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***Ortalis remota*: a forgotten and critically endangered species of chachalaca (Galliformes: Cracidae) from Eastern Brazil**

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Abstract

The habits and general behaviour of the chachalacas (*Ortalis* spp.) in the Neotropics are well known. However, the validity and even the diagnoses of some taxa are poorly studied, and this may jeopardize the conservation of some populations. Within *Ortalis guttata* two subspecies are currently accepted, the nominate *O. g. guttata* (Spix) and *O. g. subaffinis* Todd. A third taxa, *O. g. remota* Pinto, 1960, was described based on a single specimen from SE Mato Grosso do Sul state, Brazil. Despite appreciable differences between *O. g. remota* and other members of *Ortalis*, this taxon was considered as a synonym of *O. squamata*, a species restricted to the lowlands of Atlantic Forest, east of Serra do Mar. Here we performed coloration and geographical distribution analysis of *O. g. remota* with additional examination of the holotype and a thorough comparison of skins and photos with other members of *Ortalis* (*O. squamata*, *O. araucuan*, and *O. guttata*) intending to disentangle the above taxonomic puzzle. Our results showed that a newly recognized population of *O. g. remota* differs consistently from all other *Ortalis* taxa currently treated as distinct species in plumage characters and geographic distribution. Therefore, we defend that it should be considered a valid species, *Ortalis remota* Pinto, 1960. *Ortalis remota* has a very restricted range on the upper Paraná River and it is threatened by deforestation and construction of dams.

Key words: Aves, São Paulo state, taxonomy, threatened species, deforestation

Introduction

The family Cracidae comprises medium to large size galliform birds from the Neotropical region. They inhabit forests, open woodlands and scrubs, being predominantly arboreal and herbivorous, feeding on fruits, flowers and stems (Sick 1997; Delacour & Amadon 2004; del Hoyo 2017). Six of the 15 species of chachalacas (*Ortalis*) are currently found in Brazil (Piacentini *et al.* 2015): *O. motmot* (Linnaeus), *O. guttata* (Spix), *O. araucuan* (Spix), *O. squamata* (Lesson), *O. canicollis* (Wagler), and *O. superciliaris* (Gray).

The habits and general behaviour of most species of this genus are well known (Delacour & Amadon 2004). However, as for most of the cracids, the taxonomy of the group has been neglected, with a lack of formal taxonomic reviews and several currently accepted species (five out the 15) are polytypic (*O. vetula*, *O. ruficauda*, *O. canicollis*, *O. guttata* and *O. motmot*). For these, the validity/diagnosis of the described taxa are poorly understood. Their geographical distribution, with ponderable implications not only in systematics and biogeography but also for conservation, are scarcely known as well.

Disagreement among authors are well-exemplified in the case of *Ortalis squamata*, which was long treated as conspecific with *O. guttata*, which, in turn, has been treated as a conspecific of *O. motmot* (which also included *O. superciliaris* and *O. araucuan*; Vaurie 1965; Delacour & Amadon 1973; Remsen *et al.* 2013; del Hoyo 2017; del

Hoyo *et al.* 2017; and references therein). More recently, all of the above were accepted as distinct species (Remsen *et al.* 2013; del Hoyo 2017; Piacentini *et al.* 2015), despite the absence of a formal taxonomic study to justify this decision.

Within the genus *Ortalis*, *O. guttata* has the largest distribution, ranging from the eastern portion of Andes (up to 2700 m a.s.l.) through riverine forests in both margins of the Amazon River, to the western portion of the Tapajós River (below 100 m a.s.l.), in Pará, Brazil (Sick 1997; Remsen *et al.* 2013; del Hoyo *et al.* 2017b). Two subspecies are currently accepted, the nominate *O. g. guttata* (Spix) and *O. g. subaffinis* Todd. However, a third taxon, *O. guttata remota* Pinto, 1960, was described based on a single specimen from SE Mato Grosso do Sul state, Brazil. Despite the appreciable differences between *O. g. remota* and other members of *Ortalis*, this taxon was considered to be a synonym of *O. g. squamata* by Vaurie (1965, 1968), a species restricted to the lowlands of Atlantic Forest, east of Serra do Mar (from sea level to about 500–800 m a.s.l. fide Belton 1984, regularly below 300 m [VQP, pers. obs.]). Pinto (1978) refused to accept Vaurie's synonymization and argued to keep *O. g. remota* as a valid taxon; however, this name was forgotten in subsequent literature.

