

A new species of *Scytalopus tapaculo* from the upper Magdalena Valley, Colombia

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Ridgely & Gaulin's (1980) paper on the birds of Finca Merenberg, Cordillera Central, dpto. Huila, Colombia, mentions that the authors regularly heard a *Scytalopus tapaculo*, and that they did not know to what species it pertained. In October 1986, Bret Whitney tape-recorded a *Scytalopus* at Finca Merenberg he too was unable to identify. He sent a copy of the recordings to NK, who was unaware of any *Scytalopus* with a similar song. Yet, *S. atratus confusus*, a taxon that ranges at similar elevations in Colombia was a possibility, as its vocalisations were then unknown. Due to mounting political instability it became dangerous to work in the region, thus very few ornithologists visited Finca Merenberg in the 1990s. In 2002, however, Andrés Cuervo finally obtained recordings of *confusus* in dpto. Antioquia and sent copies to NK, who found the vocalisations very different from the Finca Merenberg birds, making it highly probable that the latter represented an undescribed taxon. By then, political tension had lessened, enabling us to visit Finca Merenberg in February 2003, with the purpose of obtaining specimens and tape-recordings of the tapaculo. Three specimens were taken, all males, whose vocalisations were also tape-recorded. Additional recordings of 5–6 individuals were obtained at Finca Merenberg and a nearby site.

The Finca Merenberg tapaculo is morphologically very similar to several other *Scytalopus*. Its main characteristic is its distinct song, as is true of several congeners (Krabbe & Schulenberg 1997). DNA sequences generated from tissue samples were compared with those of a variety of *Scytalopus*, revealing that the bird must have been isolated for a substantial period. The vocal and genetic distinctiveness of this tapaculo convince us that it represents a new (biological) species, which we name:

Scytalopus rodriguezi sp. nov.
Upper Magdalena Tapaculo
Tapaculo del Alto Magdalena

Holotype Adult male, no. ICN-34841 of the ornithological collection of the Instituto de Ciencias Naturales, Universidad Nacional de Colombia (ICN), Bogotá, Colombia (Fig. 1). Collected and prepared by NK (original no. NK3-24.2.03), on 24 February 2003, in Finca Merenberg Natural Reserve, San Agustín municipality, dpto. Huila, Colombia (02°12'N 76°06'W). This locality is at 2,200 m on the east



slope of the Cordillera Central, in lower montane humid forest. The specimen was tape-recorded in dense understorey of heavily disturbed primary forest and through playback lured into a mist-net placed nearby. Sound-recordings are deposited at the British Library Sound Archive (cat. nos. 131212, 131213 and 131217); (uncatalogued) tissue samples in DMSO buffer are held at Banco de Tejidos, Instituto Alexander von Humboldt. For measurements see Table 1.

Diagnosis Song and call distinctive (see Vocalisations), but plumage typical of genus. The lack of distinguishing plumage features in many species of *Scytalopus* is depicted in Fig. 2. Medium-sized *Scytalopus* with a body mass of 21.9 g (21.4–22.7 g; see Table 1). Much like sympatric *S. spillmanni* but body mass smaller, plumage overall slightly darker, especially on lower belly and flanks, wings and tarsi shorter, and tarsi and toes darker. Also much like allopatric *S. chocoensis* and *S. robbinsi*, but body mass averages slightly larger, plumage slightly darker, especially on throat and belly, wings and tail longer, tarsi and toes darker, and bill slenderer. Decidedly smaller than allopatric *S. micropterus* in all measurements, with a distinctly slenderer bill. Smaller and less glossy than the possibly sympatric *S. atratus confusus*; also longer tailed, without a white crown spot, and lacks clearly demarcated white tips to belly feathers. Body mass much larger than near-sympatric *S. canus opacus*, wing-length the same but bill longer, tail averages slightly longer, and dark bars on flanks broader and less straight. Much like allopatric *S. stilesi*, a recently described species from further north in the Central Andes of Colombia (Cuervo *et al.* 2005), but tarsi shorter, wings shorter, tail longer, and brown flanks slightly paler. Body mass larger than the widespread and possibly sympatric *S. latrans*, plumage distinctly paler, bill and tail longer, and brown on rump and flanks much more extensive.

Description of holotype Capitalised colour nomenclature and numbers from Smithe (1975). Adult male (body mass 22.7 g) with unossified skull, no *Bursa Fabricii* and no fat; each testis 4 x 8 mm. Upperparts, wings, tail (of 12 rectrices) and head- and neck-sides Blackish Neutral Gray (82), with rump evenly barred Brussels Brown (121B); barring indistinct on upper rump. Uppertail-coverts indistinctly barred and tips of tertials indistinctly tipped dark Prout's Brown (121A); tertials very faintly washed Vandyke Brown (121). Underparts Dark Neutral Gray (83), with belly

Captions to plates on opposite page:

Figure 1. Holotype of *Scytalopus rodriguezi* (Paul Salaman)

