

A History of Germs

THE BLACK DEATH



JIM OLLHOFF



WHAT CAUSED THE PLAGUE?



The cause of the Black Plague wasn't discovered until 1899. It was a bacterium called *Yersinia pestis*. It lived in the digestive system of fleas. The fleas lived on rats. When the rats died, the fleas went looking for more food. When the fleas bit people, the bacteria were injected into their bloodstream. Then, victims infected others by coughing near them, or even breathing.

There were actually three different types of the plague, even though they are often lumped together and called "the bubonic plague."

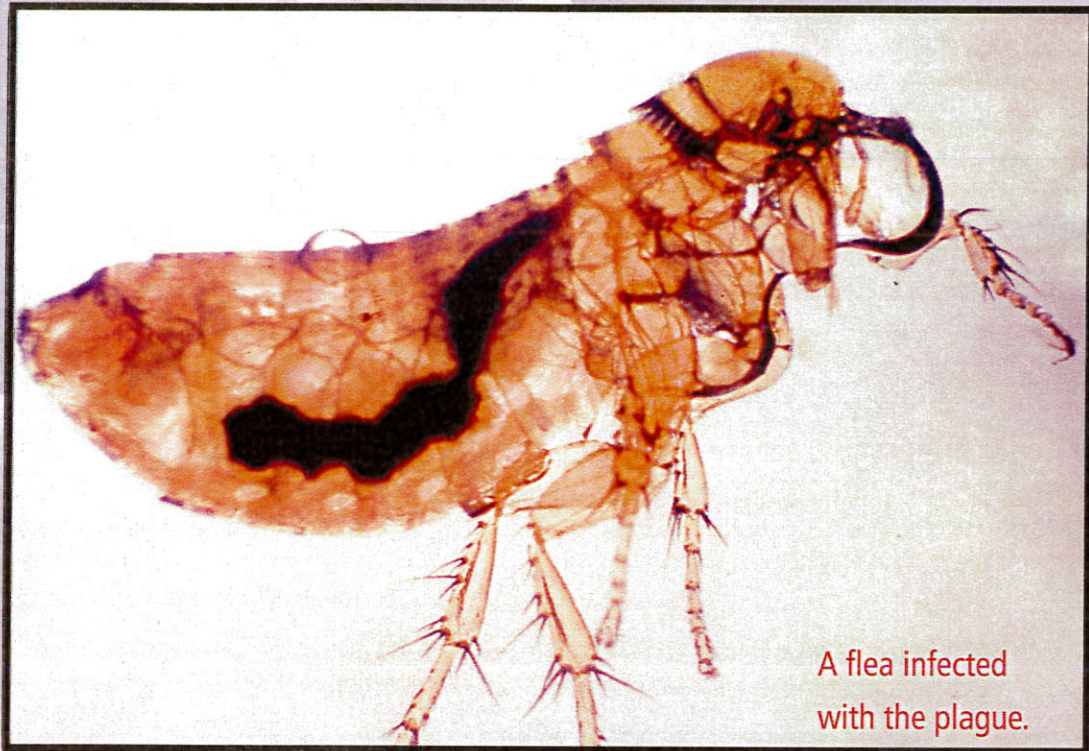


An image of the plague bacteria *Yersinia pestis*. This bacteria causes bubonic plague.



A 14th-century image of a physician lancing a plague-caused bubo. These blackened swellings appeared on the neck, armpits, and other areas.

The bubonic plague was the most common, and the most survivable, of the three types. About 30 percent of those who got the bubonic type died. The bubonic plague was named after a symptom called buboes, which were blackened swellings on the neck, armpits, and other areas.



A flea infected with the plague.

The second type was called pneumonic plague. It infected the lungs, and was very contagious when victims coughed.

The third type was called septicemic plague. Septicemia is when blood is poisoned by bacteria or toxins they produce. Septicemic plague was less common, but almost always fatal.

There were a number of other factors that made people more susceptible to the plague. There was a small climate change in the early 1300s. This caused more droughts and floods. Farm crops didn't grow as well. The resulting shortage of food left many people malnourished. When people are malnourished, they are more susceptible to disease.

Further, the shortage of food may have forced rats to move closer to humans, where there is more food. Since the rats were carrying the fleas with the plague, more people got sick.

Another factor was that cities were growing rapidly. This meant more people had to eat. So, there were more slaughterhouses, where cattle and other animals were butchered for their meat. Large amounts of animal entrails were left lying around. This attracted rats, bringing them closer to humans.

With the growth of the cities came an increase in human waste. There were no sewers or flush toilets. Many communities' only law about human sewage was to shout, "Look out below!" before throwing a pot of human sewage into the streets. This also attracted rats, and thus made humans closer to the fleas that lived on the rats.

In rural areas, many homes were made out of thatch and mud bricks. Farm animals often lived in the same house as the people. This made easy access for rats and fleas. Bathing was uncommon, which meant lots of dirt, fleas, and lice.



