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Author: Jones, Trevor

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**CASSIN'S HAWK-EAGLE *SPIZAETUS AFRICANUS* IN NDUNDULU FOREST: A FIRST RECORD FOR TANZANIA, WITH BIOGEOGRAPHICAL IMPLICATIONS**

**Trevor Jones**

Environmental Sciences Research Centre, Department of Life Sciences  
Anglia Ruskin University, East Road, Cambridge, CB1 1PT, UK  
Udzungwa Ecological Monitoring Centre  
Box 99, Mang'ula, Morogoro, Tanzania  
tembomkubwa@gmail.com

**ABSTRACT**

A single adult Cassin's hawk-eagle *Spizaetus africanus* was sighted on five occasions over three years in a highland forest in the Udzungwa Mountains, the first ever record of this species in Tanzania. This discovery has potentially significant biogeographical implications, strengthening ancient links between the forests of the Udzungwa Mountains and the Guineo-Congolian forests of central Africa.

**Keywords:** Cassin's, hawk-eagle, *Spizaetus*, Ndundulu, Udzungwa Mountains.

Cassin's hawk-eagles are the only African representative of the tropical genus *Spizaetus* Vieillot, 1816, a group of small to medium sized eagles with short, rounded wings and long tails (Brown *et al.*, 1982; Ferguson-Lees & Christie, 2001; though for current taxonomic debate based on recent molecular analyses see Helbig *et al.*, 2005; Lerner & Mindell, 2005; Haring *et al.*, 2007). *Spizaetus africanus* Cassin, 1865 is a forest eagle with a black-and-white appearance (wing length, male 330–341 mm, female 381 mm; tail length, male 211–234 mm, female 266 mm) (Ferguson-Lees & Christie, 2001). The adult is mainly white below with black patches on the side of the breast, and blackish axillaries and underwing-coverts. Above it is mainly black, with black-tipped primaries. The tail is banded dark and light brown; cere and feet are pale yellow. It is known to be resident in dense tropical forests across Equatorial Africa, from Togo east to Gabon, Cameroon and the Democratic Republic of Congo. The easternmost known site for this species is the Mabira Forest Reserve of central Uganda (Fishpool & Evans, 2001), though a dead juvenile was found on Mount Elgon in western Kenya in 1926 (Clark & Edelstam, 2001) (figure 1).

A single adult Cassin's hawk-eagle was observed on five occasions between September 2004 and November 2007 (11 September 2004, 13 September 2004, 19 February 2006, 29 August 2006, 2 November 2007) in Ndundulu Forest (7°45'S, 36°30'E; 1300–2000 m) in the Udzungwa Mountains of southern Tanzania (figure 1). The plumage pattern and feathered tarsi of the observed and photographed bird (figure 2) are diagnostic. The amount of white on the underparts is consistent with Cassin's hawk-eagle and distinguishes it from African hawk-eagle *Aquila spilogaster* Bonaparte, 1850 (Helbig *et al.*, 2005; formerly *Hieraetus*

*spilogaster*: Brown *et al.*, 1982; Ferguson-Lees & Christie, 2001) and Ayres' eagle *Hieraetus ayresii* Gurney, 1862. The white feathered tarsi, and black underwing coverts observed in flight, distinguish it from the Black sparrowhawk *Accipiter melanoleucus* Smith, 1830. Colour and length of the tail distinguish it from the Augur buzzard *Buteo augur*