Recently, new sightings and photographic records of the chachalaca population known from the upper Paraná River basin in northwestern São Paulo (see Willis & Oniki 2003), the closest to the type locality of *Ortalis guttata remota*, came to light and suggested that a distinct taxon was indeed involved. Here we performed a detailed analysis of this taxon, including additional examination of the holotype deposited at the Museu de Zoologia da Universidade de São Paulo (MZUSP) and a thorough comparison with other members of *Ortalis*.

Material and methods

We examined photographic records archived in the WikiAves platform (www.wikiaves.com.br) together with skins deposited in the following museums (see Appendix for details of specimens): Museu de Zoologia da Universidade de São Paulo (MZUSP), São Paulo, Brazil; Museu de História Natural de Taubaté (MHNT), Taubaté, Brazil; Museu de Ciências Naturais, Fundação Zoobotânica do Rio Grande do Sul (MCN), Porto Alegre, Brazil; Museu Nacional (MN), Rio de Janeiro, Brazil; Museu Paraense Emílio Goeldi (MPEG), Belém, Brazil; Museu de História Natural Capão da Imbuia (MHNCI), Curitiba, Brazil; American Museum of Natural History (AMNH), New York, USA; Field Museum of Natural History (FMNH), Chicago, USA; Instituto de Investigación de los Recursos Biológicos Alexander von Humboldt (IAVH, formerly IND-AN), Villa de Leyva, Cundinamarca, Colombia; Louisiana State University, Museum of Natural Science (LSUMZ), Louisiana, USA; Muséum National d'Histoire Naturelle (MNHN), Paris, France; Natural History Museum (NHMUK), London, UK; Naturalis Biodiversity Center (RMNH, formerly Rijksmuseum Natuurlijke, RNHL), Leiden, The Netherlands; Universität Humboldt, Zoologisches Museum (ZMB, formerly Museum für Naturkunde, MFN), Berlin, Germany; Zoologische Staatssammlung München (ZSM), Munich, Germany. In total, we examined the single known skin (the holotype) and 24 photos of *O. g. remota*, 20 skins and 1402 photos of *O. squamata*, 18 skins and 562 photos of *O. araucuan* and 242 skins and 168 photos of *O. guttata* (including *O. g. subaffinis*) (Appendix). Among the specimens analyzed were also some topotypes of *O. g. subaffinis* Todd, and the holotypes of *Penelope guttata* Spix (= *O. g. guttata*) and *Ortalida squamata* Lesson, the latter one being relocated at MNHN (MNHN 11942) by one of us (VQP) after decades without notice (cf. Hellmayr 1906 vs. Voisin *et al.* 2015).

Taxa were compared using the following characters: the coloration of the tarsus, bare facial skin, forehead, crown, mantle, neck, chest, abdomen, flanks, crissum, tail coverts, wing coverts, primaries and rectrices. We also compared the pattern of white markings in the chest and neck regions. For the museum skins, we examined all specimens in each institution under the same light and to standardize the comparisons between institutions used a color chart (Munsell 1994). A distribution map of the five taxa (but aggregating *subaffinis* and *guttata*) was prepared with data from WikiAves and that associated with specimens in the above-mentioned collections.

