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# Notes on the behaviour of Bare-necked Umbrellabird *Cephalopterus glabricollis* in the Monteverde Cloud Forest Preserve, Costa Rica

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Se presentan apuntes sobre los movimientos locales y tamaño de población, actividad de lek, descripciones de las vocalizaciones y despliegues, comportamiento alimentario, el primer registro de nido y estado de conservación de *Cephalopterus glabricollis*, basados en observaciones en la Reserva de Bosque Nublado Monteverde, Costa Rica.

Dentro del área de estudio, la especie aparentemente ocupa del 20–30% del habitat adecuado, todo dentro del rango de 750–1300 msnm. Se sugiere, a partir de observaciones detalladas desde 1986–1988, que la especie adopta leks explosivos, muy espaciados, en vez de pequeños leks, como se había registrado en la literatura.

El primer nido en ser descrito para esta especie se descubrió en un árbol relativamente aislado en abril de 1988; como otras cotingas grandes, la postura consiste en un sólo huevo, pero esta especie construye un nido mucho mayor que otras cotingas estrechamente emparentadas. La especie come frutos y presas animales, generalmente arrebatado al follaje en vuelo, aunque ocasionalmente cuando esta perchado.

Se anota un declive en las poblaciones en elevaciones menores; por debajo de los 1000 msnm las perchas de vocalización han sido abandonadas desde 1988, aunque el bosque se mantiene intacto en estas áreas. Se sugiere que un movimiento altitudinal ascendente en los rangos de muchas especies en esta área durante los últimos diez años, atribuido al calentamiento global, puede haber afectado adversamente a la especie *Cephalopterus glabricollis*.

## Introduction

Bare-necked Umbrellabird *Cephalopterus glabri-collis* is one of three closely related species which replace each other geographically in Central and South American rainforests. Collar *et al.*<sup>1</sup> described its distribution in detail and Snow<sup>5</sup> summarised its little-known ecology and behaviour. In Costa Rica, the Bare-necked Umbrellabird occurs on the Caribbean slope of the mountain ranges which extend the length of the country<sup>6</sup>. It is an altitudinal migrant, breeding in the subtropical belt, between 800–2,000 m and spending the non-breeding season in the foothills and adjacent lowlands, principally below 500 m.

It is not uncommon in the Peñas Blancas river valley, in the Monteverde Cloud Forest Preserve on the Caribbean slope of the Tilaran mountains in northern Costa Rica. We have observed it there every year since 1979, though most of our observations were made in 1986–88, when we spent several weeks watching and photographing a male on its display territory. In 1988, we also photographed a female at the first active nest to be found.

## Local movements and population size

Bare-necked Umbrellabirds usually return to their breeding areas in the Peñas Blancas valley in March, our earliest record being of a female on 28 February 1986. They leave by late July or August (we have an early record of an adult male in the lowlands in the last week of July).

The species is not uniformly distributed in the Peñas Blancas valley; almost all of our records are clustered in four relatively small areas (2–4 km<sup>2</sup> each), the lowest at an altitude of c. 750 m, the highest at 1,300 m. Each of these concentrations is separated from the others by extensive areas

of forest where umbrellabirds are almost never seen. The area utilised by umbrellabirds comprises only 20–30% of the apparently suitable habitat. Each concentration includes 4–5 adult males with display territories, but we have no information on the number of females or non-breeding males. However, we doubt whether more than 80–100 individuals were present in the Peñas Blancas valley at any time in the past 20 years. The present population is probably less than 60 birds.

## Lekking activity

The behaviour of male Bare-necked Umbrellabirds was first described by Cordier<sup>2</sup> (quoted in Snow<sup>5</sup>). Though basically accurate, Cordier's account of events is misleading in some ways. For this reason, we will recount our own observations in some detail.

