

SHORT COMMUNICATION

An unusual oviposition site for *Gekko smithii* (Squamata: Gekkonidae) from peninsular Malaysia

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Gekko smithii Gray, 1842 is a large forest gecko that is abundant in tropical rainforests of southern Thailand, Malaysia, Singapore, Sumatra, Java, Borneo, and Sulawesi (Cox *et al.* 1998, Das 2007, Koch *et al.* 2009). The maximum snout-vent lengths (SVL) of adult males and females are 183 and 191 mm, respectively (Grismer 2011). The species primarily inhabits primary and secondary forests, between elevations of sea level and at least 1000 m a.s.l. (Das 2004, Daicus and Hashim 2004, Wood Jr. *et al.* 2008). The adult geckos perch on the tree trunks, in tree holes, on large rocks, and crevices rather than on the small branches or leaves (Grismer 2011). Sometimes, this arboreal gecko is found in houses (Cox *et al.* 1998, Das 2007).

The life cycle and reproductive behavior of geckos have been described by various researchers. According to Rogner (1997), a captive *Gekko smithii* laid two clutches once in a week, whereas Manthey and Grossman (1997) reported multiple clutches (consisting of two eggs) at various times during year. In another

study, *G. smithii* was found to lay two eggs glued on tree trunks (Das 2007) and attached to the underside of boulders (Grismer 2011). A clutch size of two is typical for many gecko species (Vitt 1986, Sousa and Freire 2010). The size of a gravid female, egg diameters, duration of incubation, and size of the offspring were described by Shahriza (2013). Goldberg (2009) discovered the presence of reproductively active females and males every month of the year, suggesting that *G. smithii* is reproductive throughout the year. Other gecko species such as *Cyrtodactylus malayanus* and *C. pubisulcus* also are reproductively active year around (Inger and Greenberg 1966), as are closely related species such as *Hemidactylus platyurus*, *H. frenatus* and *Gehyra mutilata* from Java, Indonesia (Church 1962), and *Dixonius siamensis* from Thailand (Goldberg 2008). Herein I describe an unusual reproduction site used by *G. smithii*, with some information about its reproductive biology.

On 23 May 2015, between 18:00 and 19:00 h, an adult *Gekko smithii* was found to be vertically perched about 4 m above ground on a bamboo trunk, at Kampung Anak Kurau, Perak (4°56' N, 100°46' E; elevation < 150 m a.s.l.). The bamboo (*Bambusa vulgaris*) was located near a small forest stream (1–2 m wide) at the

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edge of the primary rainforest. As I approached the lizard, it escaped and entered in a hole (4 cm diameter) of a bamboo trunk (Figure 1A). To find the individual, I cut the trunk and was surprised to find two juveniles, along with six hatched and two unhatched eggs that adhered inside the trunk (Figure 1B). The whitish, spherical eggs have flattened bottoms. The specimens were collected for further investigation. The length and diameter of the two unhatched eggs were 24.9×23.4 mm and 26.7×25.1 mm, respectively. The eggs and juvenile geckos were kept in separate terraria. The snout-vent length (SVL), tail length (TaL), and total length (ToL) of the juveniles were 51.4, 48.7, and 100.1 mm for Specimen 1, and 53.1, 49.5, and 102.6 mm for Specimen 2. After 21 days, the two eggs hatched and the new offspring were produced (Figure 1C). The SVL, TaL, and ToL were 38.7, 37.1, and 75.8 mm for Specimen 3, and 39.4, 37.8, and 77.2 mm for Specimen 4. The newly hatched geckos were fed crickets and raised in separate terraria. After two weeks, all the geckos were released and returned to their natural habitats. All measurements were made to the nearest 0.1 mm with digital callipers.

