

RANA SIBERU DRING, MCCARTHY & WHITTEN, 1990 - A FIRST RECORD FOR PENINSULAR MALAYSIA (AMPHIBIA: ANURA: RANIDAE)

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ABSTRACT. – Previously regarded as an endemic anuran to the Indonesian island of Siberut (west of Sumatra), *Rana siberu* Dring, McCarthy & Whitten, 1990, has subsequently been known to occur on mainland Sumatra. This species has recently been found in a lowland rainforest in Pahang, Peninsular Malaysia and its occurrence in the country is hereby reported for the first time. This find represents an eastward extension of its geographic range, and its biogeographical implications are discussed.

KEY WORDS. – *Rana siberu*, Ranidae, Peninsular Malaysia, Sumatra, Siberu, Sunda, biogeography.

INTRODUCTION

In the most comprehensive account of the terrestrial herpetofauna of the Mentawai group of islands (west of Sumatra, Indonesia), Dring et al. (1990) described the then endemic *Rana siberu* from Siberut, the largest and northernmost among the four. The type series was collected by Anthony J. Whitten from Teitei Bulak, Sabeuleleu (1°21'S, 98°59'E) and deposited at the British Museum of Natural History, London (BMNH). The holotype (BMNH 1979.306) is an adult male, while the three paratypes (BMNH 1979.305, 307-308) consist of one female and two males.

Superficially, *R. siberu* bears a resemblance to the *R. signata* complex (Brown & Guttman, 2002), but actually possesses a unique suite of diagnostic characters which were clearly described by Dring et al. (1990). These include: (i) entirely black dorsum, without spots/blotches; (ii) uninterrupted dorsolateral stripes, from snout tip to vent, stripes red/deep orange in life; (iii) lips, limbs and lower flanks with spots (vs. barrings), yellow in life; (iv) males with enlarged humeral glands, paired subgular vocal sacs, without nuptial pads; (v) females with dorsal asperities and unpigmented ova. In addition, the calls of males are significantly different from that of *R. signata* (see Dring et al., 1990). In their definition of the *R. signata* complex, Brown & Guttman (2002) listed ten morphological characters which may be applied to the members in this species group. However, *R. siberu* departs from this group in its lack of nuptial pads in the males (character seven in Brown & Guttman, 2002). At the present

moment, it would be difficult to assign *R. siberu* to other known species groups within Sundaic representatives of *Rana*. This is due to our incomplete knowledge of the other important characters, especially the acoustic and larval identities.

Despite the initial assumption that *R. siberu* was an island endemic, the frog has subsequently been recorded from various parts of mainland Sumatra, including Aceh, Bengkulu and West Sumatra (Iskandar & Colijn, 2002; D. T. Iskandar, pers. comm.). This paper formally reports the occurrence of *R. siberu* in Peninsular Malaysia for the first time, based on an adult male collected from the catchment area of Sungai Temir, within the Lakum forest reserve, Raub, Pahang (3°40'N, 101°55'E).

MATERIALS AND METHODS

The Malaysian specimen was collected on the night (ca. 2200 hrs) of 17 March 2003 in lowland primary forest, from the edge of a temporary forest pool (ca. 1.5 x 1.0m) by C. H. Lim. This pool was among swampy, waterlogged areas away from streams. It was syntopic with the anurans *Rana chalconota*, *R. erythraea*, *Polypedates macrotis*, *Rhacophorus appendiculatus* and *Philautus* sp. Live photographs of *R. siberu* were taken in the field prior to fixing in 10% formalin (Fig. 1). It was transferred to and stored in 70% alcohol and is deposited at the Zoological Reference Collection (ZRC) of the Raffles Museum of Biodiversity Research (RMBR),

National University of Singapore, cataloged as ZRC.1.10536. A slide vernier was used to obtain morphometric measurements (to 0.1mm). Detailed photographs of the type series (BMNH 1979.305-308) were obtained for comparisons, courtesy of the BMNH (British Museum of Natural History) Herpetology Department staff.

EXAMINATION AND COMPARISONS

The live colouration of ZRC.1.10536 matched that as described by Dring et al. (1990), and Whitten et al. (2000, lower fig. opp. Pg. 222). Although these vibrant colours faded upon preservation, the diagnostic markings were still unmistakable (Fig. 2). The enlarged humeral glands (length 4.2mm), lack of nuptial pads on fingers and light dots over a dark throat were readily discernible (Fig. 3). Morphometric measurements and calculations of ZRC.1.10536 are as follows: snout-vent length (SVL) 39.5mm; expressed in relation to SVL - head width 0.32, head length 0.35, eye-nostril distance 0.08, inter-narial 0.09, eye diameter 0.14, tympanum diameter 0.07, tibia length 0.51.

DISCUSSION

The fact that *Rana siberu* is now known to occur as far east as Peninsular Malaysia is consistent with known prehistoric land connections between the Mentawai islands, Sumatra and the Malay Peninsula. It has been postulated that physical connections between the Mentawai islands, via the Batu islands (north of Siberu), and the rest of the Sunda shelf occurred about one million years before present (Heaney, 1986; Hall, 1996, 1998; Voris, 2000). This would have allowed the mutual flow of fauna between Siberut, Sumatra and the Malay Peninsula. However, as a result of rising sea levels and the deep channels between the Mentawais and the west coast of Sumatra, Siberut has been isolated relatively early (more than 250,000 years before present). According to present day bathymetry readings, the waters between north

Siberut and Batu islands are ca. 200m deep, while the channel between east Siberut and west coast of Sumatra reach depths of 400m (Heaney, 1986; Hall, 1996; Voris, 2000).

