

### Breeding activity of *Rhacophorus prominanus* SMITH, 1924, from Peninsular Malaysia

Among the genera and species of the tree frog family Rhacophoridae, various developmental and reproductive modes are found, including life history traits such as larval or direct development and foam nest production (DUELLMAN & TRUEB 1986). The latter is known in the genera *Polypedates*, *Rhacophorus*, *Chiromantis* and *Chirixalus* (GROSJEAN et al. 2008). Foam nests are usually deposited in or on vegetation above the water (INGER 1966; BERRY 1975; IBRAHIM et al. 2008) to protect the eggs from desiccation (DUELLMAN & TRUEB 1986). The foam originates from amplexant pairs who whisk their skin secretions during the amplexus (GRISMER 2011). Numerous rhacophorid species from Malaysia including *Polypedates leucomystax* (GRAVENHORST, 1829) (BERRY 1964; SHERIDAN 2008), *P. macrotis* (BOULENGER, 1891) and *Rhacophorus nigropalmatus* BOULENGER, 1895 (INGER & STUEBING 1989) deposit their eggs in foam nests. In *P. leucomystax*, multiple males were seen in amplexus with a single gravid female (FENG & NARIN 1991; GRISMER 2011).

*Rhacophorus prominanus* SMITH, 1924, is a medium-sized tree frog of 65–68 mm snout-vent-length (Fig. 1). For a concise morphological diagnosis see BERRY (1975). This species is native to Indonesia, Malaysia and Thailand where it is recorded between 250 and 1,100 m a.s.l. (SUKUMARAN et al. 2004). In Peninsular Malaysia, it can be encountered perched on leaves and branches of vegetation in primary rain forest and clearing areas near primary forest (BERRY 1975). The existence of *R. prominanus* has been documented in several forested areas including Jor, Batang Padang Perak, which is the type locality of this species, Templer Park Selangor, Kuala

Tahan Pahang, Gunong Benom Pahang (BERRY 1975), Ulu Muda Forest Kedah (JULIANA et al. 2002), Bubu Forest Perak (IBRAHIM et al. 2011) and Bukit Fraser Pahang (NORHAYATI et al. 2011).

Building its foam nest in small forest rain pools and puddles, including the beds of intermittent streams (SUKUMARAN et al. 2004) is almost everything that was known about the reproductive behavior of *R. prominanus*. In the present note, the author reports the first data on oviposition sites, amplexus behavior, foam nest construction, egg clutches and egg diameter of *R. prominanus* from Peninsular Malaysia (Figs. 2–4).

On 15 November, 2014, between 19:00–19:30 h amplexant individuals of *R. prominanus* were observed at Sungai Sedim Recreational Forest, Kedah, Malaysia (5° 25'N, 100°46'E; elevation about 200 m a.s.l.). Two males grasping a single gravid female were perched on leaves approximately 2.5–3 m above a shallow rock pool, at the edge of the main river. The size of the shady and clear water rock pool located on a large granite boulder was approximately one meter length, 0.5 m width and 3–18 cm depth. It was filled with dead leaves and twigs on top of a sandy-pebbly bottom.

Both males clung to the female in axillary amplexus, one from the dorsal side in almost normal position, the other from lateral, the first male being posterior to the second. The female individual had flattened, pressed her body on the leaves, and gripped the fingers on the outer edge of the leaves, to support her own weight and that of the males.

At about 19:45 h, all three frogs started wiping the posterior area of their backs with the hind limbs to produce a secretion, which is used to construct a foam nest. Around 22:30 h, the foam nest was completed and the female had deposited eggs inside it. Later the two male frogs released the female and leaped to other leaves. The exhausted female, rested on top of the foam nest for nearly 15 minutes before she leaped to another branch. After this, the author took the frogs and the foam nest to the laboratory for measurements and further inspection.

Snout-vent-length, head width and body mass of individual 1 (male), individual 2 (male) and individual 3 (female) were 57,

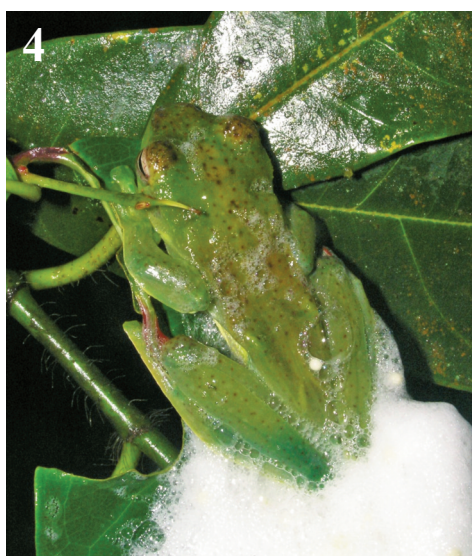
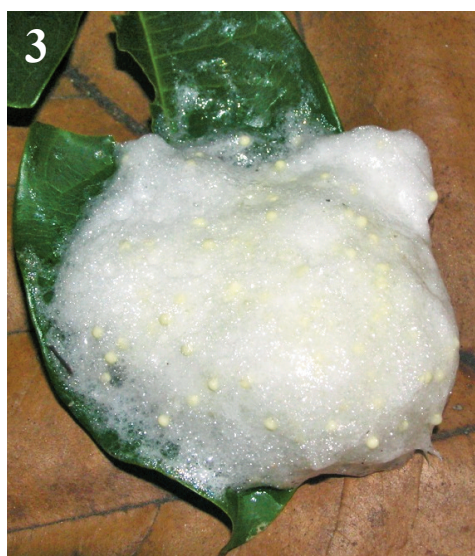


Fig. 1: Adult male of *Rhacophorus prominanus* SMITH, 1924, from Sungai Sedim, Kedah, Peninsular Malaysia.

