Range extension of Chocó Vireo Vireo masteri in Ecuador, with a description of the species' song

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Presentamos los primeros registros de *Vireo masteri* en el Bosque Protector Mashpi, provincia de Pichincha, Ecuador. Nuestros registros extienden el ámbito de distribución de la especie c.85 km al sur de la localidad más austral y previamente conocida en Ecuador. En este artículo también describimos el canto de *V. masteri*, el cuál es muy distinto al de los otros miembros del género *Vireo*.

Chocó Vireo is a rare, very local and range-restricted species found on the Pacific slope of the West Andes in Colombia and north-west Ecuador. It is endemic to the Chocó biogeographic region and is currently considered Endangered^{1,4,6}. Until recently, it was known from just three areas: (1) Alto de Pisones, dpto. Risaralda, (2) the Junín area, dpto. Nariño, both in Colombia, and (3) the río Negro drainage, near Alto Tambo, prov. Esmeraldas, Ecuador^{1,6,8}. In 2010 we observed and sound-recorded the species at a new locality in Ecuador. The vocalisations of Chocó Vireo were poorly known and its song was believed to be reminiscent of Yellow-winged Vireo V. *carmioli* at the time of its description⁸. However, recent tape-recordings⁵ and our data reveal that the species' song is highly distinct from Vireo. Here we report a southward range extension for Chocó Vireo and describe the species' song.

New locality and behaviour

The new locality is c.5 km west of the settlement of La Delicia, prov. Pichincha, on the Pacific slope of the Andes, in cloud forest of the río Guayllabamba drainage (00°09'N 78°50'W). Sightings were made along the La Magusa Road, now better known as Bosque Protector Mashpi (hereafter Mashpi). The species was first found on 14 June 2010 by DMB, who observed and sound-recorded one individual at the road bordering the reserve at c.1,100 m (www.xeno-canto.org/93798). The bird sang almost continuously, even prior to playback. DMB is familiar with the species and its song, and recognised it immediately. The bird remained in the canopy throughout the observation and was not seen with other birds. It responded to a pre-recorded song, pausing its singing and moving through the canopy via short flights to the crowns of neighbouring tall trees. It was not seen well due to prevailing fog, but the bird's size, shape and behaviour matched Chocó Vireo. On 20 June AS-U relocated what was presumably the same bird, although on this occasion it associated with a mixed-species flock of mostly insectivorous birds, but solely within its territory (inferred from song posts). Shortly afterwards, a mixed-species flock



Figure I. Chocó Vireo Vireo masteri, Mashpi, prov. Pichincha, Ecuador, 27 December 2010 (lan Davies)

mainly comprising tanagers moved through the area but was not joined by the vireo. Subsequently, the bird appeared in the subcanopy apparently in response to a single whistled imitation of the song of Cloud-forest Pygmy Owl *Glaucidium nubicola* and behaved alertly, permitting its diagnostic plumage characters (short supercilium, wingbars and overall coloration) to be seen.

Subsequently there have been several sightings of Chocó Vireo at Mashpi by different observers (Table 1), always from the road at the edge of the reserve at c.1,100 m and probably mostly involving birds at a single territory. Initial sightings involved one bird defending a territory along a c.500-m stretch of road; however, from 25 August 2010 a pair was observed there, and on 15 June 2011 AS-U observed three individuals. Nonetheless, the species is not easily observed, usually being located only if singing, and then almost exclusively high (c.30 m) in the canopy. Occasionally, a bird visits the midstorey in response to playback when the double wingbar, well-defined pale supercilium and dark eyestripe^{4,8} are more easily observed (Fig. 1). When two were seen together only one bird was heard singing, with the other usually following silently, occasionally delivering brief chatters. The presence

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Table I. Sight records of Chocó Vireo *Vireo masteri* at Mashpi, Pichincha, Ecuador. Number (no. of individuals recorded), Song (S = natural song, P = after playback), Seen (V= visual observation, N = bird not seen), Flock (A = with mixed-species flock, N = not with mixed-species flock), Doc. (Documentation: S = sound-recorded, P = photographed).

