

[Click here to Download Supplemental Dataset 1](#)

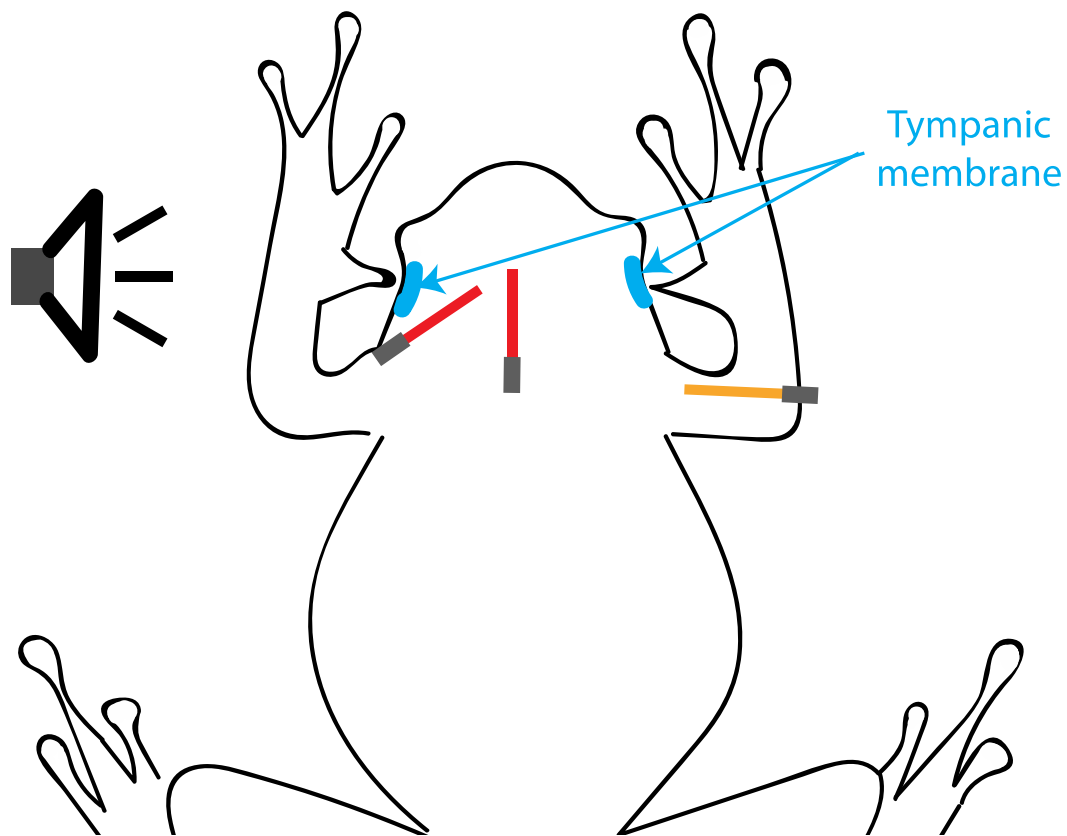
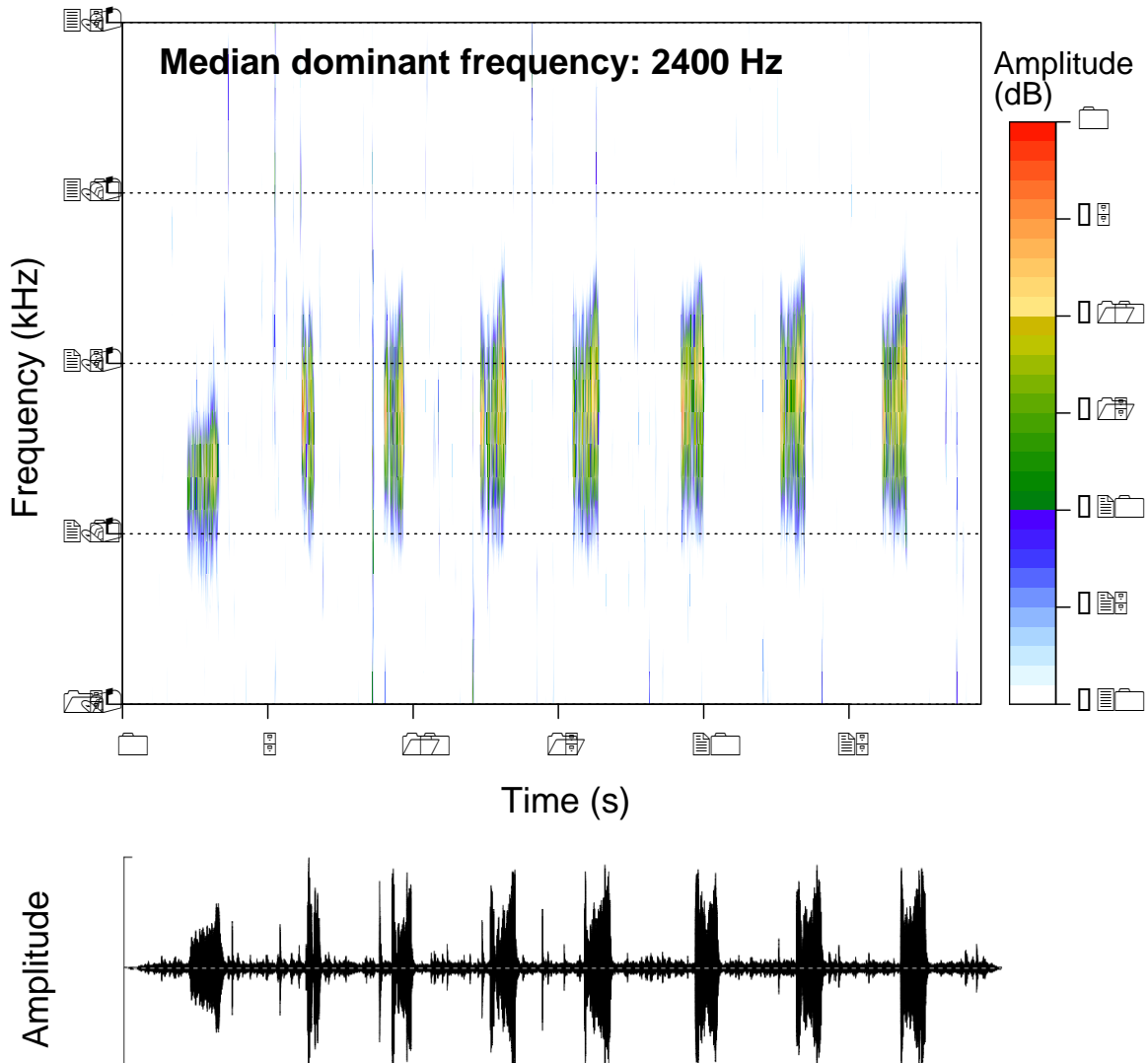