Display territories are occupied from about mid-March until June, this period being the breeding season for most rainforest birds in Costa Rica. The intensity of calling and displaying diminishes by about mid-May. The

4–5 calling males in each group are widely spaced in an “exploded lek”, just about in hearing distance of each other. In this respect, the Bare-necked Umbrellabird resembles the Amazonian Umbrellabird *Cephalopterus ornatus*<sup>5</sup>. The same calling territories are occupied each year, probably by the same individuals. The territory known best to us was definitely occupied from the mid-1970s (Eladio Cruz pers. comm.) until 1990, but not since.

Males begin to call at about 05h20, sometimes a little earlier, just as the first signs of dawn appear in the sky. Bare-necked Umbrellabird is one of the first species to call in the morning. At dawn, and only at dawn, males call from perches in the tops of high trees, using a call we refer to as the “double-hoot” (see below). It is a low frequency call which carries for several hundred metres, although at close quarters it is difficult to locate and sounds surprisingly quiet. The male that we watched intensively did not call from a fixed perch, but moved between a large number of canopy perches within an area measuring c. 50 x 100 m. Typically, it called 4–5 times from each perch, at intervals of 5–6 seconds, before moving to another tree. It generally ceased calling between 06h00–06h15 and flew off to commence feeding. Occasionally, it called a few more times from the fruiting tree.

Male umbrellabirds spend much of the day on one of 2–3 adjacent, favourite perches 10–15 m above ground. The male that we watched intensively spent at least 80% of its time on these daytime perches. It departed to feed about every 20–30 minutes in 1987, and at longer intervals of up to 2–3 hours in 1988, when food was presumably easier to obtain. Whilst perched, it preened or dozed (“boring bird” was a frequent notation in our notebook!). It called or displayed briefly at intervals of c. 15–20 minutes and almost always did so before departing to feed. The first sign that it was going to call was the elongation of its wattle from c. 2 cm to 10 cm or more. When on its daytime perch, it rarely gave the full double-hoot. More often, it used two lower intensity calls that we described as the “hoot-growl” and “inflate-hum” (see below).

Visits by other umbrellabirds usually occurred soon after dawn, rather than later in the day. When the visitor was a female, the activity of the male became more frenzied as he flew from perch-to-perch around her, calling frequently. In all such observed encounters, the female sat with sleeked plumage, looking nervous and soon departed. Visits by other males usually provoked supplanting attacks, accompanied by harsh, grating calls, although it was unclear whether the calls originated from the pursuer or pursued. Sometimes males displayed at each other, using the hoot-growl call.

On several occasions we saw groups of 3–4 males displaying together for an hour or more in fruiting trees, carrying twigs, grunting rhythmically “like a quiet hippo” and occasionally chasing each other. Cordier<sup>2</sup> described similar gatherings, though he used words and phrases (“din”, “commotion”, “the noise is terrific”, “fieriness of his temper”) that give the impression of more excitement than occurred in the rather low-key interactions seen by us. It was Cordier’s description of these gatherings that led Snow<sup>5</sup> to conclude that male Bare-necked Umbrellabirds are organised in small leks, rather than the widely spaced, exploded leks described for Amazonian Umbrellabirds<sup>5</sup>. However, in our opinion, these gatherings of males are not a true lek. They occur when several males happen to simultaneously arrive in the same fruiting tree and are unpredictable in both location and time. They were rarely observed on successive days and never in the same place. True lekking behaviour occurs in exploded leks similar to those of Amazonian Umbrellabird.

### **Descriptions of the calls and displays**

At dawn, the main call and display of males is a mournful double-hoot accompanied by complex movements. The following description was written with a displaying bird in view: “as the male bows low, he emits a soft hum as his throat pouch inflates. Then he draws himself up, making the first loud *oooo*, followed by a hiccup as he becomes upright with his head back. Then he does a little bow, then draws himself up, so that the air seems to be squeezed into the top part of his chest, before making the second loud *oooo* as he throws his head backwards beyond the vertical. The whole performance is convulsively energetic”. At a distance, only the loud double-hoot is audible. The whole performance takes about four seconds, with two seconds between the two loud hoots. It can be imitated quite accurately by blowing across the top of a half-full wine bottle.

