# Gray treefrogs provide clues to climate change

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Gray treefrog (*Hyla versicolor*). Credit: Brice Grunert

According to the National Aeronautics and Space Administration (NASA), and the National Oceanic and Atmospheric Administration (NOAA), 2015 was the hottest year on record. According to a University

of Missouri researcher, increasing temperatures and climate variability might have an effect on the sounds produced by gray treefrogs. According to a recent study, scientists found that a female's interpretation of male mating calls may not be affected by climate change; however, knowing how breeding habits are affected can help predict the health of ecosystems. These findings will contribute to the enhanced management practices of ecosystems by federal and state officials.

Gray treefrogs are a common species found in North America and throughout the eastern two-thirds of the country, including Missouri. They're marked by their sticky toe pads that help them cling to windows and by the male mating calls, or trills, which distinguish them on warm, summer evenings.

"In a way, the decline of the polar bear has become the face of climate change; yet, gray tree frogs located in our own backyards might give us better clues about changes in the environment," said Sarah C. Humfeld, a postdoctoral fellow of biological sciences in the MU College of Arts and Science. "Our team wanted to take a look at how rising temperatures might affect how female gray tree frogs interpret the signals given off by males and whether or not that might interrupt their breeding habits."

During mating season, male treefrogs produce calls to attract potential female mates. Females interpret various characteristics of the trilled call to help them locate a high-quality male of the correct species. Scientists have long known that the pitch and rate of trilling can be temperature-dependent, often corresponding to rising or falling temperatures experienced by these cold-blooded animals.

"We already know that there's an optimal range for male mating calls," Humfeld said. "When temperatures rise, the pitch and trill rate of the calls can increase. What we didn't know, was whether or not females'

interpretation of those calls were dependent on temperature as well. We were interested in studying whether or not the responses of the female's auditory system shifted in tandem with the male's calls at different temperatures."

The researchers gathered female treefrogs from the field and brought them to the lab. In a controlled environment, they elevated the temperature slightly to simulate a warmer climate. Then, using computer-synthesized sounds, they played back various types of calls to see how the females responded.

"We found that temperature didn't have a great effect on females and their interpretation of the mating call; however, these are still important findings," Humfeld said. "Amphibians are the veritable 'canary in the coal' mine, an indicator species that can send signals to scientists who study the effects of rising global temperatures. Knowing more about how their mating habits are affected by climate change can help us study the ways rising temperatures are affecting biodiversity. Findings from our study help add to the knowledge base needed to study thermal tolerance levels for various species and the steps conservation managers can take to maintain various ecological systems."

The study, "Effects of Temperature on Spectral Preferences of Female Gray Treefrogs (*Hyla versicolor*)" recently was published in *Herptological Conservation and Biology*.

Provided by University of Missouri-Columbia

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