

Geomyces destructans was recently described as causing the skin infection that is the hallmark of bat white-nose syndrome (WNS). Since first described in 2006, WNS has devastated populations of cave-hibernating bats in the northeastern US, with mortality rates of 75-95%. The WNS infection area has expanded in 2009 to include PA, NJ, NH, VA, and WV.

G. destructans should be a sequencing priority for the NHGRI for the following reasons:

1. Aggressive pathogen of mammals. WNS has been linked to the deaths of up to 1 million bats since 2006, and is rapidly spreading. Genomic information on the pathogen is key to identification, determining source populations, epidemiological tracking, and assessing pathogenicity. Examining the genome and comparison to other skin fungal pathogens (Dermatophytes, *Malassezia*, and *Batrachomyces*) and commensals (*Candida*) will help identify genes generally important for colonizing skin, and genes that could be common targets for therapies.

2. Phylogenetic sampling of pathogenic fungi. *G. destructans* is in the *Leotiomyces* subphylum of fungi. Only two plant pathogenic fungi have been sequenced from this group and both are very distantly related to *G. destructans*. The *Geomyces* group has no sequenced representative, and includes *Geomyces pannorum*, which is frequently found in soil and air samples and rarely causes skin and nail infections in humans.

3. Bats are vectors of zoonotic disease. Bats carry infectious agents of humans and other animals. Nearly all human rabies cases in the US are from bat strains of rabies. Bats are also a host reservoir of several emerging infectious agents of humans including the SARS, H1N1 and Hendra viruses, and implicated in the transmission of Ebola and Marburg viruses. A better understanding of the origin and epidemiology of bat infectious disease is crucial to prepare for and combat novel zoonotic infectious agents.

4. Key environmental niche of bats: insect control. Bats occupy a key position in the ecosystem by consuming insects. The environmental impact of bat dieoffs are unclear, but likely would include expanded populations of insects, including those which are vectors of agricultural and forest pathogens.

5. Study of immune system evasion. *G. destructans* infection of bats progress during hibernation, and become dormant during the summer. Bats can carry dormant *G. destructans* while active, but fungal growth increases during the next hibernation cycle. An understanding of how this pathogen is able to evade the immune system can serve as a model for other mammalian pathogens.