Results and discussion

Pinto (1960) described *Ortalis guttata remota* based on a single specimen collected in Porto do Sapé, Paraná River, Mato Grosso do Sul State. It was diagnosed as distinct from the nominate *O. guttata* by its olive-brown chest,

reddish brown abdomen and brownish rump. Furthermore, *O. g. remota* is larger and presents a more reddish overall coloration (Pinto 1960). We recognize the paramount importance of collecting specimens for taxonomic purposes, and a series of this forgotten chachalaca would be more than desirable. However, due to the status of the population which can be considered as Critically Endangered (see below), we purposely avoided collecting specimens, and additional collecting must be preceded by a careful examination of the robustness of the population in the wild. All individuals represented by photographs from the population in northwestern São Paulo can be safely linked to the holotype specimen through at least one of the diagnostic features that we identify (see below), so we consider that they belong to the same taxon, as also suggested by habitat and biogeographic grounds. Apart from the plumage differences between the taxa, they are allopatric (Fig. 1): *O. g. guttata/subaffinis* occurs in the eastern Colombia and Peru, northern Bolivia and the western portion of Amazonas state, in northern Brazil (del Hoyo *et al.* 2017b). Thus, it is unlikely that the individuals inhabiting the Amazon forest belong to the same population as the ones in southeastern Brazil (i.e., *O. g. remota*; Fig. 1), since the latter is associated with the Paraná River (Pinto 1960). In agreement with the original description (Pinto 1960), we also observed differences in plumage characters: in particular, the chest pattern is comprised of poorly-defined scales in *O. g. remota*, while it is clearly speckled, with a white spot in each feather in *O. g. guttata* (though with a trend to be less marked in *O. g. subaffinis*); and the coloration of crown and neck is uniformly reddish brown in *O. g. remota*, but whitish/speckled in *O. g. guttata/subaffinis* (Figs. 2–4). A further diagnostic trait of *O. g. remota* in relation to *O. g. guttata/subaffinis* seems to be the gray tarsus of the former (Fig. 4). In *O. g. guttata/subaffinis* the tarsus is pink to grayish pink, and it may be particularly brightly coloured in the birds from southern Amazonia in Brazil (the geographically closest ones to *O. g. remota*).

Vaurie (1965, 1968) proposed that *O. g. remota* is a synonym of *O. guttata squamata*. His suggestion was based on a misinterpretation of its distribution (simply lumping the large area between the range of *O. squamata* and the type locality of *O. g. remota* in Mato Grosso do Sul, including the Province of Misiones in Argentina) and on the fact that Pinto (1960) did not offer a comparison with *O. squamata*. Even if the type-locality is in the boundaries of São Paulo state, it is still distant and it presents a very distinctive vegetation, relief and climate from the region where *O. squamata* occurs in Paraná southward to Rio Grande do Sul states. As a matter of fact, the diagnostic characters proposed by Pinto (1960) (reddish crown, white and less defined white marks in the neck and better defined white chest markings) are exactly the ones distinguishing *O. guttata remota* from *O. squamata*. Vaurie (1965) also stated that the type locality of *O. g. remota* was confusedly notated, and he was unable to find the correct place because of Pinto's indication of first "Porto Sapé" in Parana River (Pinto, 1938:37, 51) and secondly in Pardo River (Pinto, 1938:101). He, however, did not examine the holotype of *O. g. remota*, so did not see its label, nor did he examine the original description from Pinto (1960), stating that *O. squamata* and *O. g. remota* are very similar for the reasons above (Vaurie 1965). Despite Pinto (1978) refuting Vaurie's (1965) suggestion, subsequent authors adopted it seemingly without further examining the material (Blake 1977; Delacour & Amadon 1973, 2004; Grantsau 2010; del Hoyo *et al.* 1994, 2017a). *Ortalis squamata* differs considerably from both *O. g. guttata/subaffinis* and *O. g. remota*, and the character that most reliably distinguishes it is the well-defined scaled chest pattern.

Delacour & Amadon (1973) proposed that the shape of the white chest markings of *O. g. remota* are more similar to yet another species, *O. araucuan*. However, the latter is a white-bellied bird with extensive and well-defined white markings in the chest region, more similar to *O. squamata*. Moreover, both *O. squamata* and *O. araucuan* present two colours in the external rectrices (dark in the base and chestnut-brown in the rest), while these feathers are entirely chestnut-brown in *O. g. remota* and *O. g. guttata* (Figs. 2–4). Finally, the distribution of *O. araucuan* does not extend further south than Espírito Santo and Minas Gerais state, without any obvious contact with that of *O. g. remota*.

