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MATING CALL OF THE BURROWING FROG, *RAMANELLA MONTANA* (JERDON1859)

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ABSTRACT : Mating calls of *Ramanella montana* were recorded from 1995-1997 at Sringeri (Western Ghats). Calls are given in in series with variable call interval. Calls are made up of harmonic pulses with a frequency range of 375-3420 Hzs. A subharmonic is observed between 400-475 Hzs. The acoustical properties show variations in comparison with its generic associate and also with other microhylids *M. ornata* and *M. rubra.*

INTRODUCTION

Acoustic signals are of central importance to the biology of anurans to ensure reproduction[20]. Males produce a call that contains species specific information and this call usually functions in both male interaction, and attractnig females, and it is termed as mating call or advertisement call[21]. Several reports are available on the role of acoustic communication in anurans[1,2,3,4,5,9,15,16,17-19,21]. The genus *Ramanella is* native to India and Srilanka[6] with six species distributed in India. Bioacoustic studies in the genus are limited to *Ramanella variegata*[10]. In the present study we choose *Ramanella montana* as little information is available about the species[12,14]. Here we describe its mating call and calling behaviour.

MATERIALS AND METHODS

The study sites were located in Western Ghats of India around Sringeri (13° 25' N; 75° 13' E). Behavioural observations and recordings of the mating calls were made from 1995-1997. Recording equipments included AKAI FS 490 cassette tape recorder (4.8 cm/s speed) andAKG D 707C/190 C, D-1000 i microphones. LUTRON SPL meter was used to measure sound pressure level (SPL). The calls were recorded at 20-23° C air temperature and 90-93% relative humidity. Calls of 20 frogs (N=20) were evaluated by acoustic analyser computer MOSIP (R) spectro analysis V6 8, 41/89, MEDAV GmBH, at Zoologisches Institut, University of Bonn, Germany. Statistical analysis was done with the statographic program STSC, Inc., Knoxville, TN, USA.

RESULTS AND DISCUSSION

Ramanella montana is distributed in some parts of Western Ghats. Its dorsal side is brown coloured with dark spots. The snout vent length from 34-36 mm. Males are identified by the presence of single subgular vocal sac at the time of breeding. During calling the vocal sac is fully expanded and it attains a spherical shape. The calling period begins immediately after two or three heavy monsoon showers i. e., in the month of June/July, and lasts till August/September. Calling activity starts after the sunset i.e., at 19.00-19.30 hrs and continues up to 6.00 am. Males call in small water ponds or drainage canals by floating on water surface. Calls are given in uniform series, for a long time with variable call intervals. Often two nearer frogs called in alternation and the call of one animal exactly spaced with the call interval of the other. Females approach the nearest calling male and axillary amplexus is formed. Paired frogs move towards the periphery of the water body. Each mating call consists of 2 pulse groups without

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Table 1 : Acoustical features of the mating calls of *R. montana*

Parameter	Sample size (n)	Mean+SE	Range
Pulse number (N)	25	34.9±0.46	30-40
Call duration (ms)	75	202.3±1.8	163-227
Call interval (ms)	75	880.1±29.2	461 – 1556
Call period (ms)	75	1084.4±29.7	fc<?/,-17754(Uid

pulse group interval (Fig 1 B). The first pulse group is small with 8-10 pulses and is followed by a large pulse group of 25-30. pulses. Acoustic features of the calls are given in Table 1. The pulses are without the pulse intervals in both the groups. The amplitude of the first pulse of the first pulse group is slightly smaller than the subsequent two pulses and later the pulse size decrease. The second pulse group begins with largest pulse subsequently there is no significant amplitude modification except the last 4-5 pulses which gradually decrease in their size. The call consists of 11-16 harmonics. The first and second harmonics are dominant, and 10-13 are emphasized (Fig. 1C). In some cai's a subharmonic exists between 400-475 Hzs. Fundamental frequency lies between 600-700 Hzs. The sound energy is concentrated between 375-3420 Hzs and the sound pressure level varies from 62-65 dB. Number of factors act as premating isolating mechanisms in anurans: the matting call, the size of the animal, the microhabitat, the duration of the reproductive period, and the sites of calling[18]. Acoustic features of the mating call of *R. montana* differ from *Microhyla* or/iora[78,13] and *Micro hy la rubra*^. in having more number of pulses, high call duration and call interval, low fundamental frequency and presence of distinct harmonics. In contrast with above, there exists a close resem blance with its generic associate i.e., *Ramnella variegata'"*. except for the features like pulse number, (/?. *m* = 34.9 ± 0.46., /?. *v.* = 96 + 3.6), fundamental frequency (/?. *m* = 600-700 Hzs., *R. v* = 400-700 Hzs) and presence of subharmonics. The variation in the acoustical characters of/?, *montana* isolate the species, not only from other individuals but also from its closest relative *R. variegata.* In addition, selection of calling site and absence ofsympatric species help the female to locate the male without difficulty.

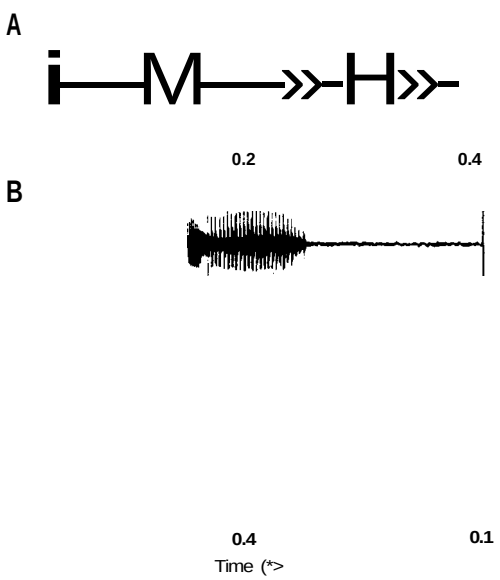

Figure 1. : (A) Shows oscillogram of four mating calls (time 0.4s) Note the call interval. **(B)** Shows oscillogram of a single mating call. Note the small pulse group (8 pulses) and the large pulse group (25pulses) (C) Shows sonagram of the mating call. Note the harmonics.

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