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**Notes on vocalisation and natural history of
Hylomantis medinae (FUNKHOUSER, 1962) (Anura, Hylidae)
from northern Venezuela**

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Hylomantis medinae (FUNKHOUSER, 1962) was originally described as *Phyllomedusa medinae* from the vicinity of the biological station “Rancho Grande” at Henri Pittier National Park in Venezuela (Aragua State). RIVERO (1967) and later CANNATELLA (1980) considered the ending of the species name to be wrong and corrected it to *P. medinai*, but following the suggestions of DUBOIS (2007) it should be kept as originally printed. Recently, FAIVOVICH et al. (2005) placed *H. medinae* together with the species of the former *Phyllomedusa buckleyi* group (sensu CANNATELLA 1980) (i.e. *Hylomantis buckleyi*, *H. hulli*, *H. lemur*, *H. psilopygion*, *H. danieli*) in the genus *Hylomantis*, which also contains the species of the former *Phyllomedusa aspera* group (sensu CRUZ 1990) (i.e. *H. aspera*, *H. granulosa*) from the Brazilian Atlantic Rainforest Domain.

Since its original description, *H. medinae* has been considered endemic to Rancho Grande and surroundings. As far as we know, the last record from this site was made in 1974 (MANZANILLA & LA MARCA 2004). PROY (2000) found two tadpoles of *H. medinae* near the entrance of the protected area Palmichal in the Carabobo State, about 60 km west of the type locality, but could not detect any adult frogs. In 2006, we discovered a reproductive population of *H. medinae* on Cerro Zapatero, which is situated between San Felipe and Nirgua in the Yaracuy State, approximately 100 km west of the type locality (LOTZKAT et al. 2007). Both publications provided new locality data, but have neither been used to update the homepage of the IUCN Red List nor the one of Amphibian Species of the World so far, and so the species is still listed as endemic to the type locality.

Few natural history data on *H. medinae* have been published so far. In the original description, a few observations on egg deposition behavior were mentioned. CANNATELLA (1980) provided some information on the population at the type locality “Rancho Grande”. He also stated that the mating call remains unknown. PROY (2000) provided data

on larval development and captive keeping of *H. medinae*. We here present information on the species’ advertisement call and miscellaneous natural history observations made in the wild.

Cerro Zapatero represents the highest elevation within the Reserva Ecológica Privada Guáquira, a private reserve on the compound of the agricultural Hacienda Guáquira in Yaracuy State, Venezuela. Slopes above 900 m a.s.l. are covered by cloud forest. The study site was located between two summits of Cerro Zapatero (10°14’ N, 68°38’ W, 1300 m a. s. l., approximately 11 km SE of San Felipe). We used a Sony MZ-R70 portable Minidisc recorder with a Hama RMZ-10 Zoom Universal directional microphone to record the advertisement call on minidisc. The microphone was placed about 0.5 m from one calling male, arranged on a tripod, so we could remain aloof. Frequency information and call analysis were achieved through Fast Fourier Transformation (FFT, width 1024 points) at Hanning window function in Adobe Audition (Version 3.0) on a PC. The obtained images of the oscillogram and the sound spectrogram were contrast-enhanced using Adobe Illustrator CS2. A sampling rate of 44.1 kHz was used and a word length of 16 bit. We follow the call parameter terminology established by DUELLMAN & TRUEB (1994). We measured air temperature and relative humidity immediately after recording using a digital hygrometer/thermometer to the nearest 0.1°C and 1% relative humidity. We preserved an amplexant pair out of the population. Unfortunately, due to the strict quantity constraints of the collection permit, we were not allowed to collect the calling male in addition, but we managed to take photos of it (Fig. 1). The collected specimens were deposited in the Museo del Instituto de Zoología Agrícola de la Universidad Central de Venezuela (MIZA), Caracas, where they were catalogued as MIZA 405 (male) and 406 (female).

We consider the recorded call to be the advertisement call, because the recorded male was sitting well-isolated



Figure 1. The recorded male of *Hylomantis medinae* at its calling site. Photo: AH.



Figure 3. Recently metamorphosed specimen on palm leaf. Photo: SL.

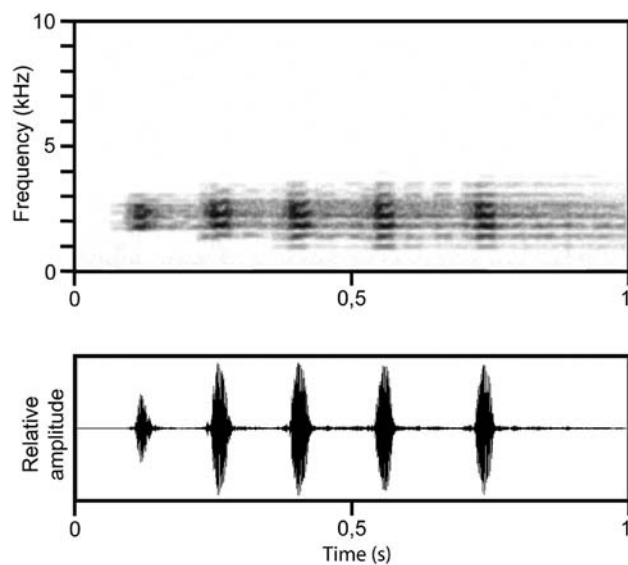


Figure 2. Spectrogram (top) and oscillogram (bottom) of the advertisement call of *Hylomantis medinae* (recorded 15 October 2006 at 21:00 h in the Reserva Ecológica Privada Guáquira, Venezuela; air temperature 18.8°C, relative humidity 99%).