While on their day perch, males call and display at intervals of c. 15–20 minutes, though there is much variation. The double-hoot display is used occasionally, but more often two lower intensity displays are used. The hoot-growl begins in the same way as the double-hoot, but finishes with a bow, accompanied by a soft *grrrrrrr*, instead of the exaggerated backwards jerk of the head. The inflate-hum appears to be a low intensity version of the first part of the double-hoot, in which the male bows, inflates his throat-pouch and emits a gentle *hmmmmm*, audible only at close range.

### **First recorded active nest**

On 19 April 1988 one of our assistants, Norman Obando, found an active nest – the first to be found – c. 5 m above ground in the fork of a relatively isolated small tree with a trunk c. 20 cm in diameter. Its isolation may have conferred some protection against monkeys and other arboreal predators. The nest was relatively large,

being bulkier than the flimsy nests of the Amazonian Umbrellabird and other large cotingas<sup>4,5</sup>, and constructed of twigs, leaves and moss. The remains of two rather similar nests in the same tree suggested the site had been used in previous years.

The nest contents were examined using a mirror on the end of a long pole. The single egg was rather pointed at one end and dirty beige in colour, finely and uniformly speckled reddish brown. As is usual in large cotingas, the female alone visited the nest and incubated the egg, which hatched sometime between 13–18 May, giving a minimum incubation period of 24 days, comparable with other large cotingas. The chick was predated sometime before 25 May.

This is not the place to discuss factors controlling clutch size in tropical birds. However, it is worth emphasising two points. Bare-necked Umbrellabird resembles other large cotingas in having a clutch of only one egg, even though adults apparently need to spend very little time foraging for food and should be able to raise more than one young. It differs from other large cotingas in having a bulky nest. Snow<sup>4</sup> suggested that the clutch size of tropical forest birds could be limited by the need to have a small nest inconspicuous to predators. Bare-necked Umbrellabird does not fit this scenario, as the nest we observed was far from inconspicuous and large enough to hold more than one nestling.

### Feeding behaviour

The diet of umbrellabirds is similar to that of trogons, motmots, toucans and other large birds that eat both fruit and animal food. In Peñas Blancas, they are often seen in the same fruiting trees as Crested Guan *Penelope perpurescens*, Rufous Motmot *Baryphthengus martii* and Yellow-eared Toucanet *Selenidera spectabilis*. Fruits taken include palm fruits (Arecaceae), several species of *Ocotea* (Lauraceae), *Hasseltia floribunda* (Flacourtiaceae) and *Cecropia* (Cecropiaceae). Animal food includes anoles, frogs and large insects, particularly Orthoptera, Coleoptera and Lepidoptera larvae (including large saturniids and sphingids). Both fruit and animal prey is usually snatched from foliage in flight, but we also saw umbrellabirds take some fruits while perched and rummage in bromeliads for prey.

### Conservation status

The conservation status of the Bare-necked Umbrellabird was discussed by Collar *et al.*<sup>1</sup>. In common with other altitudinal migrants in Costa Rica, it is vulnerable to lowland deforestation. Its status, in the higher areas of its breeding range in the Peñas Blancas valley, appears stable, but it is less common at lower altitudes than 10 years ago. Below 1,000 m, most of the calling sites that we knew in 1985–88 are no longer occupied, despite the fact that the forest in the lower Peñas Blancas valley is intact and protected.

The low numbers of breeding umbrellabirds below 1,000 m might indicate a reduction in the general population, perhaps due to deforestation in the lowland, non-breeding range. However, there is another possibility: over the last 10 years the ranges of many birds have shifted upward, on both the Caribbean and Pacific slopes of the Monteverde Preserve. Pounds, Fogden & Campbell<sup>3</sup> attributed these changes to global warming. The Tilaran mountains are relatively low, and if this trend continues, the future for the Bare-necked Umbrellabird in northern Costa Rica may be bleak.

### Acknowledgements

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