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## Field notes on the biology of the Long-wattled Umbrellabird *Cephalopterus penduliger* in west Ecuador

Karl S. Berg

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La biología del Pajaro Paraguas Longipendolo *Cephalopterus penduliger* es quizás lo menos conocido del género. A pesar de eso, lo consideraron una de las especies más amenazadas en el continente Sudamericano debido a la deforestación, caza y a un grado menor, la comercialización de las aves como mascotas. Entre febrero y octubre de 1998 yo observe *C. penduliger* a lo largo del período y 1.600 horas de observación en la Estación Biológica Jatun Sacha Bilsa, Provincia de Esmeraldas, Ecuador. Documente varios aspectos de las observaciones incluyendo un sonograma de dos vocalizaciones, descripciones de comportamiento, forrajeo y las primeras fotos de *C. penduliger* en su estado natural. También se presenta teorías acerca de su distribución biogeográfica y sugerencias para su conservación.

### Introduction

The biology of the Long-wattled Umbrellabird *Cephalopterus penduliger* is perhaps the least known of its genus<sup>4,7,13</sup>. It is, however, considered one of the most threatened bird species in South America due to deforestation, hunting and to a lesser extent capture for the pet trade<sup>2,12</sup>. In February–October 1998, while conducting a bird inventory of the 3,300 ha Estación Biológica Bilsa (00°22'N 79°45'W) in Esmeraldas province, north-west Ecuador, I observed various aspects of the biology and behaviour of *C. penduliger* during the nine months and over 1,600 hours of observations. Much of the species' habitat in west Ecuador is fragmented and little of this currently enjoys any protected status. The continued fragmentation and isolation of existing protected areas, current agricultural intensification, as well as the future development of tourism necessitates our acquiring a better understanding of the habitat requirements and nesting of this poorly known species.

### Population density

I identified at least five areas within the reserve where male umbrellabirds were repeatedly seen and / or heard calling. The total area involved was c.32.4 km<sup>2</sup> (i.e. 6.4 km per male), although this estimate may be biased toward the reserve's trail system. Although no individuals were banded, the birds appeared to use well-established territories. For example, individuals were seen or heard calling in more or less the same areas of the reserve during repeated walks, over the course of the entire study period, and one male aggressively defended one such area while playback of the 'mooing' 'song' was given in one such territory.

### Nesting period

No first-hand observations of nesting were obtained, although three secondhand reports of active nests were received during the first three months of the study period. There were two secondhand records

of *C. penduliger* carrying nesting material (long thin twigs) in February and September, but this could be as easily attributed to courtship as to nesting. Of the three nests reported to me, I was only able to visit one, unfortunately after it had been abandoned. The alleged nest had a structure similar to that reported for congeners<sup>4,6,13</sup>. The nest, (partially destroyed?) was located 3.5 m above ground on the horizontal branch of a cacao tree *Theobroma cacao* and should be considered as only hypothetically belonging to this species. It was constructed of long thin twigs of several tree species, including a relatively common (although not specifically identified) pioneer tree species of Melastomataceae, and the deformed 'brooms' of the common agricultural pest witch's broom *Crinipellis pernicioso*. The nest's structure recalled that of several larger pigeons (Columbidae). The cacao tree was located in a traditional farm including many native plant species and was c.50 m from the edge of a forest block of undetermined size.

### Foraging ecology

During approximately half of the visual observations made (n = 100 observations), *C. penduliger* took fruits from canopy trees (Palmae, Myristicaceae, Lauraceae), while loose foraging flocks of Chestnut-mandibled Toucan *Ramphastos swainsonii*, Choco Toucan *R. brevis* and / or Pale-mandibled Aracari *Pteroglossus erythropterygius* were nearby or flocked with *C. penduliger*. In approximately 25% of encounters *C. penduliger* foraged in small groups of 3–4 birds or sometimes alone much lower in the forest strata (at 10–20 m) where insects were occasionally taken (n = 2). Approximately 50% of my observations were made in forest that had been selectively logged to varying degrees within the last 20 years, although the territories were always in mature forest. One group of five birds fed at a fruiting *Bacteris* palm by swooping in and hovering momentarily while one fruit was taken in the bill, similar to the behaviour of various



1



2



3



4

Figure 1. Dead male Long-wattled Umbrellabird *Cephalopterus penduliger* with hunter, Azuay province, west Ecuador, March 1993 (Karl S. Berg)

Figures 2–4. Male Long-wattled Umbrellabird *Cephalopterus penduliger*, in secondary forest at Jatun Sacha Bilsa, Esmeraldas province, west Ecuador, August 1998 (Karl S. Berg)

