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THREE *CHAMAEZA* ANTTHRUSHES IN EASTERN BRAZIL (FORMICARIIDAE)[1]

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Abstract. There are three, not two, sibling antthrushes of the genus *Chamaeza* (Formicariidae) in eastern Brazil. One is the short-tailed, large, pale-billed, lower montane *C. campanisona,* with a spotted throat, dark forehead, and a long song ending in several grunts. The second is the long-tailed, small, dark-billed, montane and southern *C. ruficauda,* with barred undertail coverts and a short upscale song. The third is medium-tailed, small, dark-billed, midmontane, with a long upscale song like that of midmontane so-called "*ruficauda*" in Colombia and Venezuela. This northern group is like the third Brazilian species in proportions but not in coloration, so is considered to be the separate species *C. turdina.* The third Brazilian bird is probably *C. meruloides* Vigors 1825, based on an 1826 color plate; type specimens were sold at auction and have disappeared. It has a reddish crown and olive-brown back as in *C. campanisona* but reddish forehead and tail as in *C. ruficauda*; the throat is unspotted but the rest of the underparts are as in *C. campanisona. C. meruloides* and *C. turdina* form a vocally similar superspecies.

Key words: *Brazilian forests;* Chamaeza; *conservation; Formicariidae; holotypes; museums.*

INTRODUCTION

Recording birds in southeastern Brazil in 1971, Paul Schwartz was surprised to find a different song in *Chamaeza ruficauda* (Formicariidae), an antthrush said to be the same as a bird he knew well in Venezuela (pers. comm.) He further noted that a bird he recorded and collected at the Boracéia Zoological Station of the University of São Paulo, thinking it *C. campanisona,* had a voice like Venezuelan *C.* "*ruficauda.*" He was unable to follow up these observations, while Sick (1985) was only able to add that there were three and not two types of song in southeastern Brazilian *Chamaeza.*

When I came to eastern Brazil in December 1974, the first *Chamaeza* found, at 1,350 m on the serra de Caparaó in eastern Minas Gerais, sang like *C.* "*ruficauda,*" which I had studied in Venezuela with Paul Schwartz. Here I show that the Caparaó and Boracéia birds belong to a previously unrecognized third species in eastern Brazil, different from *C. ruficauda* and *C. campanisona,* and that Venezuelan "*ruficauda*" are also different.

METHODS

I checked specimens at the Museum of Zoology of the University of São Paulo (MZUSP), the American Museum of Natural History in New York (AMNH), the British Museum (Natural History) at Tring (BM), the Museum Alexander Koenig in Bonn, and from the Museum Humboldt in Berlin.

RESULTS

SONGS

Sick (1985) describes the three types of songs in eastern Brazil. One is a long series of *Otus*-like whistles near 1.0 kHz, which end in a few low grunts ("*ku ku ku ku,*" Bertoni 1901). Figure 1(A) shows the end of a 13-sec, 90-note song, including two terminal grunts. The type specimen of *C. campanisona* (Lichtenstein 1823), examined in Bonn courtesy of the Museum Humboldt, is of this widespread lower montane species.

The second type of song, a rising short trill, is a familiar voice on mountaintops and southward and is associated (Belton 1985) with *C. ruficauda* (Cabanis and Heine 1859). Figure 1(B) shows a 3.6-sec song of 50 notes, given at twice the rate in *C. campanisona*; it rises from 950 to 1,350 Hz or 8 Hz per note. Hellmayr (in Cory and Hellmayr 1924) examined the type specimen, mounted in the Museum Heineanum at Halberstadt, Germany, and mentions size and plumage characters typical of the montane bird. After no answer to several letters, I visited Halberstadt but was unable to see the bird because the curator was away; I did meet his assistant, Rudiger Holz, who later sent information on the type specimen that confirms Hellmayr's account.

