# A comparison between sixth-century literature and modern scientific research on the Justinianic Plague

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## Introduction

*Plague* has been used as a generic term for waves of pandemics through history, but specifically refers to the bubonic plague caused by the bacterium ***Yersinia pestis.*** The term 'bubonic' refers to the defining characteristic of ***buboes***, lumps caused by swollen lymph nodes. Between 2010 and 2015 there were only 3248 cases of plague worldwide, most of them limited to Madagascar. Plague is nowhere near as virulent as Ebola in the present day, but in the sixth century it was responsible for the death of up to half the population of the Byzantine Empire.

The origins of the plague have been hotly contested by authorities on this period. Researchers have primarily used written sources from the sixth century to investigate where the focus of plague outbreak might be. However, scientific research, albeit from a complete separate perspective, has made discoveries that help provide a more definitive answer to this question.

## Methodology

1. Reading sources contemporary to the plague.
   - Procopius' *Wars*
   - John of Ephesus' account in the *Chronicle* of Pseudo-Dionysius
   - Evagrius' *Historia Ecclesiastica*

2. An examination of scientific literature.
   - Extensive tests conducted on skeletal remains from the Aschheim graveyard (Bavaria, Germany).
   - Medical reports on plague outbreak in late 19th century India.
3. Reading secondary sources
   - Dionysius Stathakopoulos
   - Peter Sarris
   - Averil Cameron
   - Pauline Allen
4. An interdisciplinary synthesis of the previous stages.

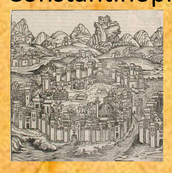
## Results

From the primary evidence it immediately becomes clear that the ancients did not have any definitive evidence of where the plague originated from. Their conclusions are based on speculation. One proposed source is Ethiopia, but this might be more a matter of classical literary convention than anything else. On the other hand, this does actually fit the secondary sources according to which there is a good chance the Justinianic Plague may specifically have originated in Africa.

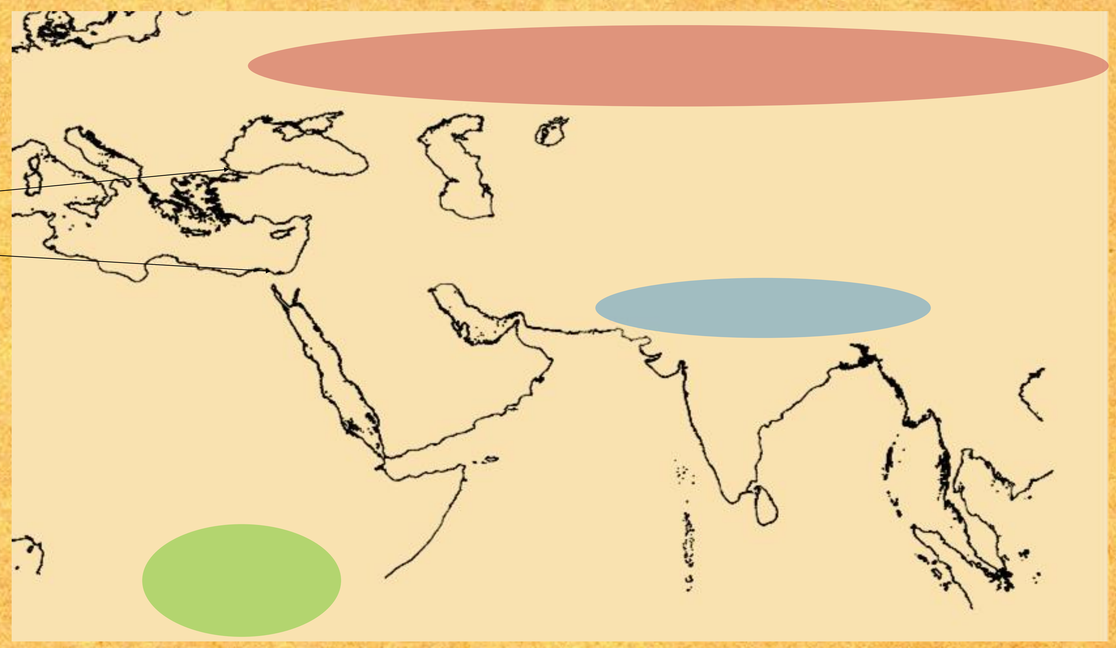
There are three possible locations for the plague origin:

i. Foothills of the Himalayas (blue)
ii. Great Lakes region in Central Africa (green)
iii. The Eurasian Steppe (red)

Constantinople



Pelusium



The sixth century writers agree that the port city of Pelusium in Egypt was the first part of the empire hit by the plague in A.D. 541. Afterwards, it spread to Alexandria and from there to the rest of the empire, eventually reaching Constantinople in A.D. 542.

The analysis of scientific literature provided a much older origin to the plague. Laboratory analysis on teeth from skeletons dated to the period of the plague confirm *Y. pestis* to be the cause. A comparison of this strain of *Y. pestis to* phenology charts loosely connects it to the 'Mongolian' strain of the bacterium. Therefore, this gives rise to the possibility of the bacterium originating in the Eurasian Steppe or in the vicinity of China. The major host for *Y. pestis* is *xenopsyllis cheopis* (the oriental rat flea) found in the black rat (*rattus rattus)*. The black rat originates from India. Given the name, it makes sense that the origins could be traced back further east. However, this does not necessarily mean the pandemic of 541 comes from this region. It is possible that many years before this outbreak, the bacterium had migrated along trade routes from India towards Ethiopia and from there further into central Africa. This would make sense in the sixth century when trade links between the east and the Axumite Empire were strong, but not in periods before this when the bacterium was more likely to have migrated.

Given the limited evidence on this plague it is also necessary to look at research on later plague outbreaks. This is possible because these outbreaks were also caused by *Y. pestis* and carried all the same characteristics found in the Justinianic Plague.

## Conclusion

The precise origins of the Justinianic plague still remain elusive to us, despite all this research . However, one major lesson to be learned is to not underestimate the primary evidence. Our prejudices incline us to think these sources are naturally biased, but in actuality the sixth century writers were surprisingly accurate. They deserve more credit. Discussions with Peter Sarris point in a similar direction: it may well be the case that the plague reached China from the eastern Roman empire (rather than vice versa).

## Acknowledgements

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## Short bibliography

Secondary sources

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- Wagner, David M. "*Yersinia pestis* and the Plague of Justinian 541-543 AD.: a genomic analysis." *The Lancet Infectious Diseases*, 14, no. 4 (April 2014): 319-326.

Images

- Map: http://awmc.unc.edu/wordpress/map-files/
- Constantinople: https://www.antipodean.com/pictures/21678.jpg?v=1478558846
- Pelusium: http://www.touregypt.net/featurestories/pelusium.htm
- Manuscript: http://www.bl.uk/manuscripts/Viewer.aspx?ref=egerton_ms_2626_f141r