Figure 2. Eight Ecuadorian taxa of *Scytalopus* tapaculos, illustrating the lack of plumage characteristics as distinguishing features in the genus. From left to right: *S. canus opacus*, *S. latrans subcinereus*, *S. latrans latrans*, *S. viciniior*, *S. spillmanni*, *S. parkeri*, *S. robbinsi* and *S. chocoensis*. Specimens in Zoological Museum, Univ. of Copenhagen, all collected within the same decade (Niels Krabbe)

Figure 3. Type series of *S. rodriguezi*. From top to bottom: paratype (ICN 35234), paratype (ICN 34842), and holotype (ICN 34841). Apart from the pale tips to the belly feathers of ICN 34842, they have nearly identical underparts (Paul Salaman)

TABLE 1
Morphometrics of males of selected species of *Scytalopus*: mean and range (in parenthesis).
Measurements of *S. rodriguezi* and *S. atratus confusus* are from Colombia, the rest from Ecuador.
See Appendix for list of specimens examined.

Taxon	Body mass (g)	Wing(flat) (mm)	Tail (mm)	Tarsus (mm)	Bill (tip to operculum forel edge) (mm)
<i>S. rodriguezi</i>	21.6 (21.40 21.9) n=3	57.3 (57.0 58) n=3	45.0 (44.0 47) n=3	21.8 (21.50 22.0) n=3	7.4 (7.30 7.5) n=3
<i>S. stilesi</i>	23.0 (21.50 24.5) n=2	63.8 (63.00 64.5) n=2	42.7 (42.00 43.3) n=2	23.0 (22.90 23.0) n=2	7.8 (7.50 8.1) n=2
<i>S. micropterus</i>	29.7 (27.00 32.5) n=9	61.4 (59.90 64.0) n=15	53.5 (48.00 59.0) n=12	24.9 (24.30 25.4) n=6	7.8 (7.50 8.2) n=4
<i>S. spillmanni</i>	25.2 (21.00 30.0) n=36	61.9 (56.00 67.0) n=38	45.3 (39.00 54.0) n=35	24.5 (22.20 26.0) n=18	7.0 (6.10 7.6) n=14
<i>S. canus opacus</i>	16.2 (13.90 17.9) n=23	57.2 (52.00 63.0) n=22	42.8 (35.40 46.7) n=19	22.5 (20.80 24.2) n=27	5.5 (5.00 6.1) n=19
<i>S. atratus confusus</i>	1 male in ICN 25.0 g	58.7 (58.10 61.5) n=7	43.8 (42.0 44.8) n=6	23.6 (22.60 24.4) n=6	1 male in ICN 8.2 mm
<i>S. robbinsi</i>	19.6 (18.10 21.0) n=8	53.9 (52.00 55.0) n=8	36.0 (34.00 39.2) n=8	22.2 (22.20 22.3) n=4	6.9 (6.60 7.2) n=5
<i>S. chocoensis</i>	21.0 (19.00 22.5) n=17	55.3 (52.00 60.0) n=20	38.7 (33.80 40.7) n=19	22.2 (21.20 25.0) n=8	7.7 (7.50 8.1) n=7
<i>S. latrans</i>	18.2 (16.80 20.9) n=15	57.5 (53.00 63.0) n=20	39.8 (36.00 45.0) n=18	22.6 (20.50 24.0) n=12	6.4 (5.60 7.0) n=10

feathers indistinctly tipped pale grey; flanks, lower belly and undertail-coverts have fairly straight and c.1-mm wide Cinnamon (123A) and blackish bars. Axillaries Cinnamon. Irides dark brown, bill black, and feet dusky brown on outer and rear of inner surface, horn brown on rest of inner surface, with paler claws. Stomach contents consisted of the remains of small arthropods.

Description of paratypes Two additional specimens were taken at the type locality, but slightly higher, at 2,235 m (Fig. 3). Both were singing males that were tape-recorded before being lured into mist-nets using playback. One (ICN 35234) weighed 21.6 g, both testes 4 x 8 mm; the other (ICN 34842) weighed 21.4 g, both testes 2.5 x 3 mm. They are almost identical to the holotype in coloration and soft parts, differing only by a slightly more pronounced wash of Vandyke Brown on the tertials; ICN 34842 also has slightly paler and better-defined tips to the belly feathers.

Systematic relationships The taxonomic affinities of *S. rodriguezi* were assessed by CDC through analyses of mt-DNA sequences as part of a broader, ongoing attempt to reconstruct a phylogeny of *Scytalopus*, which will be published elsewhere (Cadena *et al.* in prep.). Cuervo *et al.* (2005) presented preliminary results based on analyses of 315 base pairs (bp) from the cytochrome-*b* (*cyt-b*) gene for multiple

Scytalopus taxa, including all but two of the known species in Colombia and Ecuador. The dataset discussed by Cuervo *et al.* (2005) has since been expanded to include more taxa (mostly from south-east Brazil) and 650 additional bp of sequence from the second subunit of the NADH dehydrogenase gene (ND2). Analyses of this more comprehensive dataset confirm the relationships described by Cuervo *et al.* (2005), with high bootstrap support (98% under maximum likelihood and 100% under parsimony) and high Bayesian posterior probability (1.00) for a clade formed by *S. rodriguezii*, *S. robbinsi*, *S. stilesi* and an unnamed species from the Pacific slope of the Colombian Cordillera Occidental (see Cuervo *et al.* 2003). All analyses consistently indicated a basal position for *S. rodriguezii* within this assemblage, but support for the grouping of *S. stilesi*, *S. robbinsi* and *Scytalopus* sp. nov. was not strong. The clade formed by these three species received 68% and 54% bootstrap support in maximum likelihood and unweighed parsimony analyses, respectively, and a Bayesian posterior probability of 0.62.

