

Project Update: October 2015

This report embraces several field trips developed in El Mudo and Numancia caves (from May to June, 2015). Among the five species inhabiting each one of these caves (Fig. 1), we could identify them acoustically due to previous descriptions of their echolocation calls (Macias et al., 2006; Mora and Macias, 2007). Acoustic recordings to make this identification were done at different points inside the caves and at their surrounding areas. Automatic recording units (Song Meter, Wildlife Acoustics, USA) with ultrasonic microphones attached were used to obtain these calls.

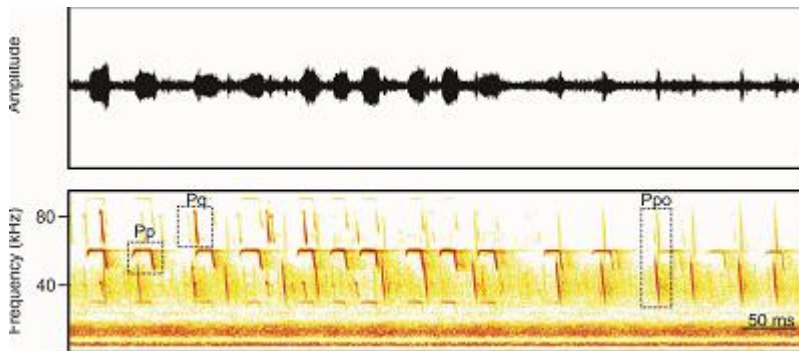


Figure 1. Waveform and spectrogram from a sound file recorded during the night exodus at Numancia cave, Mayabeque province, Cuba. Dotted squares signal the echolocation calls from three species inhabiting this cave: *Pteronotus parnelli* (Pp), *Pteronotus quadridens* (Pq) and *Phyllonycteris poeyi* (Ppo).

We dedicated this report mainly to the first two species that give birth: *Phyllonycteris poeyi* and *Mormoops blainvillei*. I will refer briefly to several items regarding their postnatal development:

The first newborns from *Phyllonycteris poeyi* and *Mormoops blainvillei* with umbilical cord attached were found in May 2015. Each female was observed with a single offspring (Fig. 2A and Fig 3D). At birth, the young were naked and pink with closed eyes, folded ears and deciduous teeth (Fig. 2B and Fig. 3).

Neonates were born approximately with the forearm length averaging 40% of the length in adult females, and 35% of the body mass of adult females. These two parameters are commonly used to estimate the age in newborn bats (Elangovan et al., 2002; Liu et al., 2007), together with external features previously mentioned. We measured newborns at both caves in their first's weeks of life (Fig. 4). These data will allow correlating acoustic parameters from their vocalizations with age.

Females from the other three species (*Pteronotus parnellii*, *P. quadridens* and *P. macleayi*) were observed pregnant in this period. Newborns from *Phyllonycteris poeyi* were located at the entrance of the heat trap, whereas newborns from *M. blainvillei* were at the end of it. Vocalisations recorded inside the heat trap from the newborns were most of them audible with some ultrasonic components but most of the energy was focused in the audible range. Most of these vocalisations were obtained in the period were mothers went out to forage.



Figure 2. Newborns from *Mormoops blainvillei* located at the heat trap from El Mudo cave, Madruga municipality, Mayabeque province, Cuba. Photography: Christian Moreno Leon.

