

Biodiversity Record: Cinnamon bush frog amplexus and egg clutch

James Donnelly

Email: jdonne1992@gmail.com

Recommended citation. Donnelly J (2023) Biodiversity Record: Cinnamon bush frog amplexus and egg clutch. Nature in Singapore, 16: e2023030. DOI: 10.26107/NIS-2023-0030

Subjects: Cinnamon bush frog, *Nyctixalus pictus* (Amphibia: Anura: Rhacophoridae).

Subjects identified by: James Donnelly.

Location, date and time: Singapore Island, Bukit Timah Nature Reserve; 24 September 2022 at 1140 hrs and 1530 hrs; 25 September 2022 at 1720 hrs; 1 October 2022 at 1215 hrs.

Habitat: Primary lowland dipterocarp forest. In a water-filled hollow approximately 0.5 m above the ground in the trunk of a large tree adjacent to a walking trail. The pool in the tree hollow measured roughly 15 cm (length) × 8 cm (width) × 3–4 cm (depth).

Observer: James Donnelly.

Observations: On 24 September 2022 at 1140 hrs, two cinnamon bush frogs, a male of approximately 3 cm, and a female of about 3.5 cm (snout-vent length) were observed in amplexus, semi-submerged in the tree hollow pool (Fig. 1). The male held on to the female by planting his forefeet at her shoulders. Earlier in the morning from 0700 to 0800 hrs, heavy rain had fallen during a thunderstorm. After the initial observation, the two frogs suddenly separated, possibly startled by the observer. Both frogs submerged and apparently tried to hide underwater. Ten minutes later, the female began to call repeatedly with a series of high pitched ‘peep’ and proceeded to position herself behind the male. After 40 seconds and continued calling by the female, the male moved to the rear of the female and resumed amplexus at around 1155 hrs (Figs. 2 & 3). Video footage of this behaviour can be viewed at <https://youtu.be/as4Jz2q-N6A>. Later in the day, at around 1530 hrs, the same frogs were found still in amplexus in the tree hollow, but they had exited the water and were about 5 cm directly above the pool.

The following day (25 September 2022), the observer visited the same tree hollow at 1720 hrs. The adult frogs were not present, but a clutch of 5 eggs were found attached to the interior of the tree trunk and suspended about 2 cm above the water (Fig. 4). Each egg was a grey-coloured embryo encased in a transparent gelatinous substance.

Six days later, on 1 October 2022, at 1215 hrs, the eggs were in the same position, but the five embryos have developed into tadpoles with distinct eyes and a caudal fin (Figs. 5 & 6). They were mostly grey with a distinct orange embryonic sac. No adult frogs were observed inside the tree hollow.

Remarks: In Singapore, the cinnamon bush frog appeared to be confined to the forests of the Bukit Timah and Central Catchment Nature Reserves where they are known to breed in tree holes (Baker & Lim, 2012) as shown here, as well as in a rusty water-filled oil drum (Leong & Chou, 1999). Recently, a population of cinnamon bush frog was successfully introduced and established in the small patch of rainforest at the Singapore Botanic Gardens with the provision of artificial phytobelms as breeding habitats (Ng & Nurul Izzah, 2021). The images shown here are random in-situ snapshots of a pair of mating *Nyctixalus pictus* and a clutch of viable eggs which may have been produced by them. In six days, the embryo developed into early tadpoles prior to dropping into the water to continue their metamorphosis.

Literature cited:

Baker N & Lim KKP (2012) Wild Animals of Singapore. A Photographic Guide to Mammals, Reptiles, Amphibians and Freshwater Fishes. Updated edition. Draco Publishing and Distribution Pte. Ltd. and Nature Society (Singapore). 180 pp.

Leong TM & Chou LM (1999) Larval diversity and development of the Singapore Anura (Amphibia). Raffles Bulletin of Zoology, 47(1): 81–137.

Ng D & Nurul Izzah T (2021) Successful translocation of the cinnamon bush frog into the rain forest. Gardenwise, 56: 15–17.

