

## Frogs: Female choice for complex calls led to evolution of unusual male vocal cord

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Male tropical túngara frogs have evolved masses on their vocal cords that help them woo females with complex calls, show scientists working at the Smithsonian Tropical Research Institute (STRI) in Panama.

Dr. Mike Ryan, Clark Hubbs Regents Professor of integrative biology at The University of Texas at Austin, Dr. Marcos Gridi-Papp, a post-doctoral scholar in physiological sciences at UCLA, and the late Dr. Stan Rand, of STRI, published their findings in the May 4 issue of *Nature*.

Males of the túngara frog, *Physalaemus pustulosus*, attract females by singing out "whine chuck chuck" calls in wetlands and puddles during the rainy season. The males may only produce whines, but females are more attracted to males that also produce chucks.

The scientists surgically removed the fibrous masses in the males' larynx and found that they could no longer produce the "chuck". The frogs produced a normal whine and attempted to add chucks to it, but the sounds that they added lacked the distinctive pattern of the chuck.

"By removing the structure within the larynx, we eliminated the ability of a frog to produce a complex call," says Ryan. "Now we know that there is a structure associated with a single syllable of the call."

"The experiment shows that the fibrous masses produce the complexity in the calls of male túngara frogs," adds Gridi-Papp, who was a post-doctoral researcher at Universidade Estadual Paulista in Brazil during

this study.

Taken together with the fact that female preference for complex male calls most likely evolved before males could actually produce them, Gridi-Papp says this shows that the fibrous masses on the male vocal cords evolved in response to female preference.

"Besides shaping the behavior of males, female preferences also indirectly shape the anatomy of the calling apparatus of males by favoring enlarged fibrous masses that allow for production of complex calls," says Gridi-Papp.

"The simple connection between the fibrous mass and call complexity gives us a unique opportunity to dissect the evolution of acoustic complexity," Gridi-Papp says.

Comparative studies looking at the fibrous masses of other species in the same genus may reveal why complex calling evolved in the túngara frog lineage and not in others.

Such studies will help explain the origins of complex traits, one of the major evolutionary questions for biologists since Charles Darwin.

Source: Smithsonian Tropical Research Institute

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