Our more extensive taxonomic analysis shows that the chachalaca population from the upper Paraná River and its forming tributaries, and named *O. g. remota* by Pinto (1960), differs consistently from all other *Ortalis* taxa and by the same degree as other populations currently treated as distinct species. Therefore, we argue that it should be considered a valid species, *Ortalis remota* Pinto, 1960. Still, future systematic work should be conducted to understand the relationship of the species within the genus, although we suspect that this species is closer related to *O. guttata* rather than to *O. squamata* and *O. araucuan*.

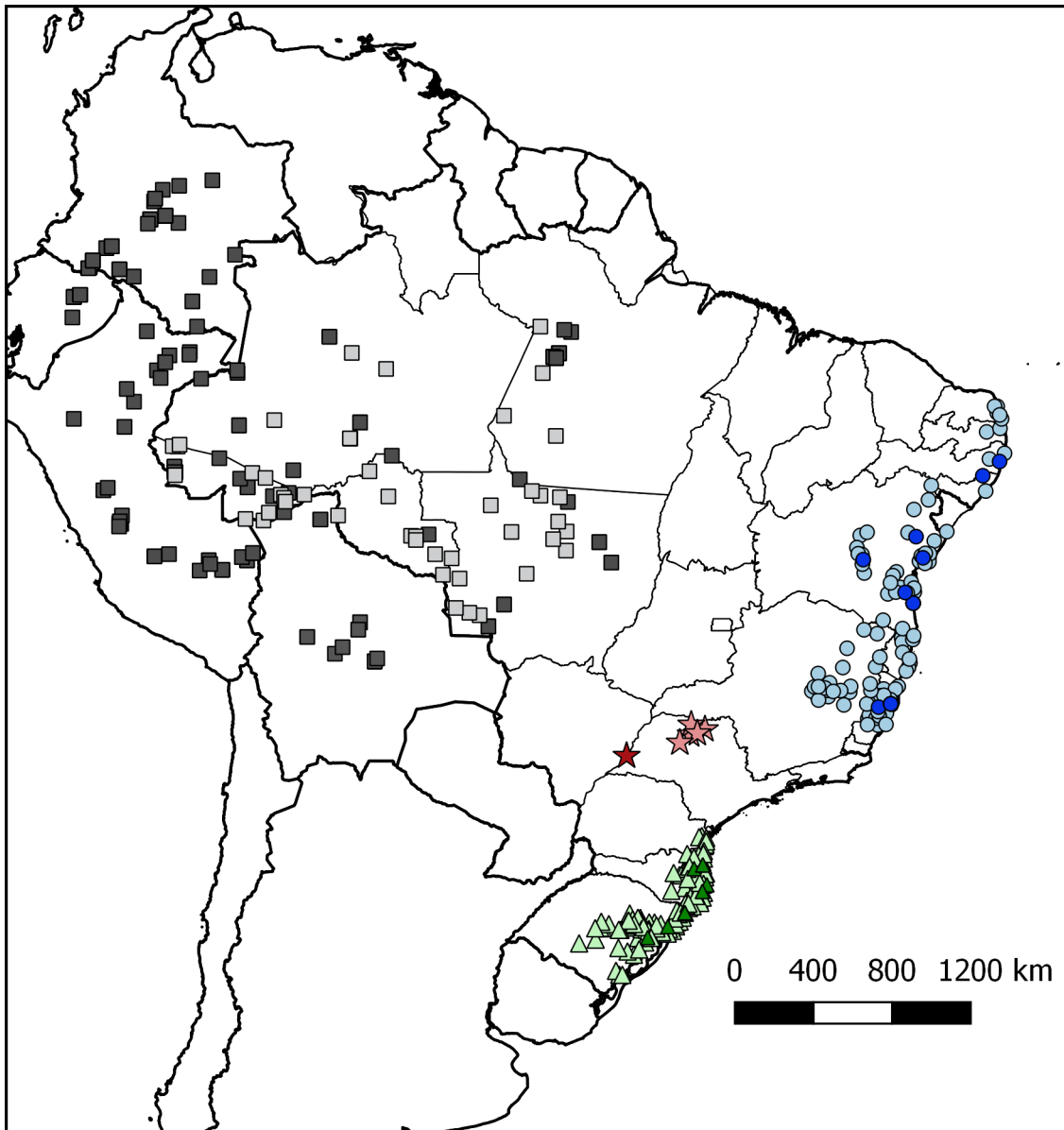


FIGURE 1. Distribution of the *Ortalis* analyzed in this work. Darker symbols represent skins and lighter symbols represent photos analyzed (see appendix for full references). Squares: *Ortalis g. guttata* and *O. g. subaffinis* (C Bolivia); Circles: *Ortalis araucuan*; Triangles: *Ortalis squamata*; Stars: *Ortalis remota*. The red star represents the type-locality of *O. remota*.

Taxonomy

Order Galliformes

Family Cracidae

Genus *Ortalis* Merrem, 1786

Ortalis remota Pinto, 1960 stat. nov.

Ortalis guttata remota: Pinto, 1960: 11.

Ortalis guttata remota: Pinto, 1964: 109.

Ortalis guttata squamata [in part]: Vaurie, 1965: 6.

Ortalis guttata squamata [in part]: Vaurie, 1968: 243.

Ortalis motmot squamata [in part]: Delacour & Amadon, 1973: 116.

Ortalis guttata squamata [in part]: Blake, 1977: 395.

Ortalis guttata remota: Pinto, 1978: 79.

Ortalis guttata squamata [in part]: Grantsau, 2010: 426.

Ortalis guttata remota: Piacentini *et al.*, 2015: 101.

Type material. MZUSP 11359, holotype (João Leonardo de Lima col., VII/1927).

Type locality. Brazil, Mato Grosso do Sul state, Porto do Sapé (formerly “Pôrto do Sapé”), at the mouth of Pardo River (right-bank tributary of Paraná River).