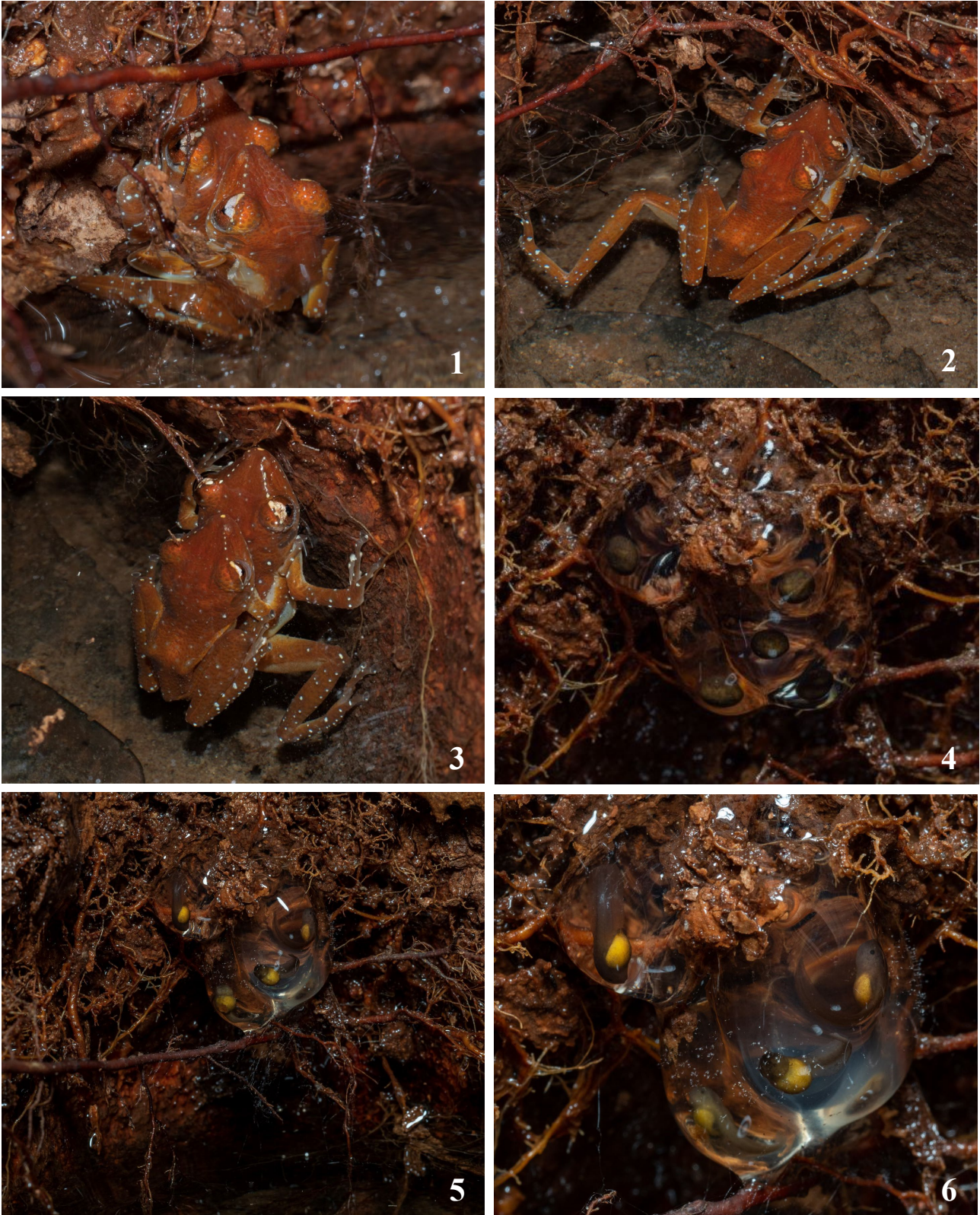


Fig. 1. Initial position of *Nyctixalus pictus* in amplexus partially submerged in water-filled tree hollow on 24 September 2022 at 1140 hrs. Figs. 2 & 3. Subsequent positions of the same frogs re-engaging in amplexus at 1155 hrs, after momentarily dislodging. Fig. 4. Clutch of 5 eggs with grey embryos suspending 2 cm above the water in the tree hollow on 25 September 2022 at 1720 hrs. Figs. 5 & 6. Five early stage tadpoles suspended 2 cm above the water in the tree hollow on 1 October 2022 at 1215 hrs. Fig. 6. Close-up view of the tadpoles. (Photographs by: James Donnelly).