

Biodiversity Record: Antler development of a sambar deer following two unusually dry months

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Subject: Sambar deer, *Rusa unicolor* (Mammalia: Artiodactyla: Cervidae).

Subject identified by: Wan Ting Chan and Poh Yee Goh.

Location and dates: Singapore Island, Central Catchment Nature Reserve, Mandai region, 30 September – 18 November 2024.

Habitat: Native-dominated secondary forest.

Observers: Wan Ting Chan and Poh Yee Goh.

Observations: Footage stills obtained by a camera trap revealed that a male sambar deer had an underdeveloped left antler and a two-spiked right antler on 30 September 2024 (Fig. 1A). The subject dropped both antlers in early October 2024 (Figs. 1B and C) and then showed regrowth of his right antler, but had limited regrowth of his left antler between October to November 2024 (Figs. 1D-F). The preceding months of July and August have been noted to be unusually dry.



Fig. 1. Camera trap footage stills of a sambar deer with antlers in late September 2024 (A), shedding of right antler (B), and shedding of left antler (C), and regrowth (D-F) sequences between October–November 2024. (Photographs by: National Parks Board)

Remarks: Antler development on the featured animal following two unusually dry months in July and August (Fig. 2; NEA, 2025) offers an insight into the potential effects of rainfall pattern disruption on antler development. The observed regrowth of antlers shortly after shedding suggests that the disruption of the regular rainfall pattern by the unusually dry consecutive July–August months had limited impact on initiating the antler cycle. This aligns with research on sambar deer elsewhere (see e.g., Dalan & Dawend, 2013; Weerasekera et al., 2020) and other tropical deer species (see e.g., Loudon & Curlew, 1988), which found relatively aseasonal antler cycles in tropical environments. However, reduction in rainfall can affect resource availability, potentially influencing antler regrowth rate, size, and condition (see e.g., Peterson et al., 2019). For example, the subject's stunted left antler growth (Fig. 1) may indicate limited access to high-quality forage, poor nutrition or health.

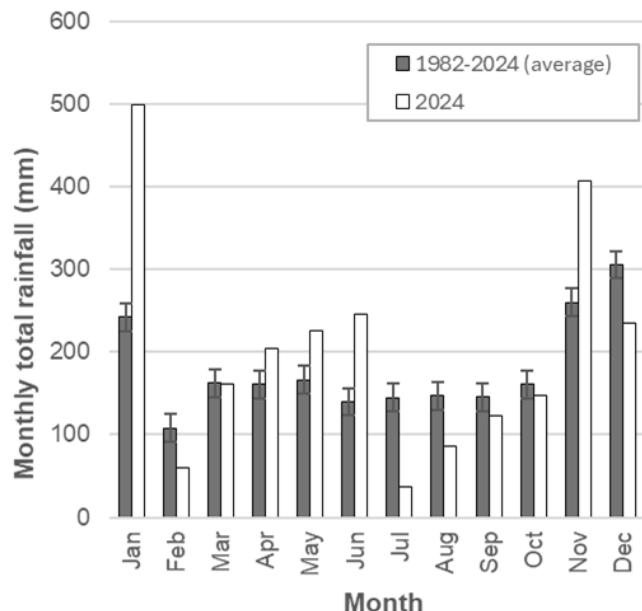


Fig. 2. Singapore monthly total rainfall average between 1982-2024 compared with 2024 only (Changi Climate Station; NEA, 2025). Error bars for 1982-2024 (average) bars represent standard errors.

Testosterone drives antler development and related behaviours, which are often associated with breeding seasons (Rössner et al., 2021). However, while sambar deer antler cycles have largely been observed to be aseasonal, peak breeding periods with a possibility of heightened hormone production have also been observed (Dalan & Dawend, 2013; Weerasekera et al., 2020). Thus, determining the possible presence and duration of a rut, and their environmental drivers in Singapore will help understand potential increases in deer aggression, which is important for informed management given a projected population increase (Khoo et al., 2021; Lamperty et al., 2023).

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Literature cited:

Dahan I & Dawend J (2013) Growth and reproductive performance of Sambar deer in Sabah Forest Reserve of Sarawak, Malaysia. *Tropical Animal Health and Production*, 45: 1469–1476.

Khoo MD, Lim BT, Soh MC, Loy RH, Lua HK, Lee BP, Loo AH & Er KB (2021) Persistence of a locally endangered mouse-deer amidst the re-emergence of two larger ungulates in small urban rainforest fragments. *Global Ecology and Conservation*, 30: e01807.

Lamperty T, Chiok WX, Khoo MD, Amir Z, Baker N, Chua MA, Chung YF, Chua YK, Koh JJ, Lee BP & Lum SK (2023) Rewilding in Southeast Asia: Singapore as a case study. *Conservation Science and Practice*, 5(3): e12899.

Loudon AS & Curlew JD (1988) Cycles of antler and testicular growth in an aseasonal tropical deer (*Axis axis*). *Reproduction*, 83(2): 729–738.

National Environment Agency [NEA] (2025) Rainfall - Monthly Total (2025) [Dataset]. https://data.gov.sg/datasets/d_b16d06b83473fdfcc92ed9d37b66ba58/ [Accessed 15 May 2025]

Peterson BC, Schoenebeck CW & Fryda NJ (2019) Effects of extreme environmental conditions on white-tailed deer antlers. *Wildlife Society Bulletin*, 43(4): 708–716.

Rössner GE, Costeur L & Scheyer TM (2021) Antiquity and fundamental processes of the antler cycle in Cervidae (Mammalia). *The Science of Nature*, 108(1): 3.

Weerasekera DS, Perera SJ, Nanayakkara DK, Herath HM, Rathnasekara AN & Ranawana KB (2020) The antler cycle and fecal testosterone of male Sambar deer *Rusa unicolor unicolor* at the Horton Plains National Park in Sri Lanka. *BioMed Research International*, 2020(1): 6903407.