

Body Lice, *Yersinia pestis* Orientalis, and Black Death

To the Editor: The letter of Ayyadurai et al. (1) reminded us of a little-known paper (2) on rats and Black Death by our colleague and mentor David E. Davis. He researched and wrote in his retirement after years of research and reflection on rat ecology and rodent-borne diseases (3,4). *Rattus rattus* is commonly recognized as the vertebrate host of flea-borne plague that swept through Europe in the 1300s, killing >50% of the population. Davis believed this explanation did not fit what he knew of the ecologic requirements of fleas and black rats. He studied reports of archeologic excavations and reviewed poems, medieval bestiaries, and paintings and concluded that these rats were scarce during the Black Death era.

His theory, based on historical information and investigative trips to Europe, was that invasive rats, if present, mostly occurred in low densities in port areas, not in rural inland areas. He noted that the expected rodent die-offs with bubonic plague were not associated with human epidemics and that rodent fleas would not have been active during winter to transmit plague. Flea-borne transmission from rodents usually causes a few deaths per household, but deaths of entire households commonly occurred in the medieval epidemics. Human-to-human transmission of pneumonic plague must have occurred, but as described by Ayyadurai et al., there was evidence of human bubonic plague, suggesting vector involvement. Davis did not present a viable reservoir/vector hypothesis for plague transmission; this and the later, well-known association of *R. rattus* and other rodents with plague throughout the world, may partially explain why his ideas received little attention. The finding that human body lice can be bubonic plague vectors suggests a mechanism for human-to-human transmission continuing during winter in inland areas and, as suggested by the authors, could also explain total deaths in households.

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References

1. Ayyadurai S, Sebbane F, Raoult D, Drancourt M. Body lice, *Yersinia pestis*, and Black Death. *Emerg Infect Dis*. 2010;16:892-3.
2. Davis DE. The scarcity of rats and the Black Death: an ecological history. *J Interdiscip Hist*. 1986;16:455-70. DOI: 10.2307/204499
3. Anonymous. Profiles of previous Wildlife Disease Association leaders: David E. Davis 1913-1994. *J Wildl Dis* 1995; 31(1-suppl):15.
4. Davis DE. The characteristics of rat populations. *Q Rev Biol*. 1953;28:373-401. DOI: 10.1086/399860

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