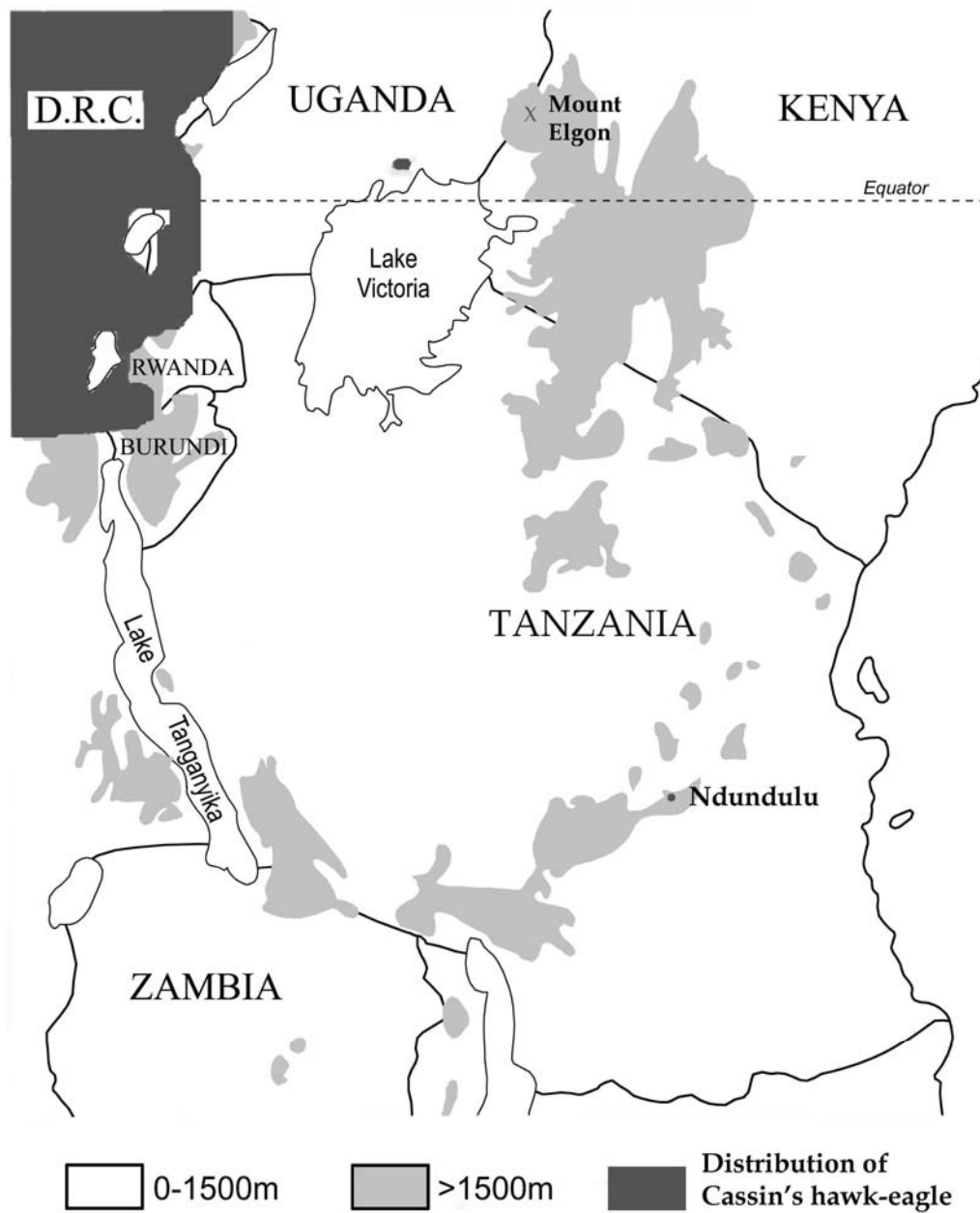


Figure 1. Map showing the currently known distribution of Cassin's hawk-eagle *Spizaetus africanus* in East Africa, including Ndundulu Forest, Tanzania. Mount Elgon, Kenya, from where a juvenile specimen was collected in 1926, is also shown.

Rüppell, 1836. Single birds were spotted on two occasions sitting in the tall upper canopy of the forest (which reaches over 50 m in height), and on three occasions soaring in circles low over the forest canopy. On two occasions a bird was heard calling while in flight, a short high-pitched call repeated several times, which was later recorded and compared with and noted to sound identical to an audio recording of Cassin's hawk-eagle. It is not possible to confirm whether all encounters have been with the same or different individuals.



Figure 2. An adult Cassin's hawk-eagle *Spizaetus africanus*, photographed in Ndundulu Forest, Tanzania, August 2006. Photograph by Anthony Jarrett.