The lowest level of genetic divergence (uncorrected *p* distance in *cyt-b*) observed between *S. rodriguezii* and another tapaculo was with *Scytalopus* sp. nov., at 5.0%. Divergence from the other two species in its clade was higher: 6.0% from *S. robbinsi* and 6.7% from *S. stilesi*. Using two available estimates of passerine *cyt-b* substitution rates to assess the time of separation of *S. rodriguezii* leads to quite different temporal scenarios. Assuming the rate of 1.6–2.0 % divergence per million years (Tarr & Fleischer 1993, Fleischer *et al.* 1998), the data suggest that *S. rodriguezii* last shared an ancestor with its closest relatives in the Pliocene, at least 2.5 million years ago. In contrast, assuming a rate of 5.6% divergence per million years (Warren *et al.* 2003) would place its divergence in the mid Pleistocene, at *c.* 1 million years before present. In either case, the sequence data indicate that *S. rodriguezii* is a relatively old taxon (Johns & Avise 1998, Johnson & Cicero 2004) that probably became isolated from its closest relatives before the onset of the large-amplitude climatic oscillations that commenced 0.8 million years ago in the Colombian Andes (Hooghiemstra & Ran 1994).

Voice Songs of eight different individuals were recorded at two localities (Finca Merenberg and Cordillera Las Minas). Recordings are deposited in the British Library Sound Archive (cat. nos. 131209–131218). Most are of birds engaged in aggressive territorial defence in response to playback. Only one bird sang in each territory, although the presence of another individual, presumably the mate, was confirmed visually in at least one case.

Song, among the simplest of any *Scytalopus*, consists of a single note repeated at a pace of 4–5 per second, and is given in a single phrase, or, more commonly, in bouts of 2–5 or more phrases. During each phrase the volume most often increases gradually and the pitch rises slightly over the first 4–6 seconds, and then both remain constant (Fig. 4). Occasionally the volume fades on the last 1–2 notes, but phrase endings are usually rather abrupt. The lengths of phrases and pauses between them are irregular; phrases vary from 2 to over 60 seconds, and pauses at 2–21

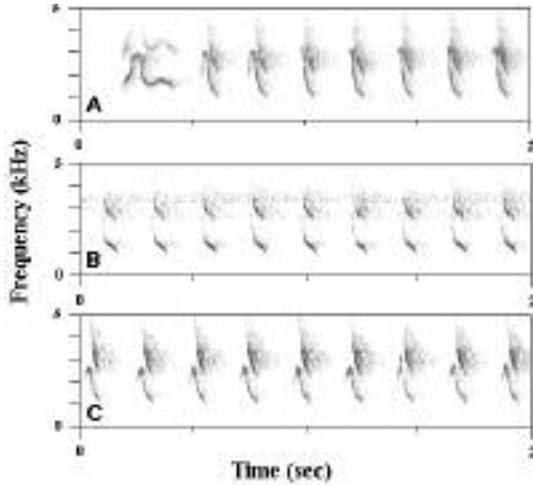


Figure 4. Relative volume of song of paratype ICN 34845 of *S. rodriguezi* during a bout of five songs (recording Niels Krabbe). Sonogram prepared using CoolEditPro (Syntrillium Software).

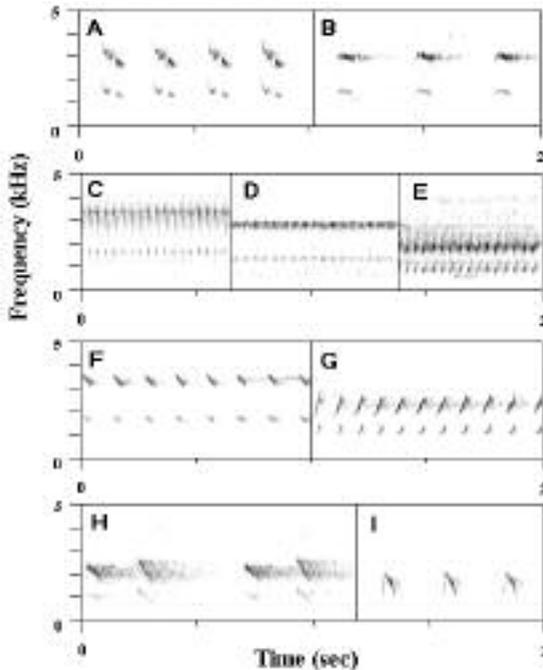


Figure 5. Songs of males *S. rodriguezi*. A: paratype (ICN 34845), including the introductory note of the song. B: Paratype (ICN 35234). C: Holotype. Sonograms produced using 1024 frequency bands and CoolEditPro (Syntrillium Software).

seconds. Each phrase is usually initiated with a slightly lower pitched, prolonged note (Fig. 5a).