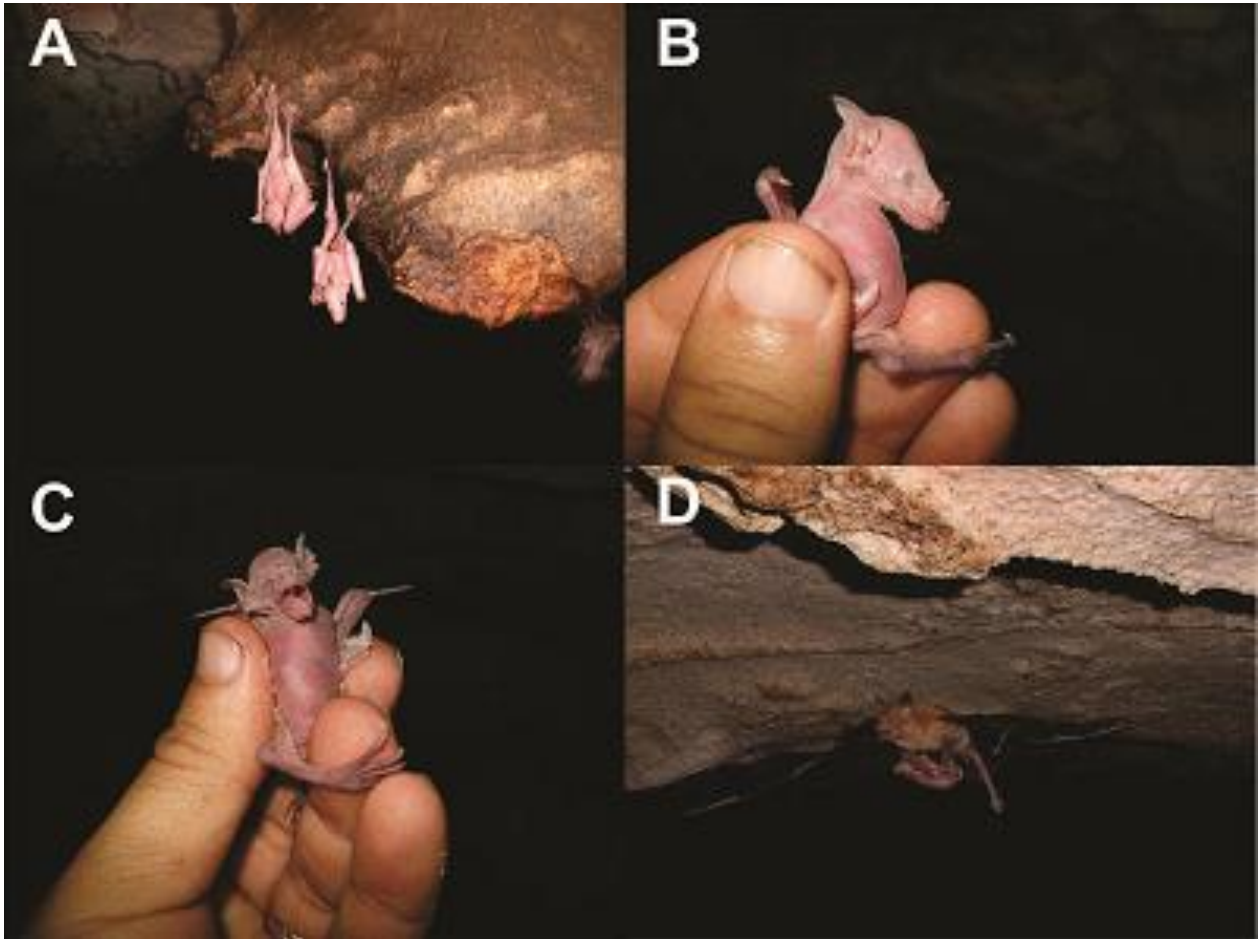


Figure 3. Newborns from *Phyllonycteris poeyi* within the heat trap from El Mudo cave, Madruga municipality, Mayabeque province, Cuba. External features from these individuals (A, B, C) indicate 1 day after birth. Females from *P. poeyi* emerging from the heat trap with its offspring (D). Photography: Christian Moreno Leon.



Figure 4. Measuring forearm length and body weight from newborns at Numancia cave. Madruga municipality, Mayabeque province, Cuba.

Educational/Scientific materials developed in this period

We organised a group within the El Mudo community, to protect bats inhabiting hot caves. We developed a workshop in the primary and secondary school with children of this community, between 5 and 14 years old (Fig. 5). We gave two talks about general characteristics of bats inhabiting in the hot caves and their importance, and other regarding newborn bats and how to avoid cave disruption during bat reproductive period. Children were able to see bats alive, in which they could recognise differences among species in colour, size and wing membrane features. They were able also to draw some of these bats (Fig. 5). We delivered a couple of educative materials regarding Cuban bats (see materials attached) to the principal of this primary school to be hanged in classrooms and halls from this school (see Fig. 6). Children and teachers from this community were very pleased with our activity due that few activities like this are not developed very often in this place.



Figure 5. Workshop developed in the primary school from El Mudo community, Mayabeque province, Cuba. (A) Teaching bat species recognition using a bat tabloid through external characters. (B) Drawings activities.



Figure 6. (A) Materials delivered to the primary school of El Mudo community. (B) Children and teachers involved in the workshop.

References:

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