

Survey of Microbial Diversity within Wind Cave Using DNA Analysis

Wind Cave National Park, South Dakota

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Abstract

Microbiology is one of the newest frontiers in cave research. Cave bacteria have been shown to influence primary speleogenesis by raising carbon content and producing higher acid levels in streambeds. Also they precipitate or influence the formation of secondary mineral deposits. The major problem in studying cave bacteria is that they evolve and live in interdependent communities and most often cannot survive alone. This is a problem for the traditional microbiologist because they need to isolate and culture individual bacteria to be able to study them. Using DNA analysis techniques allows us to study bacteria that cannot be cultured in addition to making possible new types of analysis. Currently there is a need for a broader background database before specific research can be meaningfully conducted or reliable. Genetic fingerprinting is ideal for creating this background database because it is economical for use on a large scale and enables us to distinguish species within a community. Using this technique in conjunction with real time PCR quantitatively monitor unidentified species within karst microbial communities.

About the Author

I began studying speleogenesis and biospeleology doing an independent study as a senior at Rockbridge County High School in 1996–1997. Since then I have developed an interest in many forms of karst research. Next I studied Speleology under Dr Kenneth Thompson at Southwest Missouri State University. Currently I am a senior at Western Kentucky University perusing a BS in Geography with a minor in

Biology. At western I volunteer for the Biotechnology Center as an undergraduate researcher, as well as the Center for Cave and Karst Studies. Since attending western I have studied Hydrogeology under Dr Nick Crawford and Karst Microbial Genetics with Rick Fowler. I have been an active caver since 1995 and am currently Chairman of the Green River Grotto. Also I am a member of the National Speleological Society and Cave Research Foundation.