Song in response to playback is remarkably similar to that under natural conditions, showing little or no change in quality, pace, pitch and phrase length, and differs only in the briefer pauses, increased volume and, sometimes, in a more accentuated introductory note. Both the fastest and slowest songs recorded (5.3 and 4.0 notes/s) were given under natural conditions.

In six of eight songs recorded from different individuals, song notes are up/down-strokes. In two they are only down-strokes. The up-stroke and peak is a fundamental note loudest around 3 kHz (Fig. 5a,c). The long down-stroke creates a first overtone at 2.5–3.5 kHz, which in seven birds is somewhat louder than the fundamental, but in one bird is weaker (Fig. 5b). The pitch and pace recall those in songs of *S. robbinsi* (Fig. 6, a) and *S. chocoensis*. (Fig. 6b), whereas songs of *S. canus opacus* (Fig. 6c), *S. spillmanni* (Figure 6d) and *S. stilesi* (Fig. 6e) are considerably faster. Other taxa from the Colombian Andes such as *S. vicinior* (Fig. 6f), *S. atratus confusus* (Fig. 6g), *S. micropterus* (Fig. 6h) and *S. latrans latrans* (Fig. 6i), differ from *S. rodriguezi* in the quality of their song notes, in most cases distinctly so.

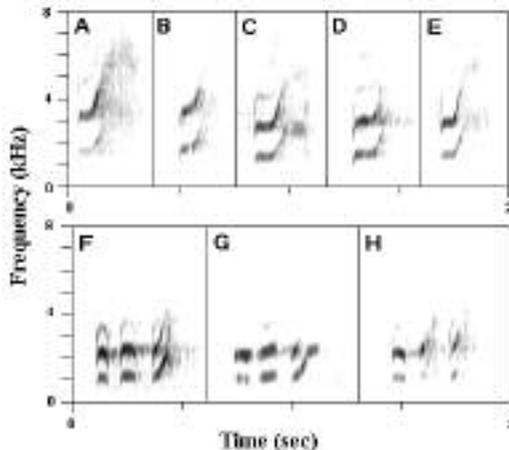


Figure 6. Songs of *Scytalopus tapaculos* (recorded by Niels Krabbe unless stated otherwise). **A:** *S. robbinsi*, Buenaventura, prov. El Oro, Ecuador, 15 April 1991. **B:** *S. chocoensis*, El Placer, prov. Esmeraldas, Ecuador, 25 October 1983. **C:** *S. canus opacus*, PN Purace, dpto. Huila, Colombia, 17 October 1986 (recorded by Bret M. Whitney). **D:** *S. spillmanni*, Alto Gallinazo, dpto. Antioquia, Colombia, 12 June 1994. **E:** *S. stilesi*, Otún Quimbaya, dpto. Risaralda, Colombia, 2 November 1996 (recorded by L. Renjifo). **F:** *S. vicinior*, Mindo, prov. Pichincha, Ecuador, 2 December 1990. **G:** *S. atratus confusus*, Mampuestos, dpto. Antioquia, Colombia, 30 March 2002 (recorded by A. Cuervo). **H:** *S. micropterus*, PN Cueva de los Guácharos, dpto. Huila, Colombia, 21 October 1986 (recorded by Bret M. Whitney). **I:** *S. latrans latrans*, Alto Gallinazo, dpto. Antioquia, Colombia, 12 June 1994. Sonograms produced using 1024 frequency bands and CoolEditPro (Syntrillium Software).

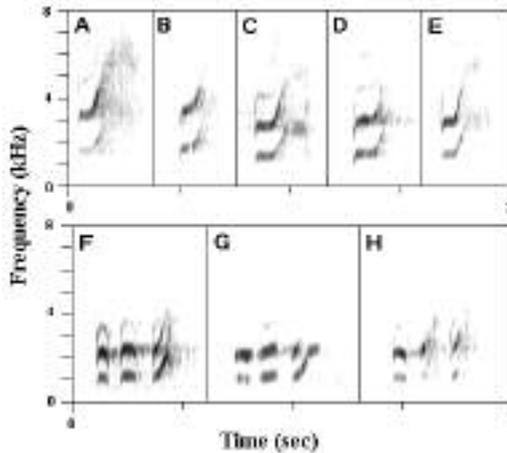


Figure 7. Calls of *Scytalopus tapaculos* (all recorded by Niels Krabbe unless stated otherwise). A–B: *S. rodriguezii* recorded at the type locality, A on 23 February 2003, B on 24 February 2003. C–E: *S. robbinsi* recorded at Buenaventura, prov. El Oro, Ecuador, C on 16 April 1991, D on 16 November 1991 and E on 26 September 1990. F–H: *S. stilesi*. F: Carolina, dpto. Antioquia, Colombia, April 1995 (recorded T. Cuadros). G: Otún Quimbaya, dpto. Risaralda, Colombia, February 1999 (recorded by C. Daniel Cadena). H: Amalfi, dpto. Antioquia, Colombia, 9 January 2003 (recorded by A. Cuervo). Sonograms produced using 512 frequency bands and CoolEditPro (Syntrillium Software).

