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The distress call of *Caiman crocodilus crocodilus* (Crocodylia: Alligatoridae) in western Amazonia, Brazil

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Analysis of vocalization can play a significant role in taxonomic studies, helping to identify cryptic species in species complex, as has been show for different vertebrate groups: primates (Zimmermann 1990), birds (Alström & Ranft 2003), amphibians (Padial & De La Riva 2009). In reptiles the analysis of vocalization has been explored mostly in behavioral, ecological, morphological and physiological studies, especially in lizards (Gans 1973; Frankenberg & Werner 1992; Russel *et al.* 2000) and crocodylians (Herzog & Burghardt 1977; Vergne *et al.* 2009). However crocodylians have the most complex acoustic repertoire, especially during the early stages of their life (Vergne *et al.* 2009), having different functions according to their stimulus and being classified as hatching, contact, annoyance, threat and distress calls (Britton 2001).

Juvenile vocalizations are important in establishing communications with their siblings and parents. Distress calls are produced when a juvenile is threatened by a predator or a conspecific, with the intensity and pitch varying according to the aperture of the palatal valve (Britton 2001). Herzog and Burghardt (1977) classified two types of distress calls: the “screech”, a loud and high pitch vocalization when the individuals maintain the palatal valve open; and the “moan”, a softer and low pitched call, produced when the palatal valve is closed.

The spectacled caiman *Caiman crocodilus* Linnaeus is the most widespread species in the American continent, ranging from southern Mexico in the north to Peru and Brazil in the south (Velasco & Ayarzagüena 2010). It is also the most geographically variable species with four recognized subspecies: *C. crocodilus crocodilus* Linnaeus, *C. c. fuscus* Cope, *C. c. chiapasius* Bocourt, and *C. c. apaporiensis* Medem. Since vocalization is a species-specific character, descriptions and comparisons of *Caiman crocodilus* vocalizations can help in the taxonomy of this group, which still needs an integrative taxonomic approach (Escobedo-Galván *et al.* 2011). Herein we describe the distress call (moan and screech) of *Caiman crocodilus crocodilus* in the western Amazonia, Brazil.

In the night of December 12th at 7.27 pm, two juveniles of *C. c. crocodilus* were captured by hand in the Mamirauá Sustainable Development Reserve (2°15'0.85"S; 65°19'7.40"W), in a varzea (floodplain) habitat in the State of Amazonas, western Brazilian Amazonia. The individuals were stimulated to vocalize by holding and pinching their tails (Britton 2001). The vocalizations were recorded with an Olympus LS-11 digital recorder, using 44 KHz at 16 bit sampling size and the recordings were saved in wave format. After recordings, the individuals were released unharmed in the same site. Spectograms were constructed with Raven Pro 1.0 for Windows (Cornell Lab of Ornithology) with the following parameters FFT 512 (1024 for power spectrum), 3 dB filter bandwidth, 124 Hz, hop size 256. Air and water temperature were measured after each recording.

The distress call of *C. c. crocodilus* is a multiple harmonic structure with a downward frequency modulation pattern. We found differences between the moan and screech type of calls. The moan has a longer call duration (200.3 ms, range from 133 – 243 ms) than the screech (134.8 ms, range from 117-164 ms), with higher dominant frequency (1231.7 Hz against 1167 Hz). The screech has a higher frequency reaching 19.8 KHz than the moan (15.7 KHz) (Table 1, Figure 1).

The calls analyzed follow the same pattern of other alligatorids, with a downsweep frequency modulation, in contrast with the members of the crocodylidae in which the downsweep is followed by a frequency modulation upsweep forming a “circumflex” shape (Herzog & Burghardt 1977; Britton 2001; Vergne *et al.* 2007).