

## SHORT COMMUNICATION

## The first evidence of breeding of the endangered Sunda Otter Civet *Cynogale bennettii* (Carnivora: Viverridae) in Peninsular Malaysia

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**Abstract.**

The Sunda Otter Civet (*Cynogale bennettii*) is one of the least known of the small carnivore species occurring in the lowland rainforests of the Thai-Malay Peninsula. Threatened primarily by habitat loss and degradation, there are few observations of the species in recent years, the majority being that obtained from camera trap surveys conducted in lowland Borneo and Sumatra. Evidence of its occurrence in peninsular Thailand remains anecdotal. In Peninsular Malaysia, the Sunda Otter Civet is very rare and there have only been two records since 1990. I report on five new photographic records of the Sunda Otter Civet obtained over two months of incidental camera trap sampling at the fringes of the Lenggong Forest Reserve, Johor state, a new locality for the species in the peninsula. In one observation, an adult and two young was documented foraging near an animal wallow at the interface of degraded lowland dipterocarp and freshwater swamp forest. This is one of few evidence of breeding for this rare carnivore across in recent decades and a first for the Peninsula. This record adds support to earlier observations on the species' ability to utilise disturbed habitats.

**Keywords:** Viverrid, lowland rainforest, swamp, carnivore, aquatic.

The rainforests of the Thai-Malay Peninsula support a rich assemblage of small mammalian carnivores, including no less than 10 species of civets (Family Viverridae) (Medway 1969, Francis 2008), and often with multiple co-occurring species at a single site. The least known of the Malayan viverrids is the Sunda Otter Civet *Cynogale bennettii* Grey 1847, an unusual member of the family given its presumed semi-aquatic habits (Heydon & Bulloh 1996, Francis & Barrett 2008, Veron *et al.* 2006) and thus strong association with water bodies (Wilting *et al.* 2010). Although apparently widespread in the lowland dipterocarp and peat swamp forests across Sundaic Southeast Asia, the majority of recent records of the species are from sites in Sumatra (i.e. Way Kambas National Park) and Borneo (e.g. Danum Valley, Deramakot Forest Reserve, Kinabatangan Wildlife Sanctuary, Bukit Sarang Conservation Area, Sabangau National Park) where the majority of records were obtained from camera trap surveys (Veron *et al.* 2006, Gimán *et al.* 2007; Cheyne *et al.* 2010a, Wilting *et al.* 2010; Cheyne *et al.* 2016).

The paucity of records of the Sunda Otter Civet in its range, including the absence of documentation from surveyed areas with fairly undisturbed habitat, suggests that the species either occurs at very low densities, or that existing survey approaches may be biased against detecting the species (Ross *et al.* 2015). For instance, Cheyne *et al.* (2010b) reported only two photographs of the species from camera traps over 602 trap-nights at