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The third song is a series like that of *C. campanisona* but longer, ascending, and without terminal grunts. Figure 1(D) shows the end of a song of 165 notes and 22.8 sec, rising from 1,250 to 1,600 Hz at a regular 2.1 Hz per note. As in other *Chamaeza,* the first notes are fainter; but so are the last ones. A sonagram by J. Vielliard (Sick 1985:54), said to be *C. campanisona,* is actually of the third species; songs are said to vary from 25 to 40 seconds, longer than the 15-sec songs of *C. campanisona.* This song is associated with the midmontane bird Schwartz collected at Boracéia (MZUSP 61988). It is like that of Venezuelan midmontane birds of the subspecies *C.* "*r.*" *chionogaster.* These Venezuelan birds and their Colombian relatives, *C.* "*r.*" *turdina,* differ in plumage from birds that sing like them in Brazil, as well as from Brazilian *C. ruficauda.*

COLOR AND SIZE DIFFERENCES

C. c. campanisona of the eastern Brazilian lowlands and lower montane zones has a short tail (Table 1), with a pale tip and blackish subterminal bar on most tail feathers. There are small black speckles on the white throat. A large black spot on the forehead and a pale, large bill (Table 2) are characteristic. As noted by Cory and Hellmayr (1924), many dark flank feathers have a pale streak on the outer web but not on the inner web. Also noted by Hellmayr, in a brief comment on Bertoni (1901), some central flank and belly feathers are three-striped, with pale areas on both inner and outer webs between the stripes (Cory and Hellmayr 1924). There sometimes are a few faint dark bars on the buff undertail coverts. The crown is redder than the olive-brown back and tail. Subspecies in Paraguay and Bolivia are rather similar; subspecies from the northern Andes to Guyana are much darker (including the bill), but the forehead is always black and the tail short. Only two MZUSP specimens from Ceará (serra de Baturité) and a few young birds (as AMNH 771181 from Argentina) lack the black forehead, and even these are speckle-throated and short-tailed. Masses are 93–102 g in Rio Grande do Sul (Belton 1985), 91.8 g in Corrientes, 89–90 g in Bolivia, 64–69 g in northern Venezuela, and 104–112 g on Cerro Urutani in southeastern Venezuela or northwestern Brazil.

C. ruficauda of southeastern Brazil and northeastern Argentina (J. C. Chebez, pers. comm.) is a long-tailed though short-winged and small species, with small and blackish bill. The upperparts are reddish brown, including the tail, which has hardly any pale tips. On each buff under tail covert, there are three or four dark bars. Buff staining on the breast sometimes extends to the unspotted throat, as well as to the sides of the abdomen. The sides of the abdomen are heavily streaked, there are three dark stripes (one medial and two lateral) per feather, but some flank feathers under the wings have only one pale stripe on the outer vane. Hellmayr overlooked these feathers, which are like those of *C. campanisona.* There is no black blotch on the forehead. The barred undertail coverts and long tail suggest that it may be related to the bar-bellied *C. mollissima* of the Andean temperate-zone forests. It weighs 70–75.5 g in Rio Grande do Sul (Belton 1985).

The third species, which occupies midmontane wet forests of eastern Brazil, looks like a collage of the other two. It is a small, medium-tailed bird with a blackish subterminal tail band that is barely visible and extensive pale tips, best seen from below. Similar to *C. ruficauda,* the rump and tail are reddish, the bill small and dark, the forehead reddish with no black blotch, and the throat white or buffish with few or no dark spots. The upper and under parts are otherwise as in *C. campanisona,* so that it is normally classified with *C. c. campanisona* in museums. In voice and in bill, tarsus, and wing, as well as midmontane habitat, it is like Venezuelan *chionogaster* and Colombian *turdina,* but these have spotted throats, mostly three-striped flank feathers, and barred undertail coverts. They are also much darker and redder above, like *C. ruficauda,* and have shorter tails than any but *C. campanisona.* (All northern Andean forms are short-tailed, compared to eastern forms at similar elevations.) Birds of average mass 69 g, cited for *C.* "*campanisona*" by Sick (1985:533), are far too light for that species and probably are the midmontane eastern form.

With rare exceptions, eastern birds with wing chord exceeding tail length between central tail feathers by 30 mm or more are *C. campanisona,* ones with 20–30 mm difference are the midmontane species, and ones with 10–20 mm difference are *C. ruficauda.* Tail length and color characters should be verified, however.