Calls, given by both sexes, were single, 0.1-second-long, rising *cui* notes at 3.0–3.3 kHz terminated with a more or less accentuated, complicated *brzk* sound with many overtones (Fig. 7a–b). Except being higher pitched, calls are very similar to those of *S. robbinsi* (Fig. 7c–e), but distinctly differ from those of *S. stilesi* (Fig. 7f–h).

Distribution *Scytalopus rodriguezii* is currently known from two areas on the east slope of the Cordillera Central, at the head of the Magdalena Valley, at 2,000–2,300 m (Fig. 8), namely Reserva Natural Merenberg (the type locality), where recorded at 2,150–2,300 m, and Serranía de las Minas (02°05′N 76°02′W; 2,000–2,300 m), a ridge 15 km south-southeast of Finca Merenberg. Although only known from these localities, we presume the species occurs in valleys on both sides of the Serranía de las Minas, and possibly over a slightly broader latitudinal range in dpto. Huila. However, both north and south of its presumed range, elevations of 2,000–2,300 m are extensively deforested (ESDI 2004). A raster and vector analysis of an image (NASA 2004) including the presumed range for *S. rodriguezii* (see below) and within these elevational ranges concurs in a range of 433 km². However, only 169.4 km² or 39% is forested (ESDI 2004). Much of the 169.4 km² of remaining forest is heavily fragmented and therefore considered suboptimal for *S. rodriguezii* populations.

Elevational and latitudinal replacements of morphologically very similar but vocally distinctive forms are prominent in *Scytalopus*, and the sutures between them are often remarkably narrow (Fjeldså & Krabbe 1990, Krabbe & Schulenberg 1997). Exceptions include *S. latrans*, which often overlaps entirely with other species, and to some degree *S. atratus*, which shows partial elevational overlap with *S. micropterus* in much of its range (Krabbe & Schulenberg 1997). It is probable that, as in many parts of Ecuador, most slopes of the Cordillera Central of Colombia are inhabited by *S. latrans* and 30 4 species of *Scytalopus* that replace each other altitudinally. From the uppermost elevation to the lowest these are: *canus opacus*, *spillmanni*, *micropterus*, *rodriguezii* or *stilesii* (depending on latitude), and (with some elevational overlap) *atratus confusus*.

Other *Scytalopus* encountered in the type locality of *S. rodriguezii* and immediate environs, include *S. spillmanni*, heard by NK at the upper limits of the Merenberg reserve (2,300 m), where it replaces *rodriguezii* sharply, and which presumably occurs up to near treeline, where it is in turn replaced by *S. canus*

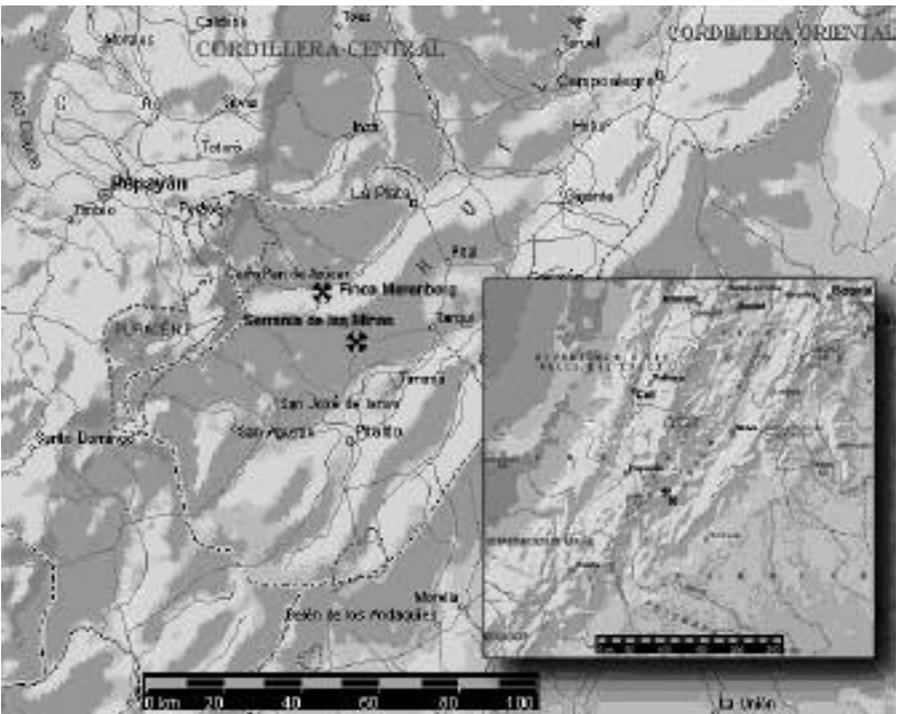


Figure 8. Map of southern Colombia, showing the distribution of *S. rodriguezii*. Crosses mark the two sites where the species has been found.

