

## The Call of *Scaphiophryne gottlebei*, a Microhylid Frog from the Isalo Massif, Southcentral Madagascar

FRANCO ANDREONE<sup>1\*</sup>,  
FABIO MATTIOLI<sup>2</sup>,  
AND VINCENZO MERCURIO<sup>1</sup>

<sup>1</sup> Museo Regionale di Scienze Naturali, Via  
G. Giolitti, 36, I-10123 Torino, ITALY

<sup>2</sup> Acquario di Genova, Area Porto Antico,  
Ponte Spinola, I-16128 Genova, ITALY

**Abstract:** We describe the advertisement call of *Scaphiophryne gottlebei* from the Isalo Massif (southcentral Madagascar). Calling males were found during a rainy night in November (21 C in air temperature). The call is similar in temporal and spectral structure to that of other *Scaphiophryne* species, such as *S. boribory* and *S. spinosa*, with a note repetition rate of 32–36/s, and a frequency range of 500–1400 Hz.

**Key Words:** Amphibia; Microhylidae; *Scaphiophryne gottlebei*; Vocalisation; Madagascar

The enigmatic microhylid *Scaphiophryne gottlebei* Busse & Böhme, 1992 has been little studied until recently, either for its distribution, or for its biology. This species was in fact known only for its type locality, which is located in the sandstone Isalo Massif, southcentral Madagascar (22°22'–22°40'S, 45° 11'–45°23'E). Due to its narrow distribution and the fact that it was heavily collected for the pet trade (Andreone and Luiselli, 2003), it was included in the critically endangered Malagasy species through the Global Amphibian Assessment (Andreone et al., 2005).

To obtain further data on the biology of *S. gottlebei* and *Mantella expectata* we carried out a series of field surveys in the Isalo area,

allowing us to discover many new records of presence, the tadpole morphology, and the larval general habitat requirements for these species (Mercurio and Andreone, 2005). During this study we also recorded the call of *S. gottlebei*, whose acoustic repertoires have never been described to the present. This paper provides its formal description.

The species' call was recorded at Zahavola, a site that lies just outside the administrative borders of the Isalo National Park (Fianarantsoa Province, Antsohy Fivondronana, Ranohira Firaisana). The breeding site was a pool (about 4×3 m wide, with sandy bottom without any aquatic vegetation) within a narrow, cave-like canyon. This pool is thus surrounded by rocky walls and is fed by spring water. Inside, the canyon is almost dark, and the humidity and temperature are nearly constant (90–100% and around 19–21 C, respectively). The only other amphibian species observed at this site was *Mantidactylus corvus*.

At the time of the recording (around 1930 h, 23 November 2004) the pool was almost full of water (2 m in depth) as a consequence of the rain of the previous day. Tadpoles of *S. gottlebei* in advanced development stages (Gosner's stage 38) were present in the water, and probably hatched from eggs laid in mid-October, on the occasion of the first rains (Mercurio and Andreone, 2005). After these rains the dry period lasted for more than one month, preventing major activities of amphibians. This was interrupted by a heavy rain during the night of 22 November, that should have stimulated the breeding activities of many of the Isalo amphibians.

The call of *S. gottlebei* was recorded using a Sony TCD-D100 digital recorder, with a semi-directional microphone. The air temperature at the moment of recording was 21 C, and the water temperature was 19 C. In the light of a low intensity head-lamp we identified five calling males swimming on the pool's surface, or clinging to the rocky border. The acoustic emission was accompanied by the inflation of the typical blackish subgular vocal sac, and the call lasted more than 20 sec. Unfortunately,

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\* Corresponding author. Tel: +39-011-4326306;  
Fax: +39-011-4323-331;  
E-mail address: f.andreone@libero.it

we failed to take photographs of the calling individuals, since they suddenly stopped vocalizing when approached and dived. We did not find any females or clutches that night.