I do not know whether the six hatched and two unhatched eggs in the hole of the bamboo trunk were deposited by several females (communal breeding) or repeated oviposition by the same female. Repeated oviposition by the same female has been observed for *Gekko smithii* by several authors (Manthey and Grossman 1997, Rogner 1997, Goldberg 2009), however, communal nesting has not. The latter has been observed in other gecko species, including *Gonatodes humeralis* (Guichenot, 1855) (Oda 2004), *Phyllopezus pollicaris* (Spix, 1825) (Righi *et al.* 2004), *P. periosus* Rodrigues, 1986 (Lima *et al.* 2011), and *Hemidactylus agrius* Vanzolini, 1978 (Bezerra *et al.* 2011).

The sex of the single adult *Gekko smithii* sighted near the eggs was not determined. The presence of an adult may indicate egg-guarding behavior, as reported previously in *G. gecko* (Linnaeus, 1758) (Zaworksi 1987), *Tarentola*

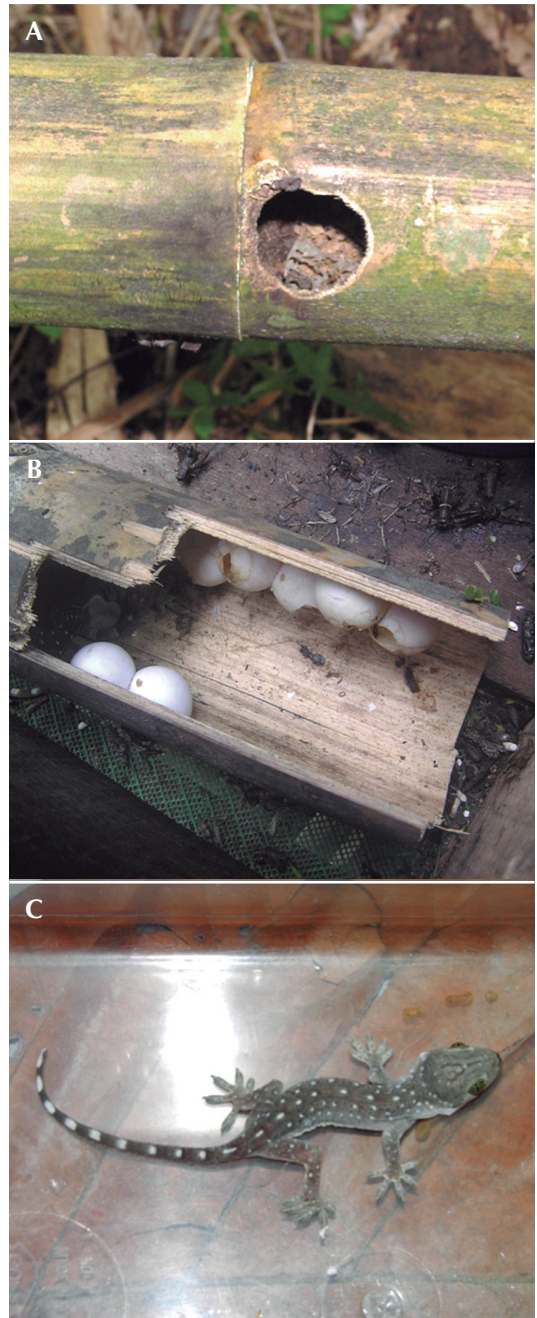



Figure 1. (A) A hole in a dead bamboo trunk used by *Gekko smithii* as oviposition site. (B) Six hatched and two unhatched eggs. (C) A newly hatched *G. smithii*.

chazaliae (Mocquard, 1895), *Rhacodactylus leachianus* (Curvier, 1829) and *Eublepharis macularius* (Blyth, 1854) (Rosler 2005), or it simply may be a female that had oviposited. Further studies are needed to elucidate more details of the reproductive behavior of this species. The presence of two juvenile geckos inside the same bamboo trunk suggests that they were using the site as their regular refuge.