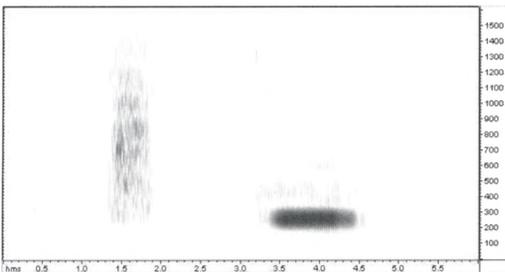


Figure 5. Vocalisation of male Long-wattled Umbrellabird *Cephalopterus penduliger*. Recording by Karl S. Berg, sonogram prepared by Niels Krabbe.

Trogonidae. Because *C. penduliger* has long, apparently strong, legs it can also reach for fruits of some other species. This palm may have required the birds to swoop because of its spiny trunk and the fact that the birds could not reach the fruits from perching on their stems as is the habit of *P. erythropygius* when feeding at *Bacteris* palms (pers. obs.).

**Local migrations?**

*C. penduliger* was observed during all months of the study period, although only females were seen or heard vocalising consistently throughout it. In February and May 1998 no males were observed or heard (although a single male was seen in March 1996 and March 1999). From June–October, males were seen or heard almost daily, with females passing unnoticed or being less abundant during this period. Thus it appears this population may not even be a partial migrant, as the males’ ‘absence’ during the early part of the year could be attributed to a lack of vocalising; birds were perhaps present but cryptic. It also appears plausible that the synchronisation of fruiting phenology of the umbrellabird’s food plants in the Andes is different owing to altitudinal gradients, thus plausibly requiring populations within the Andes to perform more significant and obvious movements.

**Vocalisations**

Three distinct vocalisations were tape-recorded. Males emit a deep resonant sound, like that produced by blowing over of a large bottle, recently described by Jahn *et al.*?. While producing this vocalisation, males sometimes performed aggressive supplanting flights against other males, occasionally breaking the branch on which they landed (n = 2). During this vocalisation, the wattle was fully extended and inflated. Often the crest was held nearly erect, the bird assuming a horizontal position with the wattle pointing directly downwards (n = 5; see Fig. 2), while facing a rival male. On one occasion a female was observed c.100 m away and

may have been observing the males' displays. On another occasion a male successfully defended an attempted supplanting flight by a *P. erythropygius* by assuming an erect posture with the wings folded back in order to appear wider, the wattle fully extended and inflated and the crest nearly erect.

Females make at least two distinct vocalisations, perhaps similar to those described for *C. ornatus*<sup>13</sup>. One vocalisation given by females (and perhaps males) consists of a low, guttural, mammal-like *gr*, *gr*, *grah* given persistently every 3–4 minutes as birds foraged in the middle strata (and perhaps canopy), also reported by Jahn *et al.*<sup>7</sup>. This vocalisation, is easily overlooked, even at close range and could not be heard at a distance of more than c.100 m. Throughout the study period this was the call I was able to use most commonly to determine the presence of umbrellabirds (at least females) in the area. At least two females gave another call, *aaugh*, that is perhaps an alarm. It is also guttural and mammal-like but monosyllabic and considerably more emphatic than the previously described vocalisation. Playback recordings of this vocalisation were used to attract a female to within c.4 m of the observer on one occasion. Recordings have been deposited at the Bioacoustic Archive at the Florida Museum of Natural History, Gainesville. Fig. 5 presents the emphatic *aaugh* vocalisations and the common 'mooring' call of the male.

### Deforestation and umbrellabirds

In 1991–1993 I conducted avifaunal research at Manta Real, Azuay province, Ecuador (02°35'S 79°24'W) and observed Long-wattled Umbrellabird on only two occasions. In 1993–1994, I studied supposedly suitable umbrellabird habitat near San Miguel, Esmeraldas province, Ecuador (01°44'N 79°55'W) without recording the species (even local people knew it only very poorly). The area is extensively forested and located only c.18 km south of where two leks have been recently discovered<sup>8</sup>. The abundance of observations during 1998 at Bilsa was therefore curious. Why was the species apparently common at Bilsa in relative terms?