Fig. 2: Amplexant pair of *Rhacophorus prominanus* SMITH, 1924, producing a foam nest.

Fig. 3: Foam nest of *Rhacophorus prominanus* SMITH, 1924.

Fig. 4: Female *Rhacophorus prominanus* SMITH, 1924, resting on top of the foam nest.

56 and 66 mm, 19, 19 and 23 mm, and 11, 11 and 13 g, respectively. The length, width and mass of the whitish foam nest were 85, 72 mm and 16 g, respectively. Inside the nest, 156 sphere-shaped, creamy-white eggs

were counted. Their mean diameter was  $1.7 \pm 0.17$  (1.4-2.0,  $N = 20$ ) mm. Air temperature and humidity value of the sampling site were 22 °C and 76 %, respectively. Later, the foam nest was placed in a glass aquari-

um (60 cm x 30 cm x 30 cm) containing tap water. The bottom part of a foam nest was attached in contact to the water surface. Approximately 72 hours later, 88.5 % (138 out of 156) of the eggs hatched, and the tadpoles dropped into the water. The total length of the tadpoles at hatching (stage 25; GOSNER 1960) was  $8.1 \pm 0.74$  (7-9,  $N = 10$ ) mm. Subsequent to this study, all the specimens were released back to their natural environment.

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**REFERENCES:** BERRY, P. Y. (1964): The breeding patterns of seven species of Singapore Anura.- *Journal of Animal Ecology*.- Oxford, Berlin etc.; 13: 227-243. BERRY, P. Y. (1975): The amphibian fauna of Peninsular Malaysia. Kuala Lumpur (Tropical Press), pp. X, 133. DUELLMAN, W. E. & TRUEB, L. (1986): *Biology of amphibians*. New York (McGraw-Hill Book Company), pp. 670. FENG, A. S. & NARINS, P. M. (1991): Unusual mating behavior of Malaysian Treefrogs, *Polypedates leucomystax*.- *Naturwissenschaften*, Berlin Heidelberg; 78: 362-365. GOSNER, K. L. (1960): A simplified table for staging anuran embryos and larvae with notes on identification.- *Herpetologica*, Lawrence; 16: 183-190. GRISMER, L. L. (2011): *Amphibians and reptiles of the Seribu Archipelago (Peninsular Malaysia) – A field guide*. Frankfurt (Edition Chimaira), pp. 239 [Frankfurt Contributions to Natural History, Vol. 50]. GROSJEAN, S. & DELORME, A. & DUBOIS, A. & OHLER, A. (2008): Evolution of reproduction in the Rhacophoridae (Amphibia, Anura).- *Journal of Zoological Systematics and Evolutionary Research*, Berlin; 46 (2): 169-176. IBRAHIM, H. J. & SHAHRUL ANUAR, M. S. & NORHAYATI, A. & CHAN, K. O. & MOHD ABDUL MUIN, M. A. (2008): The common amphibians and reptiles of Penang Island. Georgetown (The State Forestry Department of Penang), pp. vii, 116. IBRAHIM, J. & WONG, J. & MOHD FAZLIN, M. S. & FATAN, H. Y. & SITI HADIJAH, Y. & NORHASLINDA, S. (2011): Amphibian assemblage of Bubu Permanent Forest Reserve, Perak, Peninsular Malaysia.- *Malaysian Applied Biology*. Kuala Lumpur; 40 (1): 1-6. INGER, R. F. (1966): The systematics and zoogeography of the amphibians of Borneo.- *Fieldiana Zoology*, Chicago; 52: 1-402. INGER, R. F. & STUEBING, R. B. (1989): *Frogs of Sabah*. Kota Kinabalu (Sabah Parks Trustees), pp. 132 [Sabah Parks Publication No. 10]. JULIANA, S. & NORHAYATI, A. & SINNAPPAH-KANG, N. D. & NORDIN, M. (2002): High anuran diversity in the Sungai Weng sub-catchment, Ulu Muda Forest Reserve, Kedah; pp. 536-541. In: OMAR, R. & ALI RAHMAN, Z. & LATIF, M. T. & LIHAN, T. & ADAM, J. H. (Eds.): *Proceedings of the Regional Symposium on Environment and Natural Resources*, 10-11 April 2002, Renaissance Hotel, Kuala Lumpur, Malaysia. NORHAYATI, A. & FARAH, A. D. & CHAN, K. O. & DAICUS, B. & MUIN, M. A. (2011): An update of herpetofaunal records from Bukit Fraser, Pahang,

Peninsular Malaysia.- *Malaysian Applied Biology*, Kuala Lumpur; 40 (2): 9-17. SHERIDAN, J. A. (2008): Ecology and behaviour of *Polypedates leucomystax* (Anura: Rhacophoridae) in Northeast Thailand.- *Herpetological Review*, New York; 39 (2): 165-169. SUKUMARAN, J. & VAN DIJK, P. P. & CHUAYNKERN, Y. & ISKANDAR, D. & YAAKOB, N. & TZI MING, L. (2004): *Rhacophorus prominanus*. The IUCN Red List of Threatened Species 2004. WWW document available at < <http://www.iucnredlist.org/details/59015/0> > < e.T59015A11868932. > < <http://dx.doi.org/10.2305/IUCN.UK.2004.RLTS.T59015A11868932.en> > [last accessed: February 24, 2017]

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