

Unusual nesting events for Von der Decken's and Northern Red-billed Hornbills in Laikipia County, Kenya

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Tockus hornbills are widespread throughout East Africa and Southern Africa (Kemp, 1995). In highly seasonal environments, Tockus hornbill breeding seasons coincide with rainfall, usually beginning after the first heavy rains of the season (Kemp, 1972; 1995). In Kenya, there are typically two rainy seasons: the long rains occur from April (sometimes late March) through May, and the short rains occur from late October to December. However, rainfall patterns are becoming less predictable with climate change and are strongly influenced by El Niño Southern Oscillation events (ENSO).

We studied the breeding cycle of the Von der Decken's Hornbill (*Tockus deckeni*) and the North-

ern Red-billed Hornbill (*Tockus erythrorhynchus*) on Mpala Ranch, a 20,000 ha cattle ranch and wildlife conservancy in Laikipia County, Kenya, in 2013 and 2014. Annual average rainfall between 1998 and 2021 was 630 mm (range 324 mm to 1016 mm). In 2013, Von der Decken's Hornbills (n = 8) began nesting in the first week of April following a wet March and was completed by early July (Figure 1). The nesting cycle, based on seven successful nests, averaged 81 days (SD = 8.4 days). The Northern Red-billed Hornbills initiated nesting in the second week of April (n = 3) and fledged young by the end of June. The nesting cycle averaged 71 days (SD = 7.0). The cumulative rainfall for the nesting season was 396.5 mm, and considered abnormally wet.



Male Northern Red-billed Hornbill.



Male Von der Decken's Hornbill.

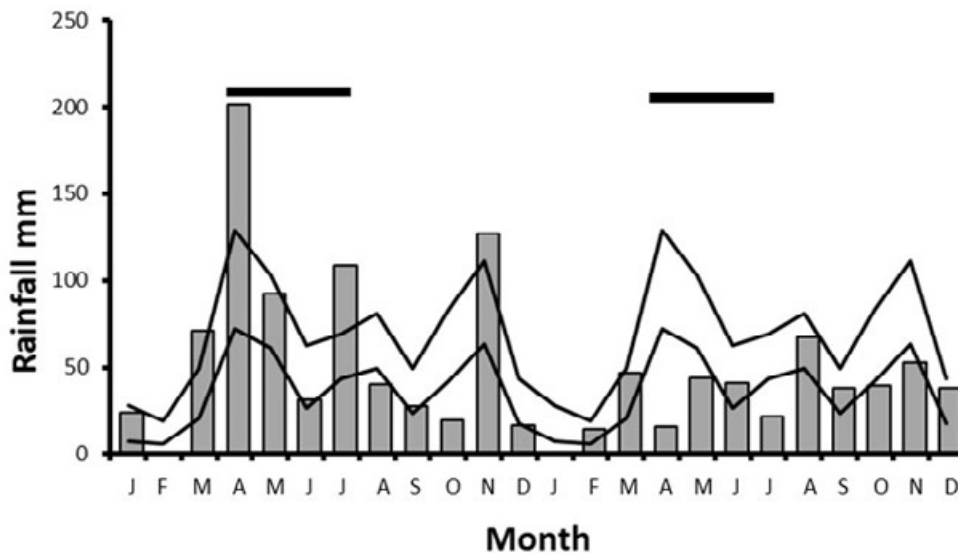


Fig. 1. Monthly rainfall (Bars) for 2013 and 2014 at Mpala Research Center, Laikipia County, Kenya with 95% confidence interval (thin black lines) for average monthly rainfall. Thick black lines indicate breeding season for Von der Decken's and Northern Red-billed Hornbills in 2013 and 2014.

In 2014, we followed 17 Von der Decken's Hornbill nesting attempts. Nesting began around 10 April, following a normal March rainfall (Figure 1). However, rains failed in April and were below normal in May. Only three nests fledged young in June with an average nesting cycle of 68 days (SD = 3.5), probably a result of the low rainfall. On the other hand, the Northern Red-billed Hornbills did not breed in 2014. Rainfall total for the 2014 breeding season was 147 mm and considered abnormally dry.

