



The Distress Call of a Masked Treefrog, *Smilisca phaeota* (Cope 1862) (Hylidae)

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Advertisement calls are the most frequently studied type of Anuran vocalizations; these are most frequently emitted by males to attract potential mates and convey territorial information to conspecifics (Toledo et al. 2015; Köhler et al. 2017). In contrast, distress calls are rarely reported sound emissions used for defensive purposes (Mendoza-Henao 2021, 2024), which typically are accompanied by stereotypical behaviors (e.g., open mouths and hissing noises or screams; see Toledo et al. 2015; Köhler et al. 2017). Distress calls differ from aggressive calls because aggressive calls include an intraspecific behavioral context (Köhler et al. 2017).

I herein describe the distress call of a Masked Treefrog, *Smilisca phaeota* (Hylidae), in the Pacific region of Colombia. The Masked Treefrog is a medium-sized frog (SVL = 40–78 mm) commonly found in humid and dry tropical forests from Honduras to Panama in Central America and Colombia and Ecuador in South America (Cochran and Goin 1970;

Duellman 1970). The recording of the distress call was made during a series of academic activities with students at 2200 h on 20 October 2023, in a secondary forest in the Jardín Botánico del Pacífico, Mecana, Bahía Solano, Chocó, on the Pacific Coast of Colombia (6.270635, -77.381440; elev. 15 m asl). The frog was perched on a palm tree ca. 150 cm above the ground.

During handling, the individual inflated its body and emitted a long, high-pitched sound, a video of which was recorded by Diego Esquivel with a Nikon p900 camera (video available at FigShare: <https://doi.org/10.6084/m9.figshare.26815285> and YouTube: <https://youtu.be/HJl0TtIpoYQ>). The original audio in MPEG-4 format (.mov) was converted to WAVE (.wav) format and stored in the Banco de Sonidos OcainaCua (BSOC) at the Museo de Ciencias Naturales de La Salle (BSOC100). Air temperature and the size of the frog were not recorded. Using the WAVE-converted recording, I extracted and analyzed call duration, spectral