BEHAVIOR AND HABITAT

All species in this genus walk on the forest floor, roots, and logs, pounding their short tails downward, and peck insects from the ground, debris,

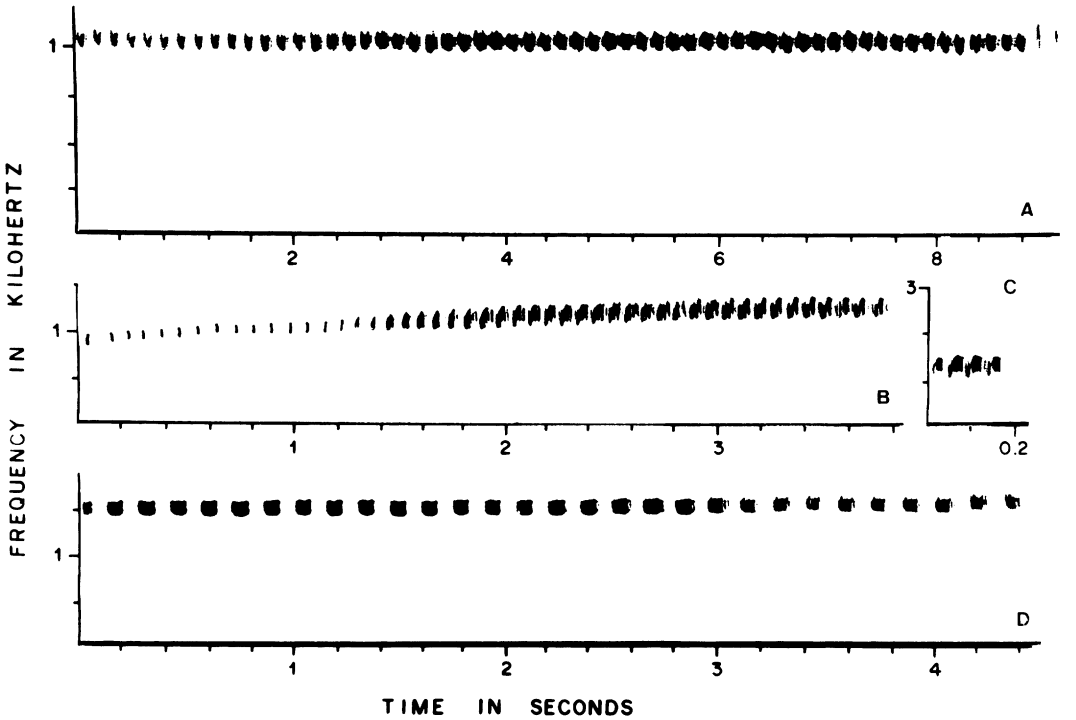

FIGURE 1. (A) End of song of *Chamaeza campanisona,* showing two final grunts (bridge over ribeirão Espírito Santo, 500 m, 21°37′S, 48°33′W, Fazenda Tamanduá forest, Matão, São Paulo, 21 December 1982); (B) Song of *C. ruficauda* (1,875 m, road to São José dos Alpes, 22°43′S, 45°28′W, Campos do Jordão State Park, São Paulo, 21 July 1982); (C) "*wh'h'h'ert*" loud roll, same bird; (D) End of song of *C. meruloides* (Alto do Ribeira State Park, Km 9, 820 m, 24°24′S, 48°36′W, 29 January 1987).

and low seedlings. They are easily attracted by imitating their spooky whistled songs, some of which (*C. campanisona, C. nobilis* of lowland western Amazonia) end in grunting noises. A sharp "*quirt*" or series can be given in alarm by the latter two species, a short trill by *C. ruficauda* (Belton 1985; Fig. 1C). I do not know the alarm of other species. All are similar in color, except bar-bellied *C. mollissima* (which has an upscale long song, according to T. Parker, III, pers. comm.).