We visited Laikipia County briefly in late December 2021 and again in early February 2022. The county had experienced severe drought conditions from November 2020 through July 2021, totaling only 147 mm of rain compared to a long-term average of 466 mm for the same time period. We were therefore surprised to observe evidence of breeding by both species. On the first occasion, we observed a male Northern Red-billed Hornbill delivering food to a sealed nest on 29 December. On 5 February 2022, we observed male Von der Decken's Hornbills feeding fledgling chicks on two separate occasions. The chicks appeared to be ~1 month out of the nest. We estimate that

both species initiated nesting sometime in October after some brief unseasonal rains in August and September (64 and 71 mm of rain: Figure 2). Rainfall total for September to December was 154 mm, within the 95% confidence limits of normal rainfall for that time period.

We speculate that, due to the extended drought in 2020 and 2021, both hornbill species either failed to initiate breeding in April 2021, or attempted to breed but failed. A third, but unlikely, possibility is that one or both species attempted to produce two clutches (double clutching) in 2021. Brown et al. (2014) reported successful double clutching for an African Grey Hornbill (*Lophoceros nasutus*) in Namibia. Stanback et al. (2021) reported double clutching in 10 Southern Yellow-billed Hornbills (*Tockus leucomelas*). However, these events were during years of above average rainfall. We followed activities of both Laikipia species between 2012 and 2015 as part of a banding and genetic monogamy study (Kinnaird and O'Brien, 2019) and did not see any evidence of double clutching. As a result of no long rains in 2021, we suspect that both species did not attempt to breed during

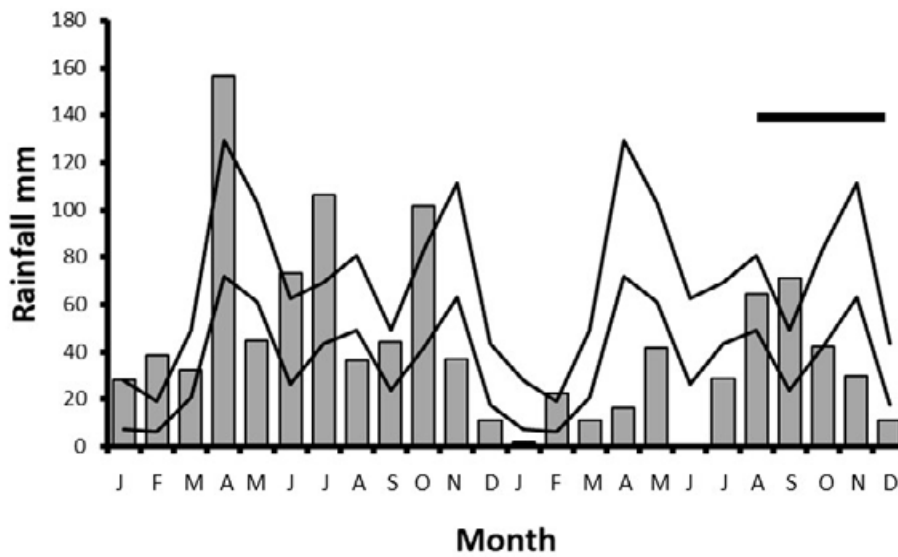


Fig. 2. Monthly rainfall (Bars) for 2020 and 2021 at Mpala Research Center, Laikipia County, Kenya with 95% confidence interval (thin black lines) for average monthly rainfall. Drought conditions present from November 2020 through July 2021. Thick black line indicates 2021 breeding season for Von der Decken’s and Northern Red-billed Hornbills.

the normal season. The unseasonal rains in August and September appear to have triggered a late breeding attempt by at least some individuals of both species.

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