with the next calling male located at least 20 m away and no aggressive interactions with other specimens could be observed. The call was recorded on 15 October 2006 at 21:00 h at an air temperature of 18.8°C and 99% relative humidity. The weather was foggy with a moderate breeze. Condensed water was dripping from the vegetation. We recorded six calls of the mentioned male, the second of which is visualized in Figure 2, as a representative example. Every recorded call consisted of five notes. Call duration was between 0.67 and 0.72 s, with an interval between calls ranging from 11.05 to 32.22 s (18.15 ± 7.27 s; $n = 5$). The call rate during recording was 4.38 calls per minute. Note



Figure 4. Individual showing a reddish brown colouration at night. Photo: SL.

rates ranged between 6.94 and 7.46 (7.15 ± 0.25 ; $n = 6$) notes per second. The dominant frequency within a note ranged between 2092.7 and 2506.6 Hz (2212.4 ± 108.7 Hz; $n = 30$). Call energy (= amplitude) is lowest at the first note and almost equal over the four following notes.

There is only little information on advertisement calls of species of the genus *Hylomantis*. The advertisement call of *Hylomantis medinae* differs most profoundly from these in its having five notes per call and thereby a much longer call duration, while the measured dominant frequency lies quite near the values reported for other members of the genus. By comparison, the advertisement call of *H. buckleyi* from Ecuador has been described by DUELLMAN (1969) as a single 'short cluck', but was not recorded and analyzed. CANNATELLA (1980) described the advertisement call of *H. psilopygion* from Colombia to consist of a 'single chirp' with



Figure 5. Egg clutch on palm leaf above the water surface. Photo: SL.

call duration of 0.04 to 0.05 s and a dominant frequency of 1900 Hz. The advertisement call of *H. lemur* from Panama and Costa Rica was described by JUNGFER & WEYGOLD (1994) as a 'simple tick' of 0.19 to 0.2 s duration repeated at irregular intervals, that vary from 12 s to several minutes, and a dominant frequency of 1400 to 3100 Hz. The advertisement call of *H. aspera* from Brazil was described by PIMENTA et al. (2007) as a sequence of three or four short and close pulses with a mean call duration of 0.03 s and a dominant frequency between 1679.59 and 2110.00 Hz. Since all these species look similar, the differences in their respective advertisement calls, besides geographic distribution, are likely to present important tools for identification by the time that more advertisement calls of species of the genus will be available.

We found at least a dozen adult individuals of *H. medinae* in and around a natural body of lentic water that is situated in a depression between two peaks, right on the ridge of Cerro Zapatero. In the water, we observed numerous tadpoles and a single adult of unknown sex, that disappeared in the water before we were able to collect it. Within a radius of about 5 m from the water, we encountered one calling male, amplexant pairs, single non-calling individuals of unknown sex, and two recently metamorphosed specimens (Fig. 3). Additional males



Figure 6. The collected pair at daytime. Photo: SL.

were calling from riparian vegetation, about 1 m above the ground. Other adult individuals and the two juveniles were moving about or sitting on the vegetation that surrounds the pond, between 0.2 and 1.5 m above the ground. Several egg clutches had been deposited on leaves hanging above the surface of the water. As it has been described for other members of the genus, the clutches had been adhered without rolling or folding them into the leaves (Fig. 5). One palm leaf was especially laden, carrying at least six egg clutches.

An adult female *Liophis reginae zweifeli* (MIZA, not yet catalogued) was found swimming in the pond. Close to the pond, several male *Leptodactylus* cf. *wagneri* were calling, well concealed by leaf litter. On Cerro Zapatero, *H. medinae* was the only hylid frog inhabiting the pristine cloud forest above 900 m a.s.l. In addition to *L.* cf. *wagneri*, it shares this premontane habitat with ten more anurans: *Allobates pittieri*, *Cochranella antisthenesi*, *Flectonotus pygmaeus*, *Gastrotheca walkeri*, *Mannophryne neblina*, *Pristimantis bicumulus*, *P. riveroi*, *P. rozei*, *P. terraeboli-varis*, *Strabomantis biporcatus* (see LOTZKAT 2007).

Although CANNATELLA (1980) described a bright green day and a reddish brown night colouration, we found both green (Fig. 1) and reddish brown (Fig. 4) individuals during night time. We could even observe green males amplexing brown females, and individuals showing a somewhat transitional colouration with neighbouring green and reddish brown surfaces merging into one another. The collected pair was kept alive until the next day, when both individuals showed bright green colourations with rusty red spots as described by FUNKHOUSER (1962). Iris colouration was described by FUNKHOUSER (1962) as golden and by CANNATELLA (1980) as pale silvery bronze. In both collected specimens, the iris colour was silver, reticulated with dark bronze at night, as it has been described for other members of the genus (CANNATELLA 1980). At daytime, the iris colouration was monochrome silver (Fig. 6). Both at day and night the iris was outlined with black.

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Note added in proof

The most recent work of FAIVOVICH et al. (2010) has shown the genus *Hylomantis* to be paraphyletic. According to this, the former *H. aspera* group is a sister taxon to *H. hulli*, a member of the *H. buckleyi* group. This clade and the remaining members of the *H. buckleyi* group, represented in the analysis only by *H. lemur*, are successive sister taxa to the clade consisting of *Pachymedusa* and *Agalychnis*. As an approach to the problem, the authors included *Hylomantis* and *Pachymedusa* in the genus *Agalychnis*, until a denser sampling of the group becomes available.

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