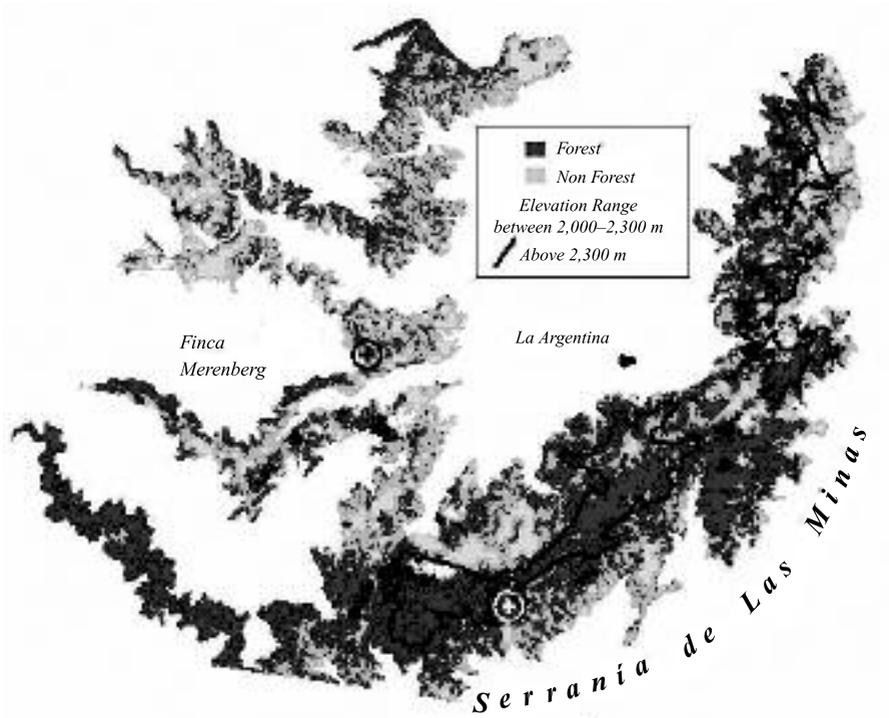


Figure 9. Present-day forest cover within the projected Area of Occupancy of *Scytalopus rodriguezi*. Except for those areas encircled in black, only elevations between 2,000 and 2,300 m are shown. Crosses mark the two sites where the species has been found. Map based on ESDI (2004) and NASA (2004).

opacus (pers. obs. and tape-recordings by B. Whitney & P. Coopmans). No *Scytalopus* occurs lower down, as these areas are too deforested and dry for the genus. Further north on the east slope of the Central Cordillera *S. rodriguezi* is replaced by another recently discovered new species of *Scytalopus* (Cuervo *et al.* 2005), but the zone of replacement is undetermined. We fear that *rodriguezi* is truly limited to a tiny area at the head of the Magdalena Valley (Fig. 9). To the east, on the western slope of the Eastern Cordillera and apparently also to the south on the east slope of the Cordillera Central *S. rodriguezi* is replaced by *S. micropterus*, a form that occurs from 1,200 to 2,500 m (being commonest at 1,700–2,100 m), on the Amazonian slope from central Colombia to northernmost Peru (Krabbe & Schulenberg 1997). In southern Colombia *micropterus* spills over the Eastern Andes to the head of Magdalena Valley, at Cueva de los Guácharos, where common at 2,000 m (own tape-recordings), and it apparently also occurs on the east slope of the Central Andes in Huila, where specimens (in the United States National

Museum [USNM], Washington DC, and Natural History Museum, Tring [NHM]) that agree with *micropterus* in their long tails, large bills and general plumage pattern were collected at La Candela (2,135 m) and nearby La Palma, (1,675 m). It is unknown where *rodriguezi* and *micropterus* replace each other latitudinally, but that will undoubtedly mark the northern limit of the range of *micropterus* in the Central Andes of Colombia.

In addition, two other species of *Scytalopus* occur in central Colombia. One is the widespread *S. latrans*, which is often found in heavily disturbed or secondary habitats, and which occupies a broad altitudinal range. It co-exists with a congener in many parts of its range (Krabbe & Schulenberg 1997). Strangely, we did not record this taxon at Finca Merenberg, nor can we find records of it from the east slope of the Central Andes south of Antioquia. The nearest records we have located from the Central Andes are on the west slope in Cauca (Chapman 1917), at Valle de las Papas and Almaguer. We strongly doubt that such a large gap in its distribution is genuine.