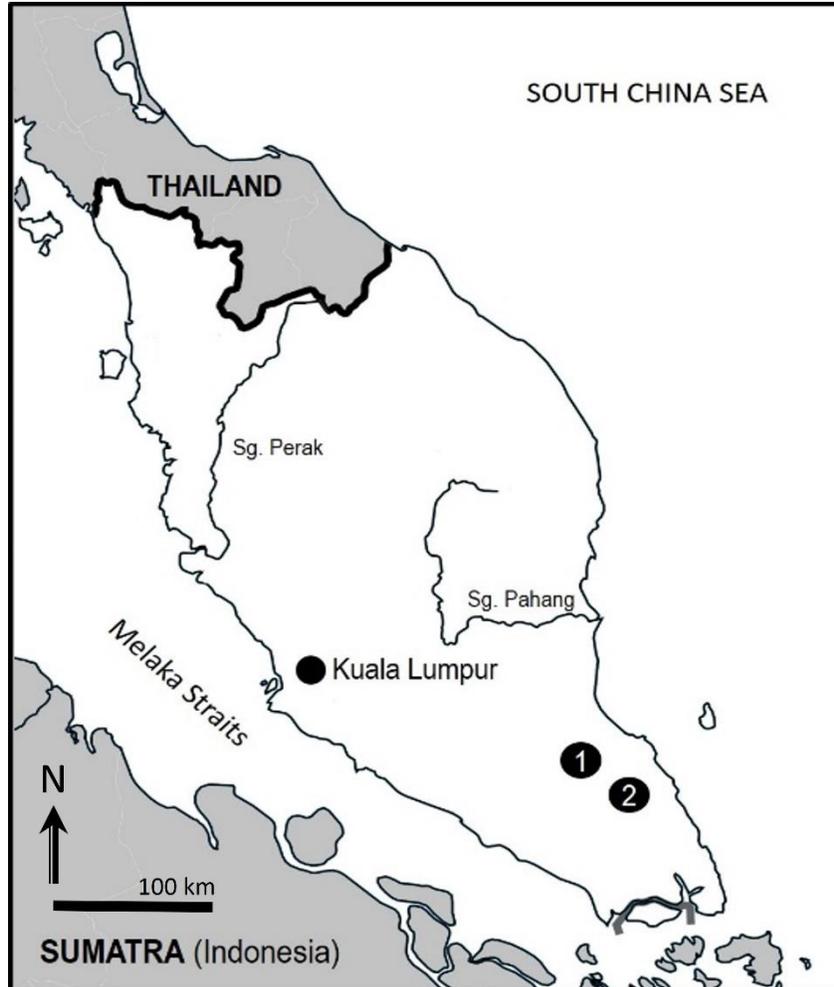
Sabangau National Park, Central Kalimantan, a relatively low encounter when compared to other small carnivores recorded there. Prior to these records, there were only six reported sightings in Indonesian Borneo (Veron *et al.* 2006). Similarly, camera trap surveys in the Deramakot Forest Reserve in Malaysian Borneo yielded only 10 images of the species (<2%) out of nearly 800 images of small carnivores. Intriguingly, a survey of the civet assemblage by Heydon & Bulloh (1996) in the Ulu Segama Forest Reserve found the species in only primary forests, but not logged forests. In view of its rarity and the rapid loss of lowland forests across Sundaic Southeast Asia, the species is currently classified as Endangered according to IUCN (Ross *et al.* 2015).

In the Thai-Malay Peninsula, there are only four recent records of the Sunda Otter Civet since 1990. Two records from Peninsular Malaysia are from the Endau-Rompin forest (Ross *et al.* 2015), a large protected block of predominantly lowland, hill dipterocarp and swamp forest along the border of Johor and Pahang state (Figure 1); records from Peninsular Thailand are from Kaeng Krachan National Park and Phru Toa Daeng Peat Swamp (Veron *et al.* 2016). Surprisingly, there are no known records from Taman Negara, the largest protected area (4,343 km<sup>2</sup>) in the Peninsular Malaysia. Here, I report on five incidental observations of the Sunda Otter Civet from two camera traps set to survey galliform birds over the period of March–April 2016 at the fringes off the Lenggong Forest Reserve, Johor. Lenggong lies about 25 km to the southeast of the Endau-Rompin National Park, and constitutes old-growth and logged lowland dipterocarp and freshwater swamp forests. Connectivity between Endau-Rompin and Lenggong (a part of the wider Endau-Kota Tinggi Wildlife Reserve) is broken by a patchwork landscape of deforested land, plantations and roads (i.e. Federal Route 50 linking the towns of Kluang and Jemaluang).

A total of five camera trap photographs of the Sunda Otter Civet were obtained from two camera traps over a survey period from 17 March to 12 April 2016 (Table 1) near the fringes of the Lenggong Forest Reserve (2°10'N, 103°40' E). Both camera traps were placed in logged swamp forest in the proximity of wet areas consisting of animal wallows and small pools and spaced 1.5 km apart along a logging track. While four images involved singletons, one image obtained on the 12 April comprised one adult and two young (Figure 2). All images were taken between dusk and early morning, the earliest at 19h57 and the latest at 07h20 hrs, strongly alluding to the species' primarily nocturnal foraging behaviour.