Fig. S1. A diagram of the electrode (red) placement for auditory brainstem recordings (ABRs). We subdermally placed differential electrodes (red) over the midbrain and VIIIth (auditory) nerve and placed a third ground electrode (orange) within the arm contralateral to the VIIIth nerve being measured. Tympanic membranes are shown in blue.

A



B

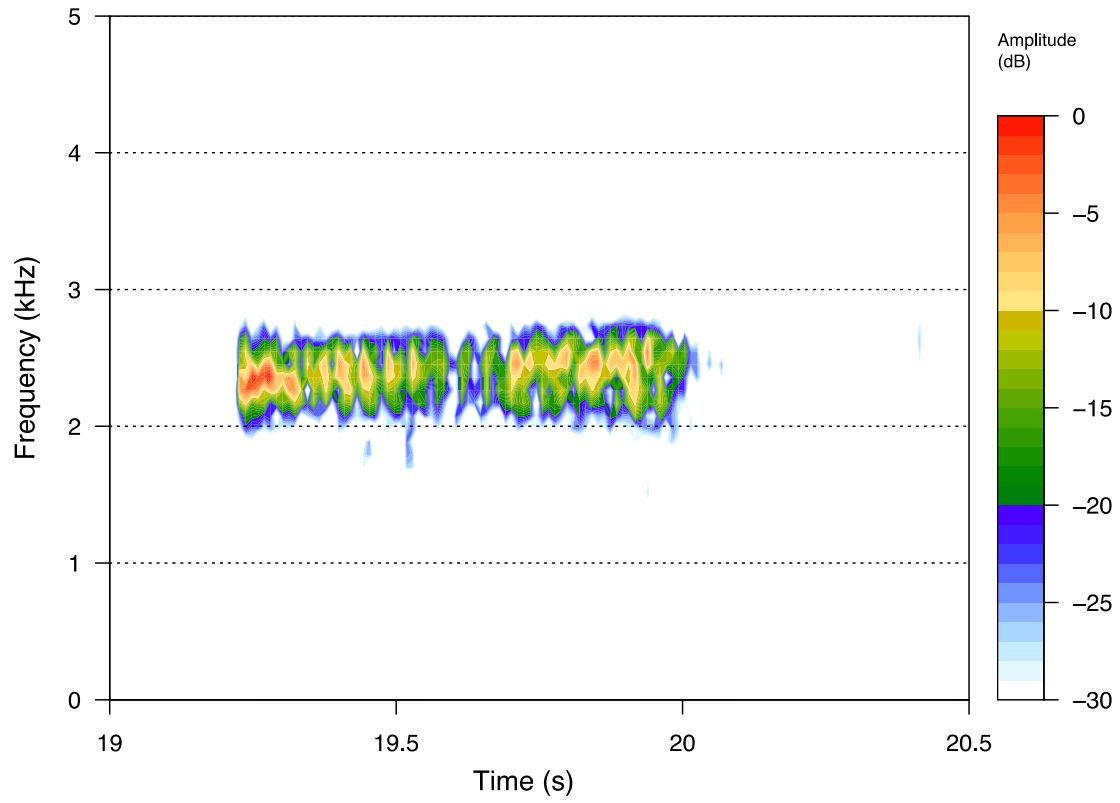


Fig. S2. *Atelopus* sp. 2 (*spumarius* complex) call collection & analysis.

The call of *Atelopus* sp. 2 was analyzed for this study. Elicio E. Tapia recorded the call on July 6th 2016 at 9:00 H and 10:00 H with a digital recorder (Olympus Linear PCM Recorder LS 10S) and microphone (Sennheisser). These recording was done (under lab conditions) of a male born in captivity from parents from San Carlos de Limón, Morona Santiago Province, Ecuador. The frog was inside a terrarium 40x40 cm partially opened in the upper cover with other males in the terrarium. The microphone was at about 5 cm from the frog. Atmospheric pressure was about 730.78 mb, the altitude of Centro Jambatu lab is 2700 m asl, and the frog's temperature was about 20 °C.

The call was analyzed using the package seewave (Sueur et al., 2008) in R (R Core Team, 2015). The call was visualized with spectrograms and then trimmed to the time frame of the call. We eliminated background noise at frequencies above and below the call using a single band pass frequency filter (window length = 1024, window = "hanning", overlap = 75). From these trimmed call files, we calculated the median dominant frequency by performing an instantaneous frequency extraction by zero crossing.

(A) A spectrogram (top) and oscillogram (bottom) of the advertisement call of *Atelopus* sp. 2 with median dominant frequency given. For spectrogram - window length = 512, window = "hanning", overlap = 0.

(B) A spectrogram of one note within the advertisement call of *Atelopus* sp. 2 shown in A. For spectrogram - window length = 512, window = "hanning", overlap = 0.