Date	Number	Song	Seen	Flock	Doc.	Observer(s)
14 June 2010	I	S, P	٧	Ν	S	DMB
20 June 2010	I	S	٧	A		AS-U
3 July 2010	1	S, P	٧	A	S	DMB
18 July 2010	I	S	Ν			AS-U
18 July 2010	I	S, P	٧	Ν	S	R. Ahlman, C. Vogt
13 August 2010	I	S	Ν			AS-U
25 August 2010	2	Р	٧	А	S	B. Palacios
2 October 2010	I	S	٧	А	Р	L. Navarette
29 October 2010	2	S, P	٧	А		DMB
13 November 2010	I	S	Ν			AS-U
24 November 2010	I	Ν	٧	Ν		B. Palacios
11 December 2010	2	S, P	٧	А	Р	R. Ahlman, B. Andersson
12 December 2010	I	Р	٧	Ν		AS-U
27 December 2010	I	Р	٧	Ν	S, P	I. Davies, A. Spencer
6 January 2011	2	Р	٧	Ν		AS-U
9 January 2011	I	Р	٧	А	Р	DMB, T. Seimola
20 February 2011	1	Р	٧	А		T. Seimola
21 February 2011	I	S	Ν			DMB
15 June 2011	1	S	Ν	Ν		DMB
15 June 2011	3	S	V			AS-U

of mixed-species flocks in the territory appeared to stimulate song to some extent, but birds were also observed singing when alone. Mixed-species flocks of mainly insectivores were joined opportunistically by *V. masteri*, which followed them briefly for short distances. Members of these mixed parties included Slaty Antwren *Myrmotherula schisticolor*, Rufousrumped Antwren *Terenura callinota*, Red-faced Spinetail *Cranioleuca erythrops*, Buffy Tuftedcheek *Pseudocolaptes lawrencii*, Scaly-throated Foliagegleaner Anabacerthia variegaticeps, Lineated Foliage-gleaner Syndactyla subalaris, Ornate Flycatcher Myiotriccus ornatus, Tawny-breasted Flycatcher Myiobius villosus, Ochre-breasted Tanager Chlorothraupis stolzmanni, Tropical Parula Parula pitiayumi, Slate-throated Redstart Myioborus miniatus, Golden-bellied Warbler Basileuterus chrysogaster and Three-striped Warbler B. tristriatus.

Description of song

We recorded songs of two individuals at different localities: (1) on 14 June and 3 July 2010 at Mashpi, and (2) on 27 May 2010 above El Cristal, Río Negro

Table 2. Song parameters in means ± SD of Chocó Vireo Vireo Masteri recorded at Mashpi, prov. Pichincha, and at El Cristal, prov. Esmeraldas, Ecuador.

Song parameters	Mashpi		El Cristal	
	(n=76 songs)		(n=55 songs)	
length of song (mean ± SD)	1.8 ± 0.4	seconds	1.9 ± 0.4	seconds
time interval between songs (mean \pm SD)	5.6 ± 2.9	seconds	3.7 ± 1.7	seconds
max. frequency use (mean ± SD)	9.4 ± 0.5	kHz	9.3 ± 0.4	kHz
min. frequency use (mean ± SD)	3.3 ± 0.5	kHz	3.0 ± 0.4	kHz
no. of notes per song (mean ± SD)	11.3 ± 2.5		. ± 2.5	
no. of song types	10		6	

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Figure 2. Songs of Chocó Vireo Vireo masteri recorded at Mashpi, prov. Pichincha (A–C) and El Cristal, prov. Esmeraldas (D–F), Ecuador. Song A consists of long trills whereas song B comprises shorter clusters of notes. Songs E–F illustrate variation within a song type (Dušan M. Brinkhuizen)

drainage, prov. Esmeraldas (00°50'N, 78°32'W; c.1,500 m), using a Sharp MD-MT190H(S) digital recorder and a Sony ECM-PB1C microphone. We assume that the recordings at Mashpi involve a single individual because the location and song types were identical. We analysed a total of 131 songs using Praat². Parameters measured were song length, time interval between songs, number of notes delivered per song, and max. and min. frequency use (Table 2). We also determined the number of song types, through reference to their basic acoustic structure⁷.