Ndundulu and the contiguous Luhomero Forest (to 2500 m) cover a total area of 250 km<sup>2</sup> comprising closed canopy forest with a few open clearings, and is one of the richest and most biodiverse of all forests in Tanzania (Dinesen *et al.*, 2001; Burgess *et al.*, 2007). As an indication of its extraordinary richness across all taxa, it is home to 22 restricted-range bird species (Marshall *et al.*, 2001; T. Jones, unpubl. data) and at least three restricted-range primate species, including the recently discovered kipunji *Rungwecebus kipunji* Davenport *et al.*, 2006 (Jones *et al.*, 2005; Davenport *et al.*, 2006). There have also been discoveries in recent years of a new genus and species of bird (Dinesen *et al.*, 1994), a new species of giant sengi or elephant shrew (Rovero & Rathbun, 2006; Rovero *et al.*, in press), and a new species of shrew (Stanley *et al.*, 2005). The discovery of Cassin's hawk-eagle here further reinforces the perception of Ndundulu as an outstanding refuge for relic faunal populations.

All five sightings to date have been made within an area of 7 km<sup>2</sup> in southern Ndundulu, although several weeks of survey effort were completed during 2005–2006 in other parts of this forest (Jones, 2006). However, these surveys were primarily focused on primates and the apparent tendency of these birds to spend most of the time in or above the forest canopy makes them very difficult to detect (Friedmann & Williams, 1970). A failure of previous surveys to detect this species does not prove that it was absent (Dinesen *et al.*, 1993; Hunter *et al.*, 1996;

Butynski & Ehardt, 2003). Moreover, there are large areas of the surrounding forest which have not yet been surveyed. The minimum 250 km<sup>2</sup> of available potential habitat in Ndundulu/Luhomero raises the possibility of a small viable population of resident Cassin's hawk-eagles, and it is not inconceivable that they could also have gone undetected by researchers in neighbouring forests such as Nyumbanitu (49 km<sup>2</sup>) (e.g. Dinesen *et al.*, 1993, 2001; Marshall *et al.*, 2001). It is now important that further investigations focused on this species are carried out to determine distribution, abundance and breeding status in the Udzungwa Mountains.

The nearest reported site of Cassin's hawk-eagle to Ndundulu is in Mabira Forest Reserve, south-central Uganda, 900 km away (figure 1). The discovery of this bird in Ndundulu has interesting implications for the debate over the presence and timing of an ancient continuous forest between the Udzungwa Mountains (and other forested highlands of Tanzania) and the Guineo-Congolian forests of central and western Africa (Axelrod & Raven, 1978; White, 1981; Lovett, 1993a; Burgess *et al.*, 2007). Although the Tanzanian highland forests have been isolated for several million years, recent discoveries of organisms endemic to these mountains, but having Guineo-Congolian affinities, have argued for a more contiguous historical distribution of species, maybe as recently as 10 million years ago. For example, the Udzungwa-endemic gecko *Urocotyledon rasmusseni* Bauer & Menegon, 2006 is more closely related to *U. weileri* Müller, 1909 of West Africa than to its Tanzanian relative *U. wolterstorffi* Tornier, 1900 (Bauer & Menegon, 2006). There are butterflies (De Jong & Congdon, 1993), reptiles (Howell, 1993) and trees (Lovett, 1993b) in the Udzungwas with close Guineo-Congolian affinities, and the recent discovery of the shrew *Congosorex phillipsorum* in Ndundulu marked the first known record of a mammalian genus with disjunct species in these mountains and in central Africa (Stanley *et al.*, 2005). Among birds, molecular analyses of some isolated eastern Tanzanian montane subspecies have shown them to be divergent from relatives in the Central Congolian forests (Roy, 1997; Roy *et al.*, 1997; Beresford, 2003). Although birds are generally more mobile dispersers across different habitats than other vertebrates, the unexpected presence of the forest-dependent Cassin's hawk-eagle in Ndundulu, if it is indeed indicative of a relic population, lends further support to the theory of more contiguous forest between the Congo Basin and southern Tanzania than is found today.

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