In the last 250,000 years, the maximum decrease in sea levels has been estimated to be 120m, at which point Siberut would already have been clearly separated from the Batu islands, which were still very much a part of Sumatra (Voris, 2000; Inger & Voris, 2001). While this relatively long period of isolation appears to have given rise to high levels of speciation among the non-volant mammals [more than 80% island endemics (Dring et al., 1990)], the herpetofauna still registers high affinities with Sumatra and the rest of the Sunda shelf. In Table 5 of Dring et al. (1990), only two of the lizards and two of the snakes were considered to be endemics, while *Rana siberu* constituted the only anuran which was (at that time) thought to be endemic. Thus, the possibility now of finding Siberut-‘endemic’ reptile species on Sumatra (or even the Malay Peninsula) should not be discounted as future research is conducted.

From the checklist compiled by Dring et al. (1990, Table 1), it may be seen that at least 13/16 (81%, including *Rana siberu*)



Fig. 1. Live adult male *Rana siberu* Dring, McCarthy & Whitten, 1990 (ZRC.1.10536; SVL 39.5 mm) from Lakum forest reserve, Pahang, Peninsular Malaysia. Note (i) uninterrupted dorsolateral stripe (bright orange in live) from snout tip to vent; (ii) lack of spots/blotches on dorsum and immediately below dorsolateral stripes; (iii) spots, instead of barrings, on hindlimbs. Photographed by C. C. Lim.

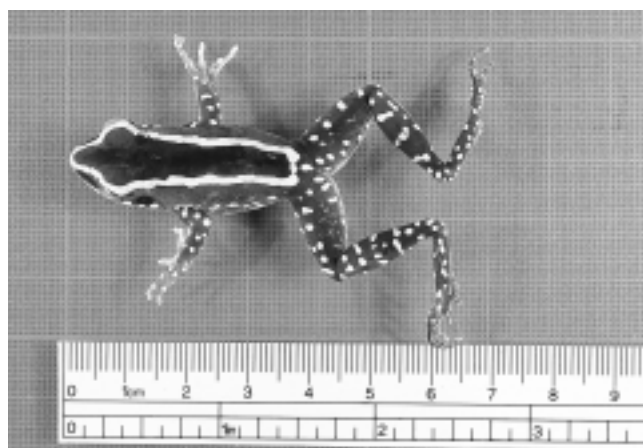


Fig. 2. Dorsal aspect of preserved *Rana siberu* (ZRC.1.10536). Upon preservation, stripes and spots faded to a pale cream colour.

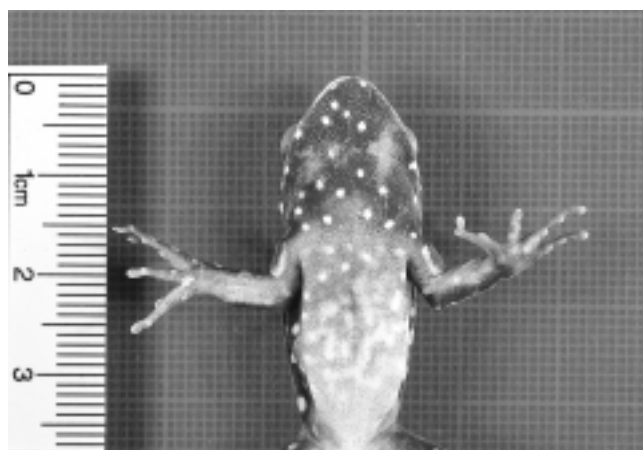


Fig. 3. Ventral aspect of preserved *Rana siberu* (ZRC.1.10536). Note darkly pigmented throat, scattered light spots, enlarged humeral glands (length 4.2 mm), and lack of nuptial pads.

of the frogs in Siberut also occur in the Malay Peninsula. For the Siberut lizards, 18/22 (82%) are also found in the Malay Peninsula. For the snakes, 29/33 (88%) are also known from the Malay Peninsula. Comparisons of herpetofaunal affinities among the various land masses within the Sunda shelf has generated highest scores between Sumatra and the Malay Peninsula. Calculations of similarity indices by Inger & Voris (2001) resulted in the final scores of 0.53 for frogs and 0.71 for snakes between Sumatra and the Malay Peninsula. The next strongest affinity was that between the Malay Peninsula and Borneo, with scores of 0.35 and 0.67 for the frogs and snakes respectively.

Despite a relatively high occurrence of shared anuran species between Sumatra and the Malay Peninsula, each of these land masses has their own share of endemic frogs, with 21/82 (26%) for Sumatra and 37/97 (38%) for the Malay Peninsula (Inger & Voris, 2001). However, with continued field surveys, the likelihood of finding Sumatran 'endemics' in the Malay Peninsula or vice versa may be increased, especially with the lowland species, as in *Rana siberu*.

For *R. siberu*, it seems odd that the species has been discovered in Sumatra and the Malay Peninsula only in the last decade, despite historical herpetological surveys in both areas. *R. siberu* may be a relic species that could be confined to limited localities or highly localised populations wherever it occurs (H. K. Voris, pers. comm.). Ecological aspects such as its population densities or breeding patterns require further investigations. The larval identity of this ranid still remains unknown.

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