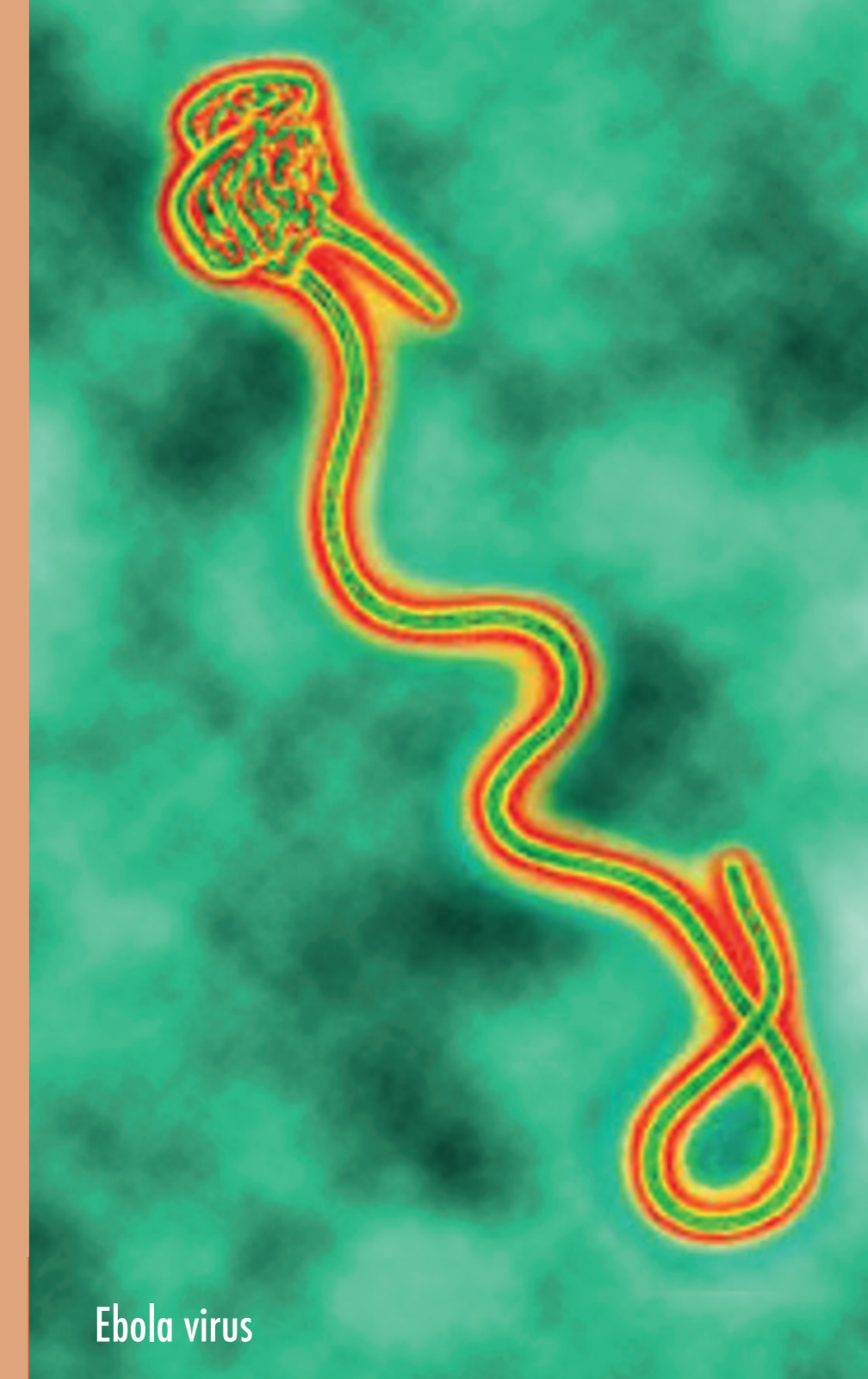
## Foot and Mouth Disease

- Debilitating and sometimes fatal viral infection of cloven-hoofed animals, including domestic and wild bovids, sheep and goats, and wild animals including elephants and hedgehogs.

- Highly contagious, it has severe implications for farming as control is often by culling. Spread by infected animals and contact with contaminated equipment, vehicles, clothing and feed.
- USA: Nine major outbreaks occurred between 1870 and 1929.
  - 1914–1929: Three major outbreaks resulting in the death or slaughter of thousands of cattle, sheep, swine and deer.
  - 1929: Outbreak originated in hogs that had eaten infected Argentinean meat from a tourist ship.
  - 1946/7: Texas proposed an animal-proof wall, to prevent infected animals from crossing from Mexico, but managed to eradicate the disease without it.
- United Kingdom:
  - 1967: Infected lamb from Argentina and Chile led to the slaughter of 442,000 animals and an estimated cost of £370 million.
  - 2001: More than 2000 cases led to six million animals being killed to halt the disease.
  - 2007: Outbreak in Surrey caused by vaccine-like strain '01 BFS67', which was used at the Institute of Animal Health, 4 km from the outbreak. Further outbreaks occurred in nearby farms, and all at-risk animals were culled. Windsor Great Park was closed as it contained deer.
- China, Taiwan, Japan and Korea have also experienced major outbreaks.



Foot and mouth disease is highly contagious and has severe implications for farming as control is often by mass culling.



Ebola virus

## Rinderpest

- A devastating viral disease of cattle and even-toed ungulates with mortality approaching 100% in immunologically naïve populations. After a global eradication campaign, the last confirmed case was diagnosed in 2001. Only the second global viral disease to have been so eradicated.
- Measles and canine distemper, which have caused devastation in naïve populations, possibly emerged from rinderpest around 600 BCE.



Rinderpest in cattle

## Sarcoptic Mange

- The parasitic mite *Sarcoptes scabiei*, a close relative of that which infests humans, affects over 100 species, including wombats, red foxes, lynx and wolves as well as domestic dogs. Mange does not appear to have a long-term effect on numbers but can be catastrophic for populations that are isolated or fragmented. It is believed to have wiped out the foxes on Bornholm.

## Sylvatic Plague in the USA

- *Yersinia pestis* can wreak havoc in the animal kingdom. It arrived in North America in around 1900 on ships from Europe and Asia carrying rats, which passed it on to the local wildlife. Entire colonies of prairie dogs have been wiped out and 90% of black-footed ferrets, their predators, have been lost. Transmission to humans occurs.

## West Nile Encephalitis

- 1999: The mosquito-transmitted West Nile virus was isolated from patients with encephalitis in New York. At the same time several crows in the city and birds at the Bronx Zoo died of this African and Asian disease. Millions of birds in North America have since died and it has been detected in 48 species of mosquito, 250 birds and horses.

## Pestilence, Plague and Pandemics: A Troubled History

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