The sound analysis was carried out with the software Voxys 5.0 (Candelo, 2004). The sonagram for a part of the call of one male is shown in Fig. 1. The call consisted of a long series of short, unharmonious notes (Fig. 1). The note duration ( $\bar{x} \pm \text{SD}$ ) was  $77.25 \pm 18.51$  ms (range=55–110 ms,  $n=12$ ), and the inter-note interval was  $35.42 \pm 13.28$  (range=20–59 ms,  $n=12$ ), The intensity of notes was constant for the duration of the call. Note repetition rate was 32–36 per second. The dominant frequency was 500–1400 Hz. We consider it a typical advertisement call, since it had an evident reproductive meaning and was emitted by males without any apparent territorial behaviour.

The description of *S. gottlebei*'s call also gives us the opportunity to provide a short overview and comparison of the acoustic aspects of the other Malagasy microhylids. Of the three microhylid subfamilies present on the island, the Cophylinae includes terrestrial and arboreal species (Andreone et al., 2004) which inhabit rainforests, and emit calls usually from the ground or underground (*Stumpffia*, *Plethodontohyla*, *Rhombophryne*), or from more elevated positions (*Platypelis*, *Anodonthyla*). Their calls consist of virtually

endless series of notes, and are usually stopped only after an external disturbance or loss of motivation. The Dyscophinae (*Dyscophus*) emit short series of unharmonious calls from the water, where they go to breed (Glaw and Vences, 1994). Of the Scaphiophryninae, vocalisations are known for the genera *Paradoxophyla* and *Scaphiophryne*. While for the enigmatic *Paradoxophyla palmata* the calls consist of pulsed melodious trills produced underwater (Glaw and Vences, 1994), the calls of *Scaphiophryne* are different and variable. Indeed, *Scaphiophryne* species may be apparently clustered into two different groups based on the acoustic characteristics. *Scaphiophryne madagascariensis* (Vences et al., 2002), *S. menabensis* (Glos et al., 2005), and *S. brevis* (pers. obs.) emit call series inflating a large vocal sac at repeated intervals. On the other hand, the call of *S. gottlebei* appears similar in spectral and time parameters to those of *S. spinosa* and *S. boribory* (Vences et al., 2003), and is represented by an almost continuous trilling series of notes. In the latter two species, the note repetition is much slower and emission frequency is lower than in *S. gottlebei* (21–23 notes/s in *S. spinosa* [frequency=600–1000 Hz] and 25 notes/s in *S. boribory* [400–1000 Hz]). Further study is desired to examine whether this pattern of acoustic differences reflects phylogenetic affinities of *S. gottlebei* and other *Scaphiophryne* species.

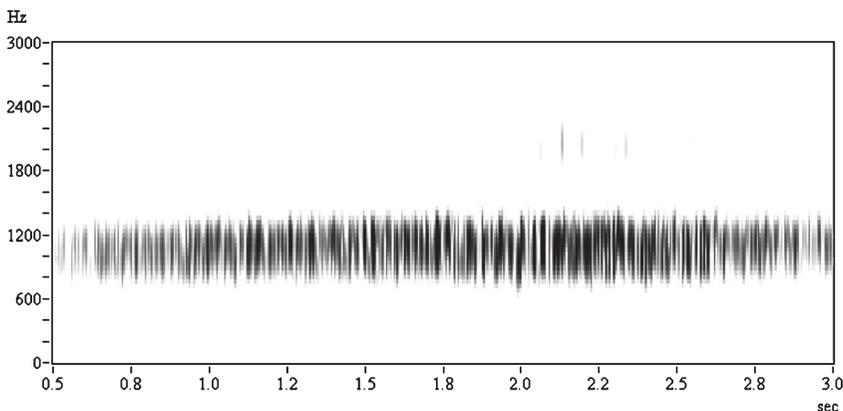


FIG. 1. Sonagram of part of an advertisement call of *Scaphiophryne gottlebei* from Zahavola (Isalo Massif).

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