Chocó Vireo sang exclusively from the canopy, often for periods of c.20 minutes or more, being especially prolonged after playback. Songs (c.2 seconds in length) were usually given at a continuous rate every 4–6 seconds. The song is a sequence of trills and complexes of notes, consisting of clear and often high-pitched notes (Fig. 2). Visual analysis of sonograms revealed that songs were

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Figure 4. Two consecutive songs of Yellow-winged Vireo *Vireo carmioli* recorded at Providencia Road, Cerro de la Muerte, prov. San José, Costa Rica, 8 February 2011 (Andrew Spencer)

often subdivided into clusters of 2-4 notes (not taking into account the longer trills) produced as coherent units. Notes (c.0.1 second) were typically delivered at a fast rate with many of them showing strong upsweeps and downslurs in frequency. The frequency range of songs was typically 3-9 kHz. Songs usually consisted of 9-12 notes but occasionally up to 22 notes. Sixteen different song types were recorded (ten at Masphi and six at El Cristal, respectively) and no shared types were found between the two individuals. Song types were usually repeated for prolonged periods, but consecutive songs often showed some variation, especially in the start and end notes. In addition, two types of calls were recorded: (1) a harsh chatter of 3-4 shrill notes and (2) a loud, rapidly delivered trill of c.30 notes.

0.5 sec

Discussion

Chocó Vireo has a distinctive song and is unlikely to be confused if heard singing. Identification was straightforward, as the sound-recordings were diagnostic of the species and exclude other small canopy-dwelling passerines in range. In addition, the observed field marks support the identification.

In recent literature, the song of Chocó Vireo has been described as comprising three parts, starting with high-pitched notes, followed by lower pitched ones, and a variable ending with up- and downslurs⁴. Our findings from sonograms were similar. Although the subdivision into three parts appears to be a common pattern, it was not consistent, with songs often containing just two coherent parts and, in turn, sometimes more than three. Correspondingly, notes delivered in the first part were generally at higher frequency than those in the following part, but with a few exceptions.

The song differs significantly from other *Vireo*. The commonly heard song of the locally sympatric Brown-capped Vireo *V. leucophrys* is markedly different, being less variable and lacking trills (Fig. 3). It is lower in frequency (usually >6 kHz) with the notes occupying a narrower frequency range and lacking the strong frequency modulations of Chocó Vireo. Furthermore, songs are usually shorter with fewer notes. The song of Yellowwinged Vireo also differs notably, with short songs (c.0.4 seconds) of very few notes (2-3) usually below 7 kHz in frequency (Fig. 4). Songs of Chocó Vireo vary within individuals, but the two individuals we recorded did not share song types. However, some Vireo species share song types, even if not occurring in the same area³. We were unable to record and analyse songs of more individuals and our small sample may have prevented our detecting song-type sharing.

Chocó Vireo is a persistent singer, at least seasonally, and our observations suggest that the species is resident year-round (Table 1). The species does not appear to be an obligate flock member but rather accompanies mixed-species flocks opportunistically⁶.

Habitat and forest structure at Mashpi are very similar to those described for the species elsewhere in Ecuador and Colombia^{1,6,8}. The birds occurred in tall canopy of very wet cloud forest on sloping ground, with natural treefall gaps and numerous mosses, bromeliads and epiphytes. The forest at Mashpi was selectively logged in the past, but the majority of habitat in the reserve has a mature structure. Thus far, Chocó Vireo has only been found in very wet, mossy cloud forest, and its distribution on the Pacific slope is perhaps restricted to a specific microhabitat. The same seems true for Buffy Tuftedcheek, Black Solitaire Entomodestes coracinus, Moss-backed Tanager Bangsia edwardsi and Indigo Flowerpiercer Diglossa indigotica, which are all fairly common at Mashpi but very rare or absent from forests at similar elevations nearby (e.g. Mindo; pers. obs.).

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Chocó Vireo was not directly observed with its congener Brown-capped Vireo, but they surely come into contact at Mashpi. Brown-capped Vireos were seen regularly in mixed-species flocks in the immediate area of the known territory of Chocó Vireo, and on 20 July 2010 a pair of Brown-capped Vireos was observed in the same tree as that used by the Chocó Vireo (DMB pers. obs.). The resident race of Red-eyed Vireo V. olivaceus griseobarbatus has also been seen there (AS-U pers. obs.), making Mashpi the only known locality at which V. masteri is sympatric with two congenerics, as previously it was known to occur only with other Vireonidae, namely the two species of *Cyclarhis*^{6,8}. This opens an opportunity to study the interaction of three resident species of Vireo at the same locality, the results of which could help to better understand the ecology of the Chocó Vireo.

The sight records at Mashpi extend the range of Chocó Vireo c.85 km south in Ecuador. Our observations are the first documented records in Pichincha and represent the southernmost ever of the species.

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