These observations of Sunda Otter Civet in Lenggong are significant as they constitute the only recent records of the species in the Malay Peninsula outside the nearby Endau-Rompin landscape. These records are also the first evidence of breeding in the peninsula for the species. Consistent with other authors, these observations indicate that the Sunda Otter Civet is able to utilise logged and degraded forest (e.g. Gimán *et al.* 2007) although the extent to which it tolerates such altered, degraded and fragmented habitat remains poorly understood (Ross *et al.* 2015; Cheyne *et al.* 2016). Similarly, these observations indicate a propensity of the species to favour low-lying forest habitat with

abundant water bodies (e.g. in Cheyne *et al.* 2016), a habitat that can be difficult to survey logistically. It is possible that the drier than usual conditions at the site during the period of survey due to the El Nino phenomena, may have reduced available habitat and made the animals forage more widely.



**Figure 1.** Recent records of the Sunda Otter Civet in the Malay Peninsula. (1) Endau-Rompin Forest, (2) Lenggor Forest Reserve (this study).

**Table 1.** Summary of camera trap data of Sunda Otter Civet.

Number of individuals	Date	Time (hrs)	Habitat type
1	4 March 2016	07h20	Swamp forest
1	17 March 2016	06h00	Swamp forest
1	17 March 2016	20h02	Swamp forest
1	25 March 2016	19h57	Swamp forest
3	12 April 2016	05h01	Animal wallow

The proximity of this record to the earlier Peninsular Malaysia records reported from Endau-Rompin (Ross *et al.* 2015) indicates that lowland dipterocarp and freshwater swamp forests in the southern part of the Thai-Malay Peninsula may be a stronghold for the

species. Interestingly, there has been no record of the species from the Southeast Pahang peat swamp forest from recent surveys (Lim, K.C. *in litt.* 2016), where considerable suitable habitat exists, though this is more likely an artefact of poor sampling effort. It could also be that the Sunda Otter Civet is more dependent on low-lying and swampy forests, a habitat relatively scarce further north and in much of Pahang, wherein Taman Negara National Park lies, and which tends to be hillier.



**Figure 2.** Adult Sunda Otter Civet seen with two young foraging by an animal wallow.

The high rates of deforestation in the state of Johor (Peh *et al.* 2006, Lim *et al.* 2012), and much of southern Pahang suggests that the Sunda Otter Civet may have lost a large proportion of its forest habitat in the region. Additionally, swamp forests, which are an important habitat for the species, are increasingly degraded by forest fires, logging and agricultural expansion across the region (Ross *et al.* 2015, Yong & Peh 2016). The observations here, consistent with that of others (e.g. Cheyne *et al.* 2010a; 2010b), suggests the Sunda Otter Civet occurs in low-lying swamp forest with many water features such as pools and animal wallows. However, the difficult terrain in both inundated freshwater and peat swamp forest, habitats of known importance to the Sunda Otter Civet, remains under surveyed (see Mathai *et al.* 2016), and as such, little is known of the species ecology and habitat requirements (e.g. Ross *et al.*, *in press*, Cheyne *et al.*, 2016). Increased surveys for the otter civet should be conducted in remaining protected areas in Johor and southern Pahang, particularly the larger remaining forest blocks protected within the Endau-Kluang and Endau-Kota Tinggi wildlife reserves to better understand its distribution and status in the southern Thai-Malay Peninsula.