The other taxon, *S. atratus confusus*, occurs on both slopes of the Cauca and Magdalena valleys, at c.915–1,980 m, i.e. lower than *S. rodriguezi*. At the head of the Magdalena Valley it has so far only been recorded south of Merenberg, specimen records being from Isnos (1,600 m), La Candela (1,980 m), La Palma (1,675 m) and below Andaluc a (915 m) (Chapman 1917, Zimmer 1939; elevation data taken directly from labels of specimens with a white crown spot held in the Academy of Natural Sciences Philadelphia [ANSP], American Museum of Natural History, New York [AMNH], Field Museum of Natural History, Chicago, and USNM). Like *S. latrans*, the lack of records from further north on the east slope of the Central Cordillera probably owes to under-sampling.

Etymology We take pleasure in naming the new species for Jos  Vicente Rodr guez Mahecha, in recognition of his dedication and contribution to ornithology and conservation in Colombia. He has collected over 8,000 bird specimens that are now housed in the Instituto Alexander von Humboldt and ICN collections in Colombia, and is one of Colombia's leading conservationists. The English and Spanish names refer to the upper Magdalena Valley of Colombia to which the species is endemic.

Ecology and behaviour

Scytalopus rodriguezi inhabits dense understorey of humid forest at elevations of 2,000–2,300 m on the east slope of the southern Central Cordillera, Colombia. Annual precipitation approaches 2 m and the driest months are December–January (Ridgely & Gaulin 1980). The Finca Merenberg reserve comprises 15 forest remnants, each c.1 ha in size, separated and surrounded by pasture (Fig. 10). Large trees are 20–30 m tall and include *Morus insignis* (Moraceae), *Brunellia occidentalis* (Brunelliaceae), *Quercus humboldtii* (Fagaceae), *Cecropia* sp.



Figure 10. Humid montane forest at Finca Merenberg showing typical landscape of fragmented forest (Paul Salaman)



Figure 11 (left). Trampled undergrowth at Finca Merenberg (Paul Salaman)



Figure 12 (right). Climbing plants and weeds at forest edge at Finca Merenberg; note felled trees within the reserve (Paul Salaman)

(Cecropiaceae), *Hedyosmum recemosum* (Chloranthaceae), *Billia columbiana* (Hippocastanaceae), *Oreopanax floribundum* (Araliaceae), *Blakea* aff. *pyxidanthus* (Melastomataceae), *Allophyllus mollis* (Sapindaceae), *Ladenbergia macrophylla* (Rubiaceae), and *Clusia* sp. (Clusiaceae). Midstorey vegetation includes *Miconia cordifolia* (Melastomataceae), *Palicourea angustifolia*, *P. albiflora* (Rubiaceae), *Geonoma lindeniana* (Arecaceae), *Renealmia policarpa* (Zingiberaceae) and *Solanum venosum* (Solanaceae). Due to roaming cattle the understorey is heavily trampled and the tree recruitment is poor (Fig. 11). Dense understorey of weeds and climbing plants is primarily found at forest edge and frequently includes *Cyathea* sp. (Cyatheaceae) and *Chusquea* aff. *scandens* (Poaceae). For further details see Ridgely & Gaulin (1980).

The montane cloud forest of the Serranía de las Minas is much less disturbed than forest at Finca Merenberg, having only been subject to selective logging and

is merely fragmented by the road that cuts through part of it. Trees include the dominant *Quercus humboldtii* associated with smaller trees such as *Ocotea cuneata*, *Nectandra macrophylla*, *Aniba perutilis* (all Lauraceae), *Viburnum cornifolium* (Caprifoliaceae), *Cedrella montana* (Meliaceae), *Cinchona pubescens* (Rubiaceae), *Ficus greiffiana* (Moraceae), *Billia columbiana* and *Myrcia fallax* (Myrtaceae). Understorey is well developed with high tree recruitment and dominant plants include *Weinmannia* sp. (Cunoniaceae), *Cavendishia strobilifera* (Ericaceae) and *Chusquea* aff. *scandens*.

The behaviour of *S. rodriguezi* does not appear appreciably different from that of most congeners (Krabbe & Schulenberg 1997, 2003). Accordingly, the new *Scytalopus* is frequently heard and rarely seen. Individuals usually move inconspicuously within 50 cm of or on the ground in the densest understorey. Judging from stomach contents of the three specimens, the diet of *S. rodriguezi* consists exclusively of small insects, principally Coleoptera. No fruits, seeds or other vegetable matter were found. All three specimens had medium-sized testes and none was moulting, suggesting that breeding does not occur in January and February, at least.

The vocal habits of the species make it reasonably straightforward to assess population densities. Along a c.1 km transect at Finca Merenberg, we registered at least five territorial males and confirmed the presence of a mate in two territories. We roughly estimated that the species occupies ≈ 3 ha of suitable habitat, but that suitable habitat is not uniformly distributed. Within the 150 ha of forest in Merenberg reserve, we estimated only c.20 pairs or territorial males.