Dry forests of the interior and humid coastal forests are the habitat of eastern *C. campanisona,* to 800 or 1,000 m in the mountains in some places. At this level, it overlaps considerably with the midmontane form, which lives mostly on wet coastal mountains, up to 1,350 m elevation in Minas Gerais and Rio de Janeiro (Itatiaia) but down to near sea level in the northern Ribeira Valley of southeastern São Paulo. It is also recorded near Botucatu, on a serra just back from the São Paulo coast ranges, and from only 290 m on the state border southwestward (Corredeira das Flores, Paranapanema River, 22°57′S, 50°45′W). The two species occur together at such locations as the Nova Lombardia Forest Reserve, Espírito Santo (Sick 1985), and at Intervales and Alto do Ribeira State Park in southern São Paulo (pers. obs.). *C. ruficauda* occurs down to 1,200 m with the midmontane form in Itatiaia National Park (specimens, MZUSP) and up to 2,000 m elevation in upper montane forests. *C. campanisona* and its song are unrecorded from Itatiaia, but lower montane forests were widely destroyed there and are mostly second growth. Southward, *C. ruficauda* occurs at lower elevations, as in Rio Grande do Sul (Belton 1985).

TAXONOMY

C. campanisona is a variable lower montane species, with a fairly continuous distribution, and with similar voice and short tail across its range from Brazil and Argentina to Venezuela. Large size, short tail, and dark colors raise the possi-

TABLE 1. Wings and tails of *Chamaeza*

Species	Measurements[a]		
	Wing[b]	Tail	Difference
campanisona			
Ceará	94.2 ± 0.7 (2)	58.5 ± 0 (2)	35.7 ± 0.7 (2)
Southeast	—	—	37.3 ± 3.6 (92)
male	99.6 ± 2.3 (58)	61.9 ± 3.5 (56)	
female	97.9 ± 2.4 (37)	61.3 ± 3.2 (36)	
Andes	—	—	37.0 ± 3.5 (14)
Bolivia	96.4 ± 4.7 (5)	61.1 ± 2.0 (5)	
S to Ecuador	93.0 ± 4.2 (9)	—	
N to Colombia	—	53.8 ± 3.0 (3)	
Venezuela	—	57.3 ± 1.2 (6)	
Tepuis/Guyana	101.1 ± 1.8 (11)	59.2 ± 1.8 (11)	41.7 ± 1.3 (10)
ruficauda	—	—	15.2 ± 2.8 (21)
male	90.0 ± 2.7 (9)	74.1 ± 2.5 (9)	
female	89.1 ± 3.1 (10)	74.5 ± 2.6 (10)	
meruloides	—	—	21.3 ± 3.2 (23)
male	90.8 ± 2.4 (14)	70.4 ± 3.8 (14)	
female	88.8 ± 2.3 (9)	67.2 ± 2.8 (9)	
turdina[c]	88.3 ± 2.7 (11)	64.0 ± 2.4 (11)	22.1 ± 3.4 (9)
mollissima	—	68.4 ± 4.3 (11)	21.3 ± 3.7 (10)
male	90.8 ± 2.9 (7)		
female	86.7 ± 2.1 (3)		

[a] In mm; $\bar{x}$ ± SD, *n*.
[b] Means differing by 1 mm or more are significantly different (*t*-test, pooled variances) except between Andean wings (including *mollissima*).
[c] 10 *chionogaster*, 1 *turdina*.

bility of a separate species on tepuis northward, where voice is unrecorded.

Upper montane *C. ruficauda* of the southeast probably is distinct from midmontane *turdina* of Colombia and *chionogaster* of Venezuela. Although all are rufous above, have three-striped belly feathers, and are barred under the tail, the southeastern bird does not have a spotted throat. (It is interesting that *C. campanisona venezuelana* of northern Venezuela, downslope from the spot-throated *chionogaster,* is the only form of its species with an almost unspotted throat.)

The midmontane eastern Brazilian bird seems related to the midmontane Colombian and Venezuelan birds formerly put with *C. ruficauda,* in proportions and song, but it is somewhat different in color. Color differences argue against placing them together in this genus of sibling species. It also seems widely separated from them geographically and unlikely to occur in Peru or Bolivia. T. Parker III and J. Terborgh (*in litt.*) register *C. campanisona* vocalizations up to 1,800 m in Peru and Bolivia, while Bolivian specimens go to 2,400 m, suggesting that this lower montane bird goes far up the mountain slopes in the apparent absence of any member of the midmontane group. Tentatively, I consider the isolated and spot-throated forms *turdina* and *chionogaster* a separate species, *C. turdina* (Cabanis and Heine 1859).