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## References

- Belden G, Stuebing R & Nyegang M. 2007. Small carnivores in mixed-use forest in Bintulu Division, Sarawak, Malaysia. *Small Carnivore Conservation* 36: 35–37.
- Cheyne SM, Husson SJ, Chadwick RJ, Macdonald DW & Hutan S. 2010a. Diversity and activity of small carnivores of the Sabangau Peat-swamp Forest, Indonesian Borneo. *Small Carnivore Conservation* 43: 1–7.
- Cheyne SM, Husson SJ & Macdonald DW. 2010b. First Otter Civet *Cynogale bennettii* photographed in Sabangau Peat-swamp Forest, Indonesian Borneo. *Small Carnivore Conservation* 42: 25–26.
- Cheyne SM, Mohamed A, Hearn AJ, Ross J, Samejima H, Heydon M, Augeri DM, van Berkel T, Boonratana R, Fredriksson G, Hon J, Marshall AJ, Macdonald DW, Belant JL, Kramer-Schadt S & Wilting A. 2016. Predicted distribution of the otter civet *Cynogale bennettii* (Mammalia: Carnivora: Viverridae) on Borneo. *Raffles Bulletin of Zoology*, Supplement, 33, 126–131.
- Francis CM & Barrett P. 2008. *A field guide to the mammals of South-East Asia*. New Holland Publishers.
- Giman B, Stuebing R, Megum N, McShea WJ & Stewart CM. 2007. A camera trapping inventory for mammals in a mixed use planted forest in Sarawak. *The Raffles Bulletin of Zoology* 55(1): 209–215.
- Heydon MJ & Bulloh P. 1996. The impact of logging on sympatric civet species in Borneo. *Oryx* 30(1): 31–36.
- Lim KS, Yong DL, Lum W & Lim K. C. 2012. Birding the tip of the Malay Peninsula: bird diversity and birding sites in Johor. *BirdingAsia* 17: 81–93.
- Mathai J, Duckworth JW, Meijaard E, Fredriksson G, Hon J, Sebastian A, Ancrenaz M, Hearn AJ, Ross J, Cheyne S, Borneo Carnivore Consortium. & Wilting A. 2016. Carnivore conservation planning on Borneo: identifying key carnivore landscapes, research priorities and conservation interventions. *Raffles Bulletin of Zoology* Supplement 33: 186–217.
- Medway Lord. 1969. *The wild mammals of Malaya*. Oxford University Press, Kuala Lumpur, Malaysia
- Peh KSH, Sodhi NS, De Jong J, Sekercioglu CH, Yap CAM & Lim SLH. 2006. Conservation value of degraded habitats for forest birds in southern Peninsular Malaysia. *Diversity and Distributions* 12(5): 572–581.
- Ross J, Wilting A, Ngoprasert D, Loken B, Hedges L, Duckworth JW, Cheyne S, Brodie J, Chutipong W, Hearn A, Linkie M, McCarthy J, Tantipisanuh N & Haidir IA. 2015. *Cynogale bennettii*. *The IUCN Red List of Threatened Species 2015*: e.T6082A45197343.
- Ross J, Hearn AJ & Macdonald DW. In press. Lessons from an unknown guild: from ferret badger to otter civet in the Bornean carnivore community. In: Macdonald, D.W., Newman, C., & Harrington, L.A. (eds.) *Biology and Conservation of Wild Musteloids*. Oxford University Press, Oxford, U.K.
- Veron G, Gaubert P, Franklin N, Jennings AP & Grassman LI, Jr 2006. A reassessment of the distribution and taxonomy of the endangered Otter Civet *Cynogale bennettii* (Carnivora: Viverridae) of South-east Asia. *Oryx* 40: 42–49.
- Wilting A, Samejima H & Mohamed A. 2010. Diversity of Bornean viverrids and other small carnivores in Deramakot Forest Reserve, Sabah, Malaysia. *Small Carnivore Conservation* 42: 10–13.
- Yong DL & Peh KS. H. 2016. Southeast Asia's forest fires: blazing the policy trail. *Oryx* 50(2): 207–212.