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Assessing the Susceptibility of North American Plethodontid Salamanders to Chytrid Fungal Infection

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Abstract: Outbreaks of the amphibian fungal disease, chytridiomycosis, are causing sudden, localized extirpations of large proportions of the amphibian fauna in Central America and other regions. Population-level responses to *Batrachochytrium dendrobatidis*, the causative agent of this disease, vary from severe declines and even extinctions in some species to apparently no effect in other species that may act as reservoir hosts. Recent surveys suggest this pathogen is widespread in the southeastern U.S., but the implications for amphibian populations are unknown. From a conservation standpoint, it is critical to determine how much of a threat this pathogen may pose to the many endemic species of plethodontid salamanders in the Southern Appalachians. Ultimately, we need to understand which species are susceptible to infection and under what environmental conditions disease outbreaks might occur. As a first step to addressing these questions, we conducted a laboratory infection study of the susceptibility to *B. dendrobatidis* infection of two species of North American plethodontids, one highly aquatic (*Desmognathus monticola*) and the other terrestrial (*Plethodon metcalfi*). We predicted that at least *P. metcalfi* would become infected through contact with high concentrations of zoospores in water, because other researchers have infected the congeneric *P. cinereus* in the lab. In our 189-day trial, we observed mortality rates of 58% for exposed *P. metcalfi* with an average time-to-death of 42 days and 4.2% for exposed *D. monticola* with a time-to-death of 40 days. None of the *P. metcalfi* in the control treatment died and only two control *D. monticola* died. We are in the process of confirming our diagnosis of chytridiomycosis and assessing individual infection levels using histology. We are also examining the potential effect of temperature on susceptibility to infection in these two species.