Naming the eastern Brazilian midmontane species presents problems. It could have been *C. tshororo* Bertoni 1901, but Bertoni describes grunts at the end of the song as well as a black forehead. Also, the midmontane bird is not recorded from Misiones or Paraguay, only *C. campanisona.* Hellmayr (Cory and Hellmayr 1924: 292) mentioned a "nearly plain" throated bird with "darker bill" from Bahia, but the type and cotype in the AMNH are black-foreheaded *C. campanisona. C. strigilata* Pucheran 1855 was a new name for the old types of "*Turdus brevicaudus*" Vieillot 1818 in the Paris Museum, but Ménegaux and Hellmayr measurements show they are indeed *C. campanisona,* a name adopted after the Vieillot name proved a junior synonym of an earlier *Turdus brevicaudus.*

This leaves *C. meruloides* Vigors 1825, based on two specimens collected in Brazil by Dr. George Such (author of *Gubernetes,* Tyrannidae). Unfortunately, the specimens were sold at auction from the Jardine collection (Ibis 1886) and

TABLE 2. Tarsi and bills of *Chamaeza*

Species	Measurements[a]			
	Tarsus[b]	Culmen	Height bill	Width bill
campanisona				
Ceará males	40.0 ± 0 (2)	24.2 ± 0.2 (2)	6.1 ± 0.1 (2)	12.4 ± 0.4 (2)
Southeast				
males	39.9 ± 1.6 (52)	24.4 ± 1.1 (50)	6.4 ± 0.2 (38)	12.8 ± 0.8 (55)
females	38.9 ± 1.5 (38)	23.7 ± 0.9 (37)	6.1 ± 0.3 (31)	12.6 ± 0.7 (39)
Andes				
Bolivia	38.5 ± 1.6 (5)	24.6 ± 1.3 (5)	6.1 ± 0.2 (3)	12.1 ± 0.4 (5)
Ecuador N	36.3 ± 1.5 (10)	25.0 ± 1.2 (9)	6.2 ± 0.5 (6)	12.6 ± 1.0 (10)
Tepuis/Guyana	39.2 ± 1.4 (11)	26.0 ± 0.8 (11)	6.5 ± 0.2 (8)	12.7 ± 0.7 (11)
ruficauda				
males	37.8 ± 2.0 (8)	21.5 ± 1.1 (9)	5.6 ± 0.3 (8)	11.6 ± 1.0 (9)
females	37.0 ± 1.4 (10)	20.9 ± 1.2 (10)	5.2 ± 0.2 (10)	10.7 ± 0.5 (10)
meruloides				
males	38.6 ± 1.4 (14)	22.1 ± 0.9 (13)	5.7 ± 0.3 (12)	11.8 ± 0.6 (9)
females	37.8 ± 1.3 (12)	21.6 ± 1.0 (9)	5.3 ± 0.3 (8)	11.6 ± 0.6 (9)
turdina	38.0 ± 1.3 (11)	22.7 ± 1.1 (12)	5.5 ± 0.2 (11)	11.3 ± 0.5 (12)
mollissima	37.8 ± 1.9 (11)	22.0 ± 0.9 (11)	5.8 ± 0.3 (9)	11.6 ± 0.5 (11)

[a] In mm; $\bar{x}$ ± SD, *n*.
[b] Tarsus differences significant if 1.0 mm or more, culmens (from base, at skull) if 0.7 mm or more, bill heights (at front edge nostril) if 0.3 mm or more, bill widths (at gape angle) if 0.4 mm or more (*t*-tests).

have not been reported since. Robert McGowan of the Royal Museum of Scotland found "Gardner" annotated alongside *Chamaeza* in A. Newton's copy of the auction catalogue in the RMS, and later discovered sales of a "J. Gardner" in 1920 listed in Chalmers-Hunt (1976:157). Chalmers-Hunt writes that James Gardner had a natural history shop and furriery in Oxford Street, London, and could have disposed of the *C. meruloides* specimens any time between 1886 and 1920, when he died.