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References

- Bezerra, C. H., D. C. Passos, P. C. M. D. Mesquita, and D. M. Borges-Nojosa. 2011. *Hemidactylus agrius*: reproduction. *Herpetological Review* 42: 274–275.
- Church, G. 1962. The reproductive cycles of the Javanese House Geckos, *Cosymbotus platyurus*, *Hemidactylus frenatus*, and *Peropus mutilatus*. *Copeia* 1962: 262–269.
- Cox, M. J., P. P. van Dijk, J. Nabhitabhata, and K. Thirakhupt. 1998. *A Photographic Guide to Snakes and Other Reptiles of Peninsular Malaysia, Singapore and Thailand*. London. Ralph Curtis Publishing. 144 pp.
- Daicus, B. and R. Hashim. 2004. Herpetofauna of the western region of Endau-Rompin, Johore, Peninsular Malaysia. *Malaysian Journal of Science* 23: 65–72.
- Das, I. 2004. *Lizards of Borneo. Malaysia*. Kota Kinabalu. Natural History Publications (Borneo) Sdn. Bhd. 83 pp.
- Das, I. 2007. *Amphibians and Reptiles of Brunei*. Kota Kinabalu. Natural History Publications (Borneo) Sdn. Bhd. 200 pp.
- Goldberg, S. R. 2008. Reproduction in the Siamese Leaf-toed Gecko, *Dixonius siamensis* (Squamata: Gekkonidae) from Thailand. *Texas Journal of Science* 60: 233–238.
- Goldberg, S. R. 2009. Reproduction in Smith's Green-eyed Gecko, *Gekko smithii* (Squamata: Gekkonidae). *Texas Journal of Science* 61: 225–228.
- Grismer, L. L. 2011. *Lizards of Peninsular Malaysia, Singapore and Their Adjacent Archipelagos*. Frankfurt am Main. Edition Chimaira. 728 pp.
- Inger, R. F. and B. Greenberg. 1966. Annual reproductive patterns of lizards from a Bornean rain forest. *Ecology* 47: 1007–1021.
- Koch, A., J. A. McGuire, E. Arida, R. Awal, and H. Amir. 2009. First record of *Gekko smithii* Gray, 1842 (Reptilia: Gekkonidae) from Sulawesi, Indonesia. *Salamandra* 45: 172–176.
- Lima, D. C., D. C. Passos, and D. M. Borges-Nojosa. 2011. Communal nests of *Phyllopezus periosus*, an endemic gecko of the Caatinga of northeastern Brazil. *Salamandra* 47: 227–228.
- Manthey, U. and W. Grossman. 1997. *Amphibien and Reptilien Südostasiens*. Münster. Natur und Tier Verlag. 512 pp.
- Oda, W. Y. 2004. Communal egg laying by *Gonatodes humeralis* (Sauria, Gekkonidae) in Manuas primary and secondary forest areas. *Acta Amazonica* 34: 331–332.
- Righi, A. F., C. A. B. Galdino, and L. B. Nascimento. 2004. *Phyllopezus pollicaris*: clutch size and oviposition sites. *Herpetological Review* 35: 395–396.
- Rogner, M. 1997. *Lizards*. Volume 1. Malabar. Krieger Publishing Company. 317 pp.
- Rosler, V. H. 2005. *Vermehrung von Geckos*. Offenbach. Herpeton Publisher. 264 pp.
- Shahriza, S. 2013. Notes on *Gekko smithii* Gray, 1842 (Reptilia: Gekkonidae) from Sungai Sedim, Kedah, Malaysia. *Herpetology Notes* 6: 83–84.
- Sousa, P. A. G. and E. M. X. Freire. 2010. Communal nests of *Hemidactylus mabouia* (Moreau de Jonnès, 1818) (Squamata: Gekkonidae) in a remnant of Atlantic forest in northeastern Brazil. *Biotemas* 23: 231–234.
- Vitt, L. J. 1986. Reproductive tactics of sympatric gekkonid lizards with a comment on the evolutionary and ecological consequences of invariant clutch size. *Copeia* 1986: 773–786.
- Wood Jr., P. L., L. L. Grismer, T. M. Youmans, N. B. Nasir, N. Ahmad, and J. Senwai. 2008. Additions to the herpetofauna of Endau-Rompin, Johor, West Malaysia. *Herpetological Review* 39: 112–121.
- Zaworksi, J.P. 1987. Egg guarding behaviour by male *Gekko gecko*. *Bulletin of the Chicago Herpetological Society* 22: 193.

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