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Nocturnal Hunting Activity of *Varanus salvator* in Goa Lalay Cave, Pelabuhan Ratu, Indonesia

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Abstract – We describe nocturnal predation of cave-dwelling bats by *Varanus salvator* observed during the filming of a television nature documentary series in the Goa Lalay caves at Pelabuhan Ratu, Java, Indonesia. This account appears to represent the first record of nocturnal predation, and a further example of predation on cave bats in the *V. salvator* complex.

Introduction

While generally considered to be diurnal (Gaulke & Horn, 2004), some nocturnal activity has been reported in *Varanus salvator*, including nocturnal nesting (Biswas & Kar, 1981) and scavenging (Uyeda *et al*., 2013). Here, we describe field observations of *Varanus salvator* hunting and predating on bats at night in the Goa Lalay caves at Pelabuhan Ratu, Java, Indonesia.

Study Site

The Goa Lalay cave system is located approximately 3 km from the rural agricultural community of Pelabuhan Ratu, in Sukabumi, West Java, Indonesia and is best known as a tourist attraction for its large nightly bat exodus. The site is comprised of a main cave situated in the side of a mountain, with many smaller caves occurring along the same cliff face. Our observations occurred in the main cave, which according to the local caretaker is comprised of a main dome covering an area of 1000 m^2, with a shallow lake occupying ca. 70% of the ground space inside of the cave. The main cave system has numerous smaller holes and openings connecting to the outside. The habitat on the mountain above and behind the cave is best described as secondary tropical forest with scattered human dwellings. The area in front of the cave was developed, with an artificial pond, small house and parking area, and the surrounding area leading up to the cave entrance is predominately agricultural land.

We visited the site daily from 16–19 April 2018 during the filming of a natural history television documentary (Dead by Dawn, produced by Love Productions USA for the National Geographic Wild television network). Since the subject matter of the documentary was nocturnal animals, our observations and filming were limited mostly to the evenings and at

Figs 1 & 2. *Varanus salvator* actively foraging in Goa Lalay cave.


Figs 3 & 4. Nocturnal predation by *V. salvator* on cave-dwelling bats inside Goa Lalay cave..

night, with little time spent in the cave between 0500 and 1430 h.

Air temperature at the site during our observations ranged from around 28.9 °C at the start of filming around 1530 h to around 23.9 °C by 0030 h. No rainfall occurred during the observation periods, and most of the region's precipitation seemed to occur in the afternoon hours. Humidity remained at 100% for the duration of our observations.

Observations

Varanus salvator were first observed at Goa Lalay during a film scout on 16 April 2018, with approximately 11 adults (> 1.5 m total length) observed in the cave between 1500 and 2000 h (Figs. 1 & 2). Upon our initial approach, the *V. salvator* were in various locations within the cave and appeared to be foraging along the edge of the interior lake or exploring around rocks and crevices. The presence of the filming crew and cameras did not appear to alter the monitors' behavior. Many smaller *V. salvator* were seen in the large pond outside the main cave, but not in the cave itself or after sunset.

The activity of the monitors appeared to increase at dusk as the bats began to leave the caves. We observed several *V. salvator* preying on bats that fell to the ground while in the process of leaving the cave (Figs. 3–5), recording this activity on film for the documentary (Alpert *et al*., 2019). Observed predation occurred from ca. 1500 h until around 2130 h, with sunset occurring around 2033 h each day. However, due to the depth of the cave, the premises were fully dark by around 2000 h. Over the next three days, we continued to observe crepuscular and nocturnal feeding by *V. salvator* in the cave; no signs of aggression or competition over prey items were observed between individuals. While many other potential prey species were observed in the cave including rats (species unknown) and cockroaches (potentially *Periplaneta australasiae* and/or *Pycnoscelus striatus*; Fig. 6), we only observed

Fig. 5. A large *V. salvator* feeds on a bat that fell to the cave floor at night.

Fig. 6. Although present in the cave, predation on cockroaches by *V. salvator* was not observed.

Fig. 7. Bats inhabiting the roof of the Goa Lalay cave system.

predation on bats which had fallen from the roof of the cave. Identification of the bat species predated on by the *V. salvator* was not possible; several species are known to occur in Goa Lalay including *Tylonycteris* spp, *Hipposideros* spp, *Miniopterus* spp, *Chaerephon plicata* and *Kerivoula picta* (Fig. 7).

The nights when these observations occurred were particularly dark, with 16 April being the first night of the new moon. No moonlight was observed over the course of these observations, ruling out the possibility that this unusual nocturnal activity was facilitated by lunar luminance.

To our knowledge, this is the first documented instance of *V. salvator* hunting natural prey items after sunset, although nocturnal scavenging on human food scraps and a pig carcass have been observed in the species (Uyeda *et al*., 2013). This also appears to be only the second report of a member of the *V. salvator* complex preying on cave-dwelling bats (Tanalgo, *et al*., 2020). The combination of nocturnal hunting of an unusual prey item and use of an unusual habitat highlights the remarkable adaptability of the *V. salvator* complex. Further research into the prey adaptability of other *Varanus* species could have ecological and conservation implications.

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References

Alpert, D., K. Bartel, M. Clarkson, B. Furst, S. Furst, A. Hoppin, R. Kirkman, D. Massyn & R. McKerrow. 2019. Night of the Living Dead, Dead By Dawn. National Geographic Wild Television Network.

Biswas, S. & S. Kar. 1981. Some observations on nesting habits and biology of *Varanus salvator* (Laurenti) of Bhitarkanika Sanctuary, Orissa. Journal of the Bombay Natural History Society 78: 303–308.

Gaulke, M. & H.-G. Horn. 2004. *Varanus salvator* (Nominate Form). Pp. 244–257. *In*: Pianka, E.R. & D.R. King (eds.), Varanoid Lizards of the World. Indiana University Press, Bloomington.

Tanalgo, K.C., N. Monfort & A.C. Hughes. 2020. Attacked from above and below: New ethological evidence on the predation strategies of corvid and varanid on a cave-roosting bat. Ethology, Ecology & Evolution 32(6): 596–610.

Uyeda, L. & E. Iskandar. 2013. Nocturnal activity of *Varanus salvator* on Tinjil Island, Indonesia. Biawak 7(1): 25–30.

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