The species is reported to occur within the elevational range 200–1,400 m<sup>7,12</sup>. The forest block in the Mache-Chindul range is c.30–35 km wide and perhaps 2,500 km<sup>2</sup> at 200–750 m. Most similar-sized areas within the Andean foothills would cover a significantly larger altitudinal range and thus include life zones where the species is unknown. In many parts, considerable lands at 2,000–3,000 m would be covered within such an area, well outside the known range of *C. penduliger*. Oblong-shaped rectangles of habitat may present more edge than similar sized square-shaped areas, because the peripheral edge permeates deeper into the area of the oblong than a similar size in the shape of a square or even circle<sup>11</sup>. Within the Mache-Chindul range

smaller areas of forest edge may consequently mean a higher density of umbrellabirds. It also appears highly plausible that the oblong-shaped rectangle of umbrellabird habitat in the Andean foothills of west Ecuador is heavily fragmented (at least 15 asphalt roads bisect it) and may harbour many small, isolated populations facing an uncertain future. This combined with the theory that *C. penduliger* may perform altitudinal migrations<sup>7,12</sup>, may further complicate the species' survival prospects.

### Conservation

Although Hilty & Brown<sup>6</sup> suggest that *C. penduliger* occurs from west Colombia to north-west Ecuador, other authors consider it endemic to the foothills of south-west Colombia and the entire lower flank of the Andes in west Ecuador<sup>7,9,12</sup>. What is certain is that preservation of the west Ecuador population is of extreme importance to the overall conservation of the species. Long-wattled Umbrellabird was considered Near-threatened by Collar *et al.*<sup>3</sup>, Endangered in Ecuador<sup>5</sup> and was upgraded to Vulnerable in *Birds to watch 2*. In Ecuador it is restricted to the fragmented foothill forests of the western Andes and extreme north-west of the coastal cordillera.

The state-run Reserva Ecológica Cotacachi-Cayapas (205,000 ha), Reserva Etnica y Forestal Awa (75,000 ha) and the privately owned and managed Estación Biológica Bilsa (3,000 ha) protect umbrellabird habit in west Ecuador. Despite the latter's size it may be no less important than the other reserves with respect to umbrellabirds as, although Cotacachi-Cayapas covers an extensive altitudinal gradient (200–4,939 m), only a narrow belt at 200–1,400 m is likely to be important to *penduliger*<sup>6,12</sup>, while land disputes, the reserve's poorly defined borders, and its under-staffing make the level of protection afforded insufficient. In 1998, there were a mere five full-time park guards to cover the huge lowland portion (F. Garcez pers. comm.). Reserva Etnica y Forestal Awa principally protects lowland rainforest and includes little foothill habitat. Estación Biológica Bilsa, located at 350–750 m, appears to have *C. penduliger* evenly distributed throughout its foothill zone, and is part of the recently (1996) declared Reserva Ecológica Mache-Chindul which contains one of the largest continuous blocks of forest in west Ecuador. Extreme caution should be used to determine the significance of this state-declared reserve—by the end of the study period there was no full-time *in situ* staff at this protected area, which is also claimed as private property by the c.20 small communities around the c.30,000 ha forest block<sup>1</sup>. At Bilsa, the 10 full-time park guards appear sufficient to ensure the protection of its 3,000 ha and represent a much

higher ratio of park guards to hectares of protected habitat than elsewhere in the species' range in Ecuador.

Nevertheless, management of these protected areas requires additional information concerning the nesting requirements, food sources (especially phenologies) and any local migrations of *penduliger* before their boundaries (or existing management plans) can be considered adequate.

### Economic alternatives

As management of the protected areas mentioned are adjusted and scarce conservation resources are dedicated to the study of *C. penduliger*, the importance of crops that best sustain biodiversity must be taken seriously into the conservation equation. *C. penduliger* forages in traditional farms and secondary growth as well as mature forest. Management should give close consideration to which crops and technologies provide a best buffer to mature forest. Nevertheless, traditional cacao farms have historically been neglected by conservation biologists<sup>10,14</sup>. The discovery of the recently described Pink-legged Graveteiro *Acrobatornis fonsceai* in a cacao plantation in Bahia, Brazil<sup>8</sup> should act as a reminder of how little is known concerning the management of biodiversity outside forest fragments. Cacao is a significant source of income for thousands of marginal farming families throughout west Ecuador, many of whom live within or near current (and potential) protected areas<sup>2</sup>. As in Bahia, traditional cacao plantations in west Ecuador, including Bilsa, mimic to varying degrees the original forest structure and may provide habitat for many threatened taxa.

The Jatun Sacha Foundation, which owns and manages Estación Biológica Bilsa is actively seeking funding to finance legal expenses and land purchases of an additional 1,500–2,000 ha, thereby making a more significant block of forest and one which undoubtedly would support a higher number of umbrellabirds. Interested individuals are urged to contact Dr. Michael McColm, (mccolm@jsacha.ecuanex.net.ec).

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