This leaves us with the original description, plus a more detailed description and color plate in Jardine and Selby (1826). Hopefully, the type specimen is the same species as the plate. In the British Museum copy of Jardine and Selby, the plate is obviously not of *C. campanisona,* for it shows a bird with a small dark bill, no spots on the throat nor black forehead, and no dark tail band nor short tail. It has a buff-tinged throat, unlike Vigors' description of "*gûla alba,*" but I have seen some midmontane birds and *C. ruficauda* with buff-tinged throats and others without. The back colors are confusing, for there is reddish-brown from crown to upper back rather than the fairly sharp crown/back contrast in the midmontane bird and *C. campanisona*; but the rest of the back, as reported in the text, is as in these two species and not reddish-brown as in *C. ruficauda.* The tail is shown rufous with long pale edges and tips, as in the midmontane bird. The undertail converts show few bars, not the dense barring of *C. ruficauda.* The flanks are little streaked, unlike the dense triple streaks of *C. ruficauda.* I conclude that *C. meruloides,* as pictured in Jardine and Selby (1826), must be the midmontane bird.

I suggest "Such's Antthrush," for the collector, as an English name for *C. meruloides* and "Schwartz's Antthrush," for Paul Schwartz, for *C. turdina.* The two form a superspecies, as does *C. campanisona* with *C. nobilis.* These two superspecies seem related and *C. ruficauda* seems more distant. To examine specimens, workers should note that *C. meruloides* is AMNH 492106 and 8 plus BM 89.9.20.593 and 95.4.1.697 and one marked "*Th. leachii.*" I found 24 specimens in MZUSP, from Rio de Janeiro (Itatiaia 1200 m, Teresópolis) and São Paulo (Corredeira das Flores, Botucatu, Rocha, Ribeirão Fundo, Tamanduá, Guaraú-Barro Branco, Fazenda Poço Grande, and serra da Cantareira immediately outside São Paulo together with *C. campanisona*).

DISCUSSION

The presence of three species of *Chamaeza* where ornithologists supposed there were only two

shows that taxonomic work is important even in birds. In conservation, it is important to know if rare or localized species are present. Although *C. meruloides* and its northern counterpart *C. turdina* are not particularly endangered, existing and proposed reserves for the local midmontane habitats where they occur may be more important than was thought earlier.

The discovery of several such cryptic or sibling species in recent years, even in North America or within a few kilometers of major museums and cities, suggests that museum and field studies should become more critical, taking into account voice recordings, detailed statistics of specimen and other measurements, as well as chromosomal and biochemical measurements for the entire ranges of species. One cannot even suppose that a sibling species will have a subspecies name; this was not the case for *Chamaeza,* for *Drymophila* (Willis 1988), nor for a new *Phylloscartes* (Tyrannidae) I am describing with Yoshika Oniki. In addition, sympatric species are being overlooked as well as important differences between isolated populations. There is reason for field workers to support recovery or collection of some specimens, for museum workers to support collection of material on vocal or behavioral differences, and for molecular biologists to collaborate with both.

During the study of *Chamaeza,* it became evident that certain difficulties occur in taxonomic studies and that basic support for museums and their studies could be useful. Since one has to examine type specimens, even of nearly-forgotten "synonyms" like *C. meruloides,* reductions in the status of museums can cause difficulties. Reductions in support at the São Paulo and British Museums did not cause great difficulties; the bird collections are still curated even if in-house research is limited. At Halberstadt, the economic crisis in East Germany may cut into municipal support for the Museum Heineanum, according to R. Holz. Type specimens and museums cannot be left to temporary or local economic vagaries or curatorial whims; they belong to the world also.

For researchers from South America, considerable time and expense is involved in going to Europe or North America to inspect type specimens. Regulated air fares northward and expenses in places like New York can be nearly unbelievable for the visitor. While curators sometimes have time to send information by mail or will risk sending type specimens, more fellowships like the one I had from Brazil and Germany are desirable. Recognizing such expenses or those for scientific organizations, some countries require that new type specimens eventually return to the country of origin. As museum support becomes more stable in the Southern Hemisphere (Australia, for instance), a repatriation of type specimens may be desirable.

The worst problem in the *Chamaeza* study was the unregistered sale of a type specimen to a private collection. I suggest that all such transfers or sales be registered, perhaps with the International Commission on Zoological Nomenclature. I urge that all museums and private collections register lists of their types. We especially need a book on the locations of type specimens of birds, including synonyms.

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