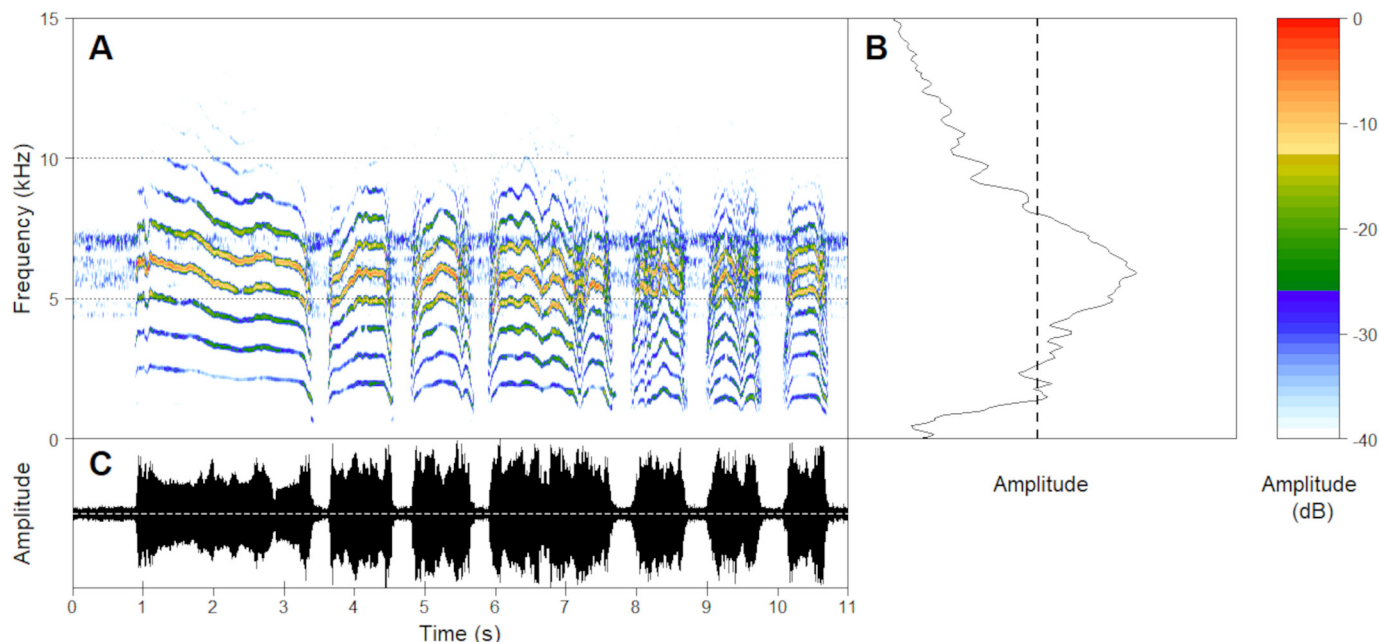


Figure 1. Spectrogram (A), power spectrum (B), and oscillogram (C) of the distress call of a Masked Treefrog (*Smilisca phaeota*). Window size = 512, sampling rate = 48 kHz. Dashed line in the power spectrum diagram represents the 20-dB threshold from the peak amplitude.

(peak, minimum, and maximum frequencies), and structural parameters (number and frequency range of harmonics). The frequency data were obtained using the power spectrum with a 20-dB threshold from the peak amplitude. Only those harmonics falling in the 20-dB threshold were counted. I used Raven Pro software (Yang Center for Conservation Bioacoustics 2023) for all measurements and Seewave (Sueur et al. 2008) in R (R Core Team 2018) to generate the figure.

The distress call of *S. phaeota* (Fig. 1) comprised seven notes, each with a unique duration, the first lasting 2.51 s, the second 0.91 s, the third 0.88 s, the fourth 1.84 s, the fifth 0.84 s, the sixth 0.80 s, and the seventh 0.64 s, and the entire vocalization 9.8 s. Mean note interval duration was 0.23 ± 0.04 s (0.18–0.30 s). The first note had a peak frequency of 6.2 kHz (1.4–9.8 kHz) (6 harmonics), the second 6.0 kHz (1.9–8.0 kHz) (6), the third 5.7 kHz (8.1–6.5 kHz) (7), the fourth 5.5 kHz (1.5–8.0 kHz) (7), the fifth 6 kHz (1.3–7.8 kHz) (9), the sixth 5.7 kHz (1.2–8.1 kHz) (9), and the seventh 6 kHz (1.3–7.7 kHz) (9), and the entire vocalization had a peak frequency of 5.9 kHz (1.3–8.0 kHz). The harmonics lost shape and power as frequency rose. Because this description was of a single call by one individual, I cannot rule out the possibility of substantial intraspecific variability in the distress call.

The advertisement call of *S. phaeota* is a low vibrant growl lasting 0.1 to 0.45 s and repeated at intervals of 20 s to several minutes (Duellman 1970; Gil-González et al. 2022). The pulse rate is 100–130/s, with a dominant frequency of 0.33–0.50 kHz (Duellman 1970; Gil-González et al. 2022). The single previously described distress call for any species in the genus *Smilisca* was for *S. baudinii*, which exhibited a dense harmonic pulsed single note with a duration of 0.174 s and a bimodal dominant frequency of 1.2 kHz and 3.1 kHz (Mendoza-Henao 2021; Savage 2002).

The distress call of *S. phaeota* is similar in structure to those of other frogs in that they are mainly dense harmonic vocalizations (Köhler et al. 2017). However, that of *S. phaeota* is very long compared to that of *S. baudinii* (9.8 s vs. 0.174 s, respectively) and has a higher dominant frequency (5.9 kHz vs. 1.2–3.0 kHz, respectively).

Distress calls of frogs are poorly documented life history traits (Toledo and Haddad 2009) and the evolutionary and behavioral significance of distress calls is still not well understood, but is believed to be a frightened call for help (Toledo et al. 2015). Toledo and Haddad (2009) suggested that distress calls could be a plesiomorphic character due to their distribution among anurans and the similarity between species. Documenting the distress calls of additional species would help to better understand the evolution of vocalization in anurans.

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