

Vindication of the Rat

Feb 7, 2008, was New Year's Day of the Year of the Rat, beginning anew the 12 year cycle of the Chinese calendar. People born in the year of the Rat are said to be leaders, pioneers, and conquerors. They are charming, passionate, charismatic, practical, and hardworking. The rat is the legendary bringer of rice to humanity. Students of medieval history are more likely to associate the rat with pestilence and death as the living arks which brought fleas infected with bubonic plague to Europe and beginning a pestilence responsible for the death of a quarter of the population of Europe. However a pair of researchers from the UK have an alternate theory that may well proclaim rats and their infamous fleas as innocent of bringing the Black Death to Europe.

Most references on the plagues of the middle ages implicate bubonic plague caused by the bacteria *Yersinia pestis* as the source of the Great Plague of the 14th century. Susan Scott and Christopher Duncan of the University of Liverpool in England published two books in 2004 and 2005 which present a compelling theory that the Black Death was in fact caused by a virus in the family of diseases known as hemorrhagic fevers.

The books are *Biology of Plagues: Evidence from Historical Populations*. (Cambridge University Press, 2005) and *Return of the Black Death: The World's Greatest Serial Killer* (Wiley, 2004). *Biology* is a technical report aimed at epidemiologists and other disease-tracking scientists while *Return* is written for a more general population.

Hemorrhagic fevers are common diseases in many parts of the world. Travelers to the tropics may receive a vaccination for Yellow Fever. Just a century ago Yellow Fever was a major killer and responsible for many deaths among workers digging the Panama Canal. Another hemorrhagic fever is Ebola made famous by the movie *Outbreak* and Tom Clancy's novels *Executive Orders* and *Rainbow Six*. (You can even purchase your very own cuddly Ebola virus plush toy at www.giantmicrobes.com.) Other examples of hemorrhagic fevers are Rift Valley Fever, Marburg virus, dengue fever, and Hanta virus.

Scott and Duncan argue that the pattern of spread of the Black Death does not match the biology of plague transmission. The pattern of the disease spread is more typical of a disease transmitted by direct person-to-person contact rather than one passed on by fleas. Evidence suggests that the disease causing the Black Death had a long time period between the person becoming infected and showing signs of disease (though it could probably be passed on before any symptoms develop). This would explain how the ships from the Far East could bring infected people (or rats for that matter) on a several-week sea journey without killing all on board. It would also let people who had been infected travel to other towns. If they had shown signs of the disease, they would have been quarantined. The villages and hamlets away from ports were far enough apart that rats would not travel the distance between population centers.

The authors state

"It is impossible that *Yersinia pestis* could have been the causative agent of the Black Death. The epidemiology of the Great Pestilence...is completely different from the biology of bubonic plague, which is critically dependent on a pre-established enzootic¹/epizootic² in rodent

¹ Endemic in an animal population

² New disease cases in an animal population

populations (both susceptible and non-susceptible species in dynamic balance) throughout mainland Europe and Britain, Iceland, the Channel Islands, Ireland, and Greenland. Only the black rat³ was available and it would have been confined to warmer climates or to close proximity to humans at seaports. It is inconceivable that the Black Death could have spread via rodents over such vast distances so rapidly, particularly across the sea.” (Biology of Plagues, p. 108).

Though these books put forth a good argument for the cause of the plague, we may never be able to get the definitive answer on the cause of the Black Death. At least for this Year of the Rat, we can give our rodent friends the benefit of the doubt.

³ The Black Rat (*Rattus rattus*) only lives in tropical climates and when transported to cooler climates has not been found more than ¼ mile inland from the seaports. The Brown Rat (*Rattus norvegicus* [**not** from Norway – see the special features on the DVD for the Disney movie *Ratatouille*]) was not introduced into Europe until the 18th century.