

Smallpox's antiquity in doubt

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Abstract: Smallpox, caused by the variola virus (VARV), is prominent in modern histories of the ancient Mediterranean world. The disease, or the diagnosis of it, has shaped estimations of the scale and significance of epidemics and pandemics, notably the 2nd-c. Antonine plague, and the burden of disease in large cities and regions densely populated in antiquity. Here we synthesize recent paleogenetic and evolutionary biological literature that casts significant doubt on the existence of a VARV that caused a disease we would recognize – clinically, ecologically, or epidemiologically – as smallpox in antiquity. On the basis of current data, it is time archaeologists and historians began to eradicate smallpox from their histories of the ancient world.

The place of smallpox in the history of the ancient Mediterranean is rarely contested. Although Enlightenment-era physicians and medical historians debated whether Greco-Roman populations knew the disease,¹ most who commented on smallpox's history before 1850 found little reason to think it was anywhere to be found in the Mediterranean region in antiquity.² Yet, gradually, from the mid-19th c., well-known ancient plagues, like the Athenian and Antonine plagues,³ and less-discussed epidemics, like those encountered

¹ E.g., Hahn 1733; Werlhof 1735.

² E.g., Sennert 1633, 464; Sydenham 1685, 260–61; Porchon 1688, 8–9; le Clerc 1723, 776–77; Freind 1727a, 274; Freind 1727b, 188–89; Mead 1747, 2; Paulet 1768a, 2, 4, 25, 44–45, 51, 57; Woodville 1796, 4–6. Rarely have authoritative studies postdating 1850 also held that smallpox was unknown to Greeks and Romans. Some exceptions: von Becker 1879, 22, 42, 46, 49; Dixon 1962, 187.

³ Willan 1821 found smallpox almost everywhere he looked in Greco-Roman sources. Shortly thereafter Haeser 1845, 17, 78–79, 143, 251, 255, thought ancients knew the disease, though he had doubts about a smallpox identification of the Athenian and Antonine plagues and proposed smallpox is invisible in ancient texts partly because of “wie unbestimmt die Terminologie...ist.” Hirsch 1860, 214–16, initially thought “Andeutungen” of smallpox were discernible in Greco-Roman texts, but that if Galen knew the disease, he did not describe it. Later, in the second edition of his *Handbuch*, Hirsch (1881, 90–91) more confidently identified smallpox in Galen's writings. Smallpox diagnoses of ancient plagues subsequently became more numerous. Baas 1876, 147–48, considered Roman-era Mediterranean plagues possibly smallpox, but 20th-c. and post-20th-c. scholarship has repeatedly identified the Athenian and Antonine plagues as smallpox: e.g., Zinsser 1935, 122–24, 127, 137; Littman and Littman 1969; Littman and Littman 1973; McNeill 1976, 103–5; Littman 1984, 110–11, 115–16; Sallares 1991, 230, 233, 247–49; Hopkins 2002, 19–23; Zelener 2003, 83; Gourevitch 2005, 64–65; Sallares 2007, 37; Little 2007, 4; Cunha and Cunha 2008, 9–13; Littman 2009, 458–59, 464; Andorlini 2012, 16, 24; Bruun 2012, 131; Livi Bacci 2012, 341; Harper 2015, 223; Harper 2017, 67–68, 102–3, 104–7; Green 2018, 8; Harper 2018, 305–6; Harper 2021, 194; McDonald 2021, 387–91. In 2017 and 2018, Harper initially offered caution against pursuing a smallpox diagnosis, but then pursues one. For alleged artistic evidence of a smallpox diagnosis: Sabbatani and Fiorino 2009, 266.

in Aëtius of Amida's medical compendium and dated to Trajan's reign, and in Eusebius's *Church History* and fixable to 310–11,⁴ were identified as smallpox. The Cyprianic and Justinianic plagues also emerged, on occasion, in scholarship as potential outbreaks of smallpox,⁵ though those diagnoses no longer hold favor.⁶ In this paper, we synthesize recent literature in the fields of paleogenomics and evolutionary biology that casts doubt on smallpox's antiquity and, thereby, on retrospective smallpox diagnoses of ancient plagues. We draw particular attention to the Antonine plague, as a smallpox diagnosis has been assigned some significance in histories of that pandemic.

