

The South American origins and spread of the Irish potato famine pathogen

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Domestic potato (*Solanum tuberosum*) infected by late potato blight (*Phytophthora infestans*), collected in Europe in 1846. Credit: Jean Beagle Ristaino

Using some ancient DNA detective work, a new study led by University of California Berkeley postdoctoral researcher Mike D. Martin and University of Copenhagen professor Tom Gilbert has linked the culprit behind the 19th-century Irish potato famine, which was transported to Europe in the 1840s, to a fungus-like organism that originated in South America.

Just how the pathogen, called *Phytophthora infestans*, made the transatlantic leap to destroy potato crops on a global scale is a "Guns, Germs, and Steel"-like tale of New World exploration and devastation published in the advanced online edition of *Molecular Biology and Evolution*.

The authors used genome sequences from 71 modern and historical samples of the microbial pathogen, a unique collection culled from worldwide private archives, to construct the ancestral tree of the pathogen. The origin of the [species](#) dates back to 1558 AD, the age when the first Europeans explored South America.

The research team further observed that the species was first introduced to 19th-century Europe shortly after it evolved and diversified. They found a close connection between a present-day sister species, *P. andina* (found only in the highlands of Ecuador and Peru) and the ancient *P. infestans* that triggered the first global outbreak in 1845 and the catastrophic Irish potato famine.

The authors speculate that after being found in South America, the

pathogen either spread from South America directly to the U.S., or was simultaneously introduced from Mexico into South America and the U.S. prior to its infestation of Europe. "We think early European activities in the New World led to the origin of this devastating pathogen. Countless improbable events led to the introduction of this species to Europe in 1845, but our work narrows down the evolutionary possibilities to exactly two," said Martin.

Future work will try to trace the exact route into Europe. "Ultimately finding the precise location where this species evolved could lead potato breeders to discover new genetic tools for improving resistance against [potato](#) blight disease," said Martin.

Provided by Oxford University Press

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