Black Rat

During the plague years, ships coming into harbors were often quarantined for 40 days. This meant that no one was allowed to leave the ship in order to prevent sick people from bringing disease into the port city. People knew that the disease spread from person to person, so the quarantines might have worked a little. But rats could easily make it to shore on the ropes that moored the ships. Since the rats spread the disease, even just having a ship docked nearby could mean infection in the city.

**Plague-ridden fleas jumped
from rats to people.**

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EPIDEMICS & PLAGUES

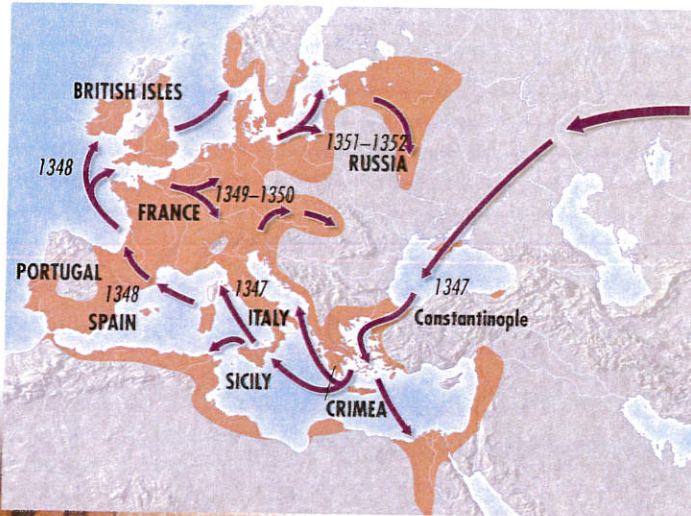
RICHARD WALKER

Model of a measles virus, spread by sneezed or coughed airborne droplets



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*Foreword by Denise Grady, science reporter for *The New York Times**



▲ This map shows the spread of the Black Death. Believed to have originated in China, it was spread by traders along caravan routes and by ship. It reached the Crimea (the southern peninsula of the Ukraine), Constantinople (modern-day Istanbul), Sicily, and Italy in 1347, spread to Portugal, Spain, and the British Isles in 1348, and then into France and central Europe in 1349–1350, finally reaching Russia in 1351–1352.

▼ This 16th-century illustration depicts the chaos surrounding the disposal of so many plague victims. There was no room to bury bodies in churchyards—and certainly not enough coffins—so hundreds of people were buried in huge trenches called “plague pits.” Although against religious rules, some bodies were burned.

The Black Death

Between 1347 and 1351, a deadly plague that became known as the Black Death spread like wildfire across Europe. Its name derives from the black swellings that were found on many of its victims, most of whom died in agonizing pain. The worst pandemic ever known, the Black Death killed at least 25 million Europeans—more than one third of the population—and changed the lives of those who survived.





▲ Bubonic plague—named because of the buboes, or swellings, that it produces—is caused by the bacterium *Yersinia pestis* (identified in 1894), which infects the black rat (*Rattus rattus*) and other rodents. It spreads to people when a rat flea, *Xenopsylla cheopis* (inset), feeds on the blood of an infected rat and then on a human.

Retribution and blame

Bewildered, terrified, and panicked by this unknown and bizarre disease, people had no idea what was causing so many people to die such horrible deaths. Some saw it as divine retribution, punishment from God for the sins of humankind. Others tried to blame other people such as lepers. Many sought protection through talismans (lucky charms), potions, self-punishment for sins committed, or other—as we now know—useless methods. In fact, the cause of the plague remained a mystery for hundreds of years.

► This 13th-century illustration shows a serf and his pigs. Serfs existed at the lowest level of the feudal system. They worked on the land, providing food and labor for their landlord in return for his protection. In turn, the landlord provided services for his knight, the knight for his baron, and the baron for his king, who owned the land. The Black Death triggered an end to this system.

Symptoms and causes

Those people who were struck down by the Black Death suffered pain, fever, and black tumors in the groin and armpits. People vomited blood, and their skin became blackened owing to internal bleeding. Death occurred within a day or a few days, and recovery was rare. It has long been accepted that the Black Death was the bubonic plague, a bacterial disease that is spread by rat fleas. But in 2001 two British scientists suggested that, because the Black Death spread so rapidly, it might have been caused by a virus similar to present-day Ebola (see page 56) that passed directly from person to person.

Social change

Whatever its cause, the Black Death changed society forever. The feudal system—in which serfs, or peasants, worked on a small area of land and paid taxes in the form of food or service to a lord—crumbled. The huge death toll produced a shortage of skilled workers, allowing surviving serfs, who had been treated like slaves, to demand wages for their labor. The newly awakened hopes of downtrodden serfs led to uprisings such as the Peasants' Revolt in England in 1381.