Retrospectively diagnosing ancient plagues is no straightforward matter.⁷ Without paleogenomic support, which remains hard to obtain for those disease outbreaks for which we have written sources,⁸ no modern diagnosis of a disease reported in an ancient text is unequivocal.⁹ Yet, disease identifications, no matter how disputable, have carried significant weight in histories of ancient disease, shaping our efforts to understand the demographic and economic impact, and determinants, of poor health in antiquity. A prominent example is the smallpox diagnosis of the Antonine plague. Although opinion on the diagnosis of that plague has begun to pivot in recent scholarship, as discussed below, no other ancient disease outbreak is as commonly or confidently identified as smallpox as is the 2nd-c. pandemic.¹⁰

Doubts about the Athenian diagnosis are not uncommon, despite its popularity: e.g., Leven 1991, 142–43; Papagrigorakis et al. 2008; Little 2007, 4. Fewer doubt the Antonine plague's identity. Bruun 2012, 131, 131 n. 44, has commented on the popularity of the Antonine plague's smallpox diagnosis, but earlier observed (2007, 201) that the diagnosis was not definitive. Silver 2012, 214–25, argued for plague, and Flemming 2019, 226, 232–34, offered a rare rebuke of this smallpox diagnosis, drawing in part on paleogenomic data available at the time. Littman and Littman 1973 and Zelener 2003 have been influential. So confident were Littman and Littman in a smallpox diagnosis of the 2nd-c. pandemic that they used it to argue (245 n. 7) that “smallpox seems to have undergone the least change in the course of history.” Similarly, Duncan-Jones 1996, 109, suggested the “disease environment” of the ancient Mediterranean “did not necessarily change significantly in kind between antiquity and much later times” and pointed specifically to smallpox.

⁴ E.g., Hirsch 1881, 90; Brown and McLean 1962, 765; Hopkins 2002, 22, 23; Stathakopoulos 2004, 181; Harper 2015, 247; Harper 2016, 474–75; Harper 2017, 141, 174.

⁵ In whole or in part, e.g., Willan 1821, 12–13, 16; Schnurrer 1823, 126; Zinsser 1935, 147; Hopkins 2002, 23.

⁶ E.g., Scheidel 2001b, 31; Stathakopoulos 2004, 111, 126–67; Wagner et al. 2014; Harper 2015, 245–48; Harper 2016, 474–75; Harper 2017, 141; Keller et al. 2019; Huebner 2021, 170–71; cf. Benedictow 2021, 108–11.

⁷ Arrizabalaga 2002; Cunningham 2002; Leven 2004; Stein 2006.

⁸ Considering both the current limits of paleogenomics (e.g., the commonness of false negatives and the difficulty in identifying viral pathogens, especially those containing RNA) and the problems inherent in attempting to marry what are often very roughly dated molecular results to precisely dated written records of disease outbreaks.

⁹ Marciniak and Poinar 2019, 123–24; Spyrou et al. 2019, 323, 329, 336. As Duncan-Jones 1996, 109, noted: textual limitations “make attempts to identify ancient epidemics relatively hazardous.”

¹⁰ A possible exception is the once infamous smallpox-like pandemic concurrent with outbreaks of first-pandemic plague in the 6th c.: Newfield et al. 2022. Most recently, McCormick 2021, 60, saw smallpox in Gregory of Tours's writings, which have been considered integral to the alleged 6th-c. smallpox pandemic for centuries: e.g., Paulet 1768a, 79–87; Zinsser 1935, 124–25 n. 8; Dixon 1962, 190; Hopkins 2002, 24–25. This pandemic co-occurred with plague outbreaks in