Researchers chirping over discovery of new cricket genus

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NAU researchers discovered this new and still-unnamed genus of cave cricket in Grand Canyon-Parashant National Monument in northwestern Arizona.

A Northern Arizona University doctoral candidate and a National Park Service researcher have discovered a new genus of cave cricket.

J. Judson "Jut" Wynne, an NAU graduate student and cave research scientist with U.S. Geological Survey's Southwest Biological Science Center, and Kyle Voyles from Parashant National Monument, made the discovery in Grand Canyon-Parashant National Monument in northwestern Arizona.

The still-unnamed genus of cave cricket has been confirmed by a San

Diego State University entomologist, one of the leading taxonomists on cave crickets.

"This discovery could be highly relevant to the management and conservation of cave resources on the monument," Wynne said.

Crickets provide a valuable ecological service to the environment. Some species are often the primary decomposers in cave ecosystems.

The researchers also found a new cricket species (genus Ceuthophilus), possibly two new cricket species and a new barklouse (Psocopertan) species. The barklouse belongs to a genus previously unrecorded in North America. These discoveries were made while conducting an ecological inventory of 24 caves in the monument.

NAU's Colorado Plateau Museum of Arthropod Biodiversity is working with taxonomists to identify other invertebrate specimens collected during this study. So far, at least five new species have been identified from this research, and museum officials believe more new species discoveries will result.

Neil Cobb, curator of the Colorado Plateau Museum of Arthropod Biodiversity, said the discovery of a new genus in such a well-known order in North America is rare.

"Caves are one of the final frontiers in temperate regions for discovering new taxa," Cobb said. "Because caves are extreme environments, cave arthropods are very specialized and possibly endemic to a single cave system or region. They present interesting and odd evolutionary forms that reflect the extreme environments found in caves."

Cave-dwelling invertebrates are important for conservation, because they can be rare and/or highly limited in distribution, Cobb said.

Wynne said more than 1,000 caves have been identified in Arizona and less than 3 percent have been surveyed sufficiently for ecological resources. "Cave ecosystems are one of the most poorly understood and fragile ecosystems," Wynne added. "The discovery of a new cricket genus from a northwestern Arizona cave emphasizes how little is known about these ecosystems."

Cave ecosystems are poorly understood because they are a relatively new avenue of scientific inquiry, Wynne explained. "We are still in the formative phase of characterizing the ecological communities of these systems as well as understanding how these ecosystems function," he said. "We have much to learn."

Wynne, an assistant curator with the Colorado Plateau Museum of Arthropod Biodiversity, has two cave projects under way at the USGS. He is developing methods for detecting caves using thermal remote sensing technologies. Once procedures are developed, these techniques ultimately will be used to find caves on Mars. Once his team identifies Martian caves, robotic cave explorers will be developed to search for life under the Martian surface. His second project involves developing procedures for rapidly inventorying cave biodiversity. He has applied these methods to caves throughout northern Arizona and Belize. He will be applying these techniques to caves in Chile this summer and Belize next year.

Voyles is also the Bureau of Land Management cave coordinator and cave resource management lead for Grand Canyon-Parashant National Monument. He is a co-investigator on both the Arizona component of the cave ecological inventory project and phase two of the Earth-Mars cave detection study.

"Jut has a very diverse research program, one day he is discovering new genera of insect, the next day he is working with a team to develop

techniques for discovering caves on Earth and Mars," Cobb said. "If there is life on Mars and it is in a cave, Jut will probably be the one to find it.

Source: Northern Arizona University