Conservation

Scytalopus rodriguezi is currently known from Merenberg reserve, the first protected area to be established in Colombia. Upon the reserve's establishment in 1950, by the Buch family, it comprised c.150 ha of forest and c.150 ha of cattle pasture. Unfortunately, the 150 ha of forest are dwindling (Fig. 12), partly owing to the creation of more pasture by the owners (second-generation Buch), partially to selective forest clearance of hundreds of mature oak and other hardwoods, which has drastically changed the forest physiognomy. In view of the deterioration in the site's conservation, we are most concerned about the uncertain future of Merenberg reserve. International and local non-governmental involvement and support in conservation efforts are acutely required. For example, the area deserves Important Bird Area status. Merenberg is accessible by road from Popayán and Neiva, so there is potential for ecotourism, although this is difficult at present given Colombia's ongoing military conflict. We very much hope that the discovery of this new species endemic to the region will lead to increased efforts to protect Merenberg.

The Area of Occupancy is <3 km² at two sites. We estimate the Extent of Occurrence to be 169.4 km² calculated from the area of extant forest within the species' projected range (see Distribution) and 20 pairs per 150 ha, as seen in the fragmented forest of Merenberg reserve (see Ecology and behaviour), giving a total

population of 2,200 territorial males or possible pairs in remaining forest. We speculate that the effects of fragmentation and continued deforestation in recent years, particularly in the Serran  de las Minas, have significantly reduced the species' total population. Only 150 ha of forest are protected at present, or just 0.3% of the species' postulated range. Based on remaining forest cover (Fig. 9), the species' stronghold is undoubtedly Serran  de las Minas, but this area is unprotected.

Since the species' discovery, an important conservation initiative has been underway at Serran  de las Minas. Together with the national parks authority (Unidad Administrativa Especial Sistema de Parques Nacionales Naturales, Direcci  Territorial Surandina), Fundaci  ProAves and local communities hope to establish a conservation area across the Serran  de las Minas in the near future, protecting c.10,000 ha of premontane and montane forest, largely oak-dominated, and thereby ensuring the survival of an additional population of *S. rodriguezi*.

Scytalopus rodriguezi presently faces a risk of extinction and is therefore recommended for IUCN Red List status as Endangered, B1a+b (ii, iii, iv, v) because its presumed Area of Occupancy is less than 170 km² and its known population is small (<5,000 individuals).

Further studies to determine the distribution and population size of *S. rodriguezi* are a high priority, and would greatly assist the development of a specific management plan for Merenberg and, especially, Serran  de las Minas. Research and conservation initiatives in the region should also focus on several other globally threatened or range-restricted birds, e.g. *Pyrrhura melanura chapmani*, *Atlapetes fuscolivaceus* and *Leptotila conoveri*. Further ornithological surveys are needed of remaining montane forest tracts at the head of the Magdalena Valley in order to assess the true distributions of these forms and the threats to their habitats.

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APPENDIX

Male *Scytalopus* specimens examined. Museums as follows: Academy of Natural Sciences, Philadelphia (ANSP), American Museum of Natural History (AMNH), Field Museum of Natural History (FMNH), Instituto de Ciencias Naturales, Bogotá (ICN), Museo Ecuatoriano de Ciencias Naturales (MECN), and Zoological Museum, University of Copenhagen (ZMUC).

Scytalopus rodriguezi: Colombia: 3 Huila (type series in ICN).

Scytalopus stilesi: Colombia: 2 Antioquia (ICN).

Scytalopus robbinsi: Ecuador: 2 Azuay (ZMUC, ANSP), 6 El Oro (ZMUC, ANSP, MECN).

Scytalopus chocoensis: Ecuador: 17 Esmeraldas (ZMUC, ANSP, MECN).

Scytalopus sp. nov. 1: Colombia: 1 Risaralda (ICN).

Scytalopus spillmanni: Ecuador: 3 Carchi (ZMUC), 8 Imbabura (ZMUC), 12 Pichincha (ZMUC, ANSP, MECN), 3 Sucumbios (ZMUC), 9 Napo (ZMUC, MECN), 2 Tungurahua (ZMUC), 1 Azuay (ZMUC); Colombia: 3 Antioquia (ICN).

Scytalopus micropterus: Ecuador: 8 Napo (ZMUC, ANSP, MECN), 1 Zamora-Chinchi (ANSP).

Scytalopus atratus confusus: Colombia: 5 Huila (FMNH, AMNH, ANSP), 2 Valle del Cauca (AMNH).

Scytalopus canus opacus: Ecuador: 11 Carchi (ZMUC, ANSP), 8 Napo (ZMUC, ANSP), 2 Azuay (ZMUC, MECN), 9 Zamora-Chinchi (ZMUC, ANSP, MECN).

Scytalopus latrans latrans: Ecuador: 3 Carchi (ZMUC, MECN, ANSP), 2 Sucumbios (ZMUC, MECN), 2 Imbabura (ZMUC), 5 Pichincha (ZMUC, MECN), 4 Cotopaxi (ZMUC), 1 Cañar (ZMUC), 3 Napo (ZMUC, MECN).

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