

Devoted frog fathers guard their eggs from predators

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A study led by Mr K. S. Seshadri of the National University of Singapore has revealed that male white-spotted bush frogs (*Raorchestes chalazodes*) guard their fertilised eggs to prevent other cannibalistic male frogs and predators from consuming or damaging the eggs. Credit: National University of Singapore

A study led by Ph.D. candidate Mr K. S. Seshadri from the Department of Biological Sciences at the National University of Singapore's Faculty of Science has revealed that male white-spotted bush frogs (*Raorchestes chalazodes*) dedicatedly guard their fertilised eggs from other

cannibalistic male frogs and predators. The study confirmed that the adult male white-spotted bush frogs are the sole caregivers of their offspring, predominantly by attending to and guarding the eggs.

The *Raochestes chalazodes*, presumed extinct until its rediscovery in 2011 in the Western Ghats of India, is currently listed as critically endangered. Incidentally, Mr Seshadri was one of the researchers who rediscovered the frogs. While frogs typically lay their [eggs](#) in or above standing water, white-spotted bush frogs lay their eggs inside the hollow internodes of reed bamboo that grow along streambanks and their offspring emerge from the eggs as fully-formed froglets.

Courtship and paternal instincts of tiny white-spotted bush frogs

Although an adult *Raochestes chalazodes* is typically about two centimetres in length, it enters the narrow openings of the reed bamboo internodes with considerable resistance as the openings are even smaller – often less than 5 to 10 millimetres long and 3 to 4 millimetres wide. For the study, the researchers used pipe inspection cameras or endoscopes to observe [frog](#) egg clutches daily until all froglets and the attending father frogs left the spawning site. They studied a total of over 40 egg clutches across two breeding seasons in 2015 and 2016.

The researchers found that male frogs that have found suitable spots for spawning in sections of the reed bamboo will call out for female mates using the vocal sacs in their throats. An ideal spawning site will have holes at the base of the bamboo section so that rainwater does not collect and drown the eggs. A female white-spotted frog responds to the mating call by entering into the bamboo section to lay her eggs on the inner walls of the section, leaving after the male frog has fertilised the eggs.

"Father frogs will then attend to the eggs by sitting on them, possibly to keep the eggs hydrated, and they guard the eggs by standing between them and the entry hole where they will lunge at intruders and make loud alarm calls to keep them away," Mr Seshadri noted.

Every evening, the father frogs will hunt for prey close by their spawning sites before returning to their egg-sitting duties. They will call out incessantly through the night to ward off other males with cannibalistic tendencies and other predators from consuming the eggs. This continues for about 37 to 47 days when all of the eggs have either hatched or perished, typically due to predation or parasites.

About 70 percent of "fatherless" frog eggs perished

"Predation by other male frogs is the main cause of egg mortality of white-spotted bush frogs. When there were no father frogs guarding the eggs, less than 30 percent of the eggs in a clutch survived," said Mr Seshadri.

Cannibalism among frogs is not unusual. According to the researchers, adult male white-spotted bush frogs feed on unattended eggs of another male to gain from their nutritional benefit. Other possible reasons for this cannibalistic behaviour could be for the purposes of taking over another individual's territory or reducing competition of resources for emerging offspring.

Findings from this study, which was conducted in collaboration with Associate Professor David Bickford of University of La Verne, demonstrated the importance of parental care behaviour in enhancing offspring survival. The work was published online in the scientific journal *Behavioral Ecology and Sociobiology* on 14 December 2017.

More information: Kadaba Shamanna Seshadri et al. Faithful fathers

and crooked cannibals: the adaptive significance of parental care in the bush frog *Raorchestes chalazodes*, Western Ghats, India, *Behavioral Ecology and Sociobiology* (2017). [DOI: 10.1007/s00265-017-2420-3](https://doi.org/10.1007/s00265-017-2420-3)

Provided by National University of Singapore

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