Description. Crown dark reddish brown. Bill gray. Bare facial skin, forehead, nape, throat and chest brown. Ventral and lateral portions of neck and whole chest edged with very pale-brown clouded colour, forming a speckled pattern in the neck region and a poorly defined scaled-like pattern in the chest region. In the chest, this white margin runs across the whole feather. The pattern fades towards the abdomen as the colour of the margins become more similar to the background colour of the feathers. Abdomen light yellowish-brown. Flanks brownish yellow. Crissum and tail coverts yellowish-red. Wing coverts and flight feathers dark reddish brown. External rectrices chestnut-brown, central rectrices dark olive brown with metallic dark grayish-green tone.

Diagnosis. *Ortalis remota* differs from other members of genus by having a distinctive colour pattern to its chest, with uniform brown feathers with clouded pale brown edges forming poorly defined scales that fade towards the abdomen. The chest feathers of *O. guttata* spp. have white or whitish edges with a distinctive white dot in the middle forming a speckled pattern (Figs. 2–5). In turn, *O. squamata* has well-defined white feather margins forming a defined scaled or scalloped pattern. Each chest feather of *O. squamata* has three colours: dark olive brown on the base, dark brown in the middle and white on the edge, making the scaled or scalloped pattern even more evident; this pattern is present in the abdomen feathers, but with a light grayish colour instead of white. *Ortalis remota* also differs from *O. guttata* spp. and *O. squamata* by an overall lighter coloration across the whole body, mainly composed of clearer brown tones. *Ortalis guttata* is darker in the crown (despite the whitish marks of some specimens), neck and chest (even the paler *O. g. subaffinis* has a darker neck than *O. remota*; Fig. 5) and *O. squamata* is the darkest one, but also with an overall grayer coloration in the abdomen and flanks, as well as black bare facial skin. *Ortalis remota* and *O. guttata* spp. present completely chestnut brown external rectrices, while those of *O. squamata* and *O. araucuan* have a dark olive brown base and chestnut red in the tip (Figs. 2-5). *Ortalis remota* neck feathers have white margins forming a speckled pattern that does not extend to the head, while in *O. guttata* this pattern is also present in the head and remarkably in the forehead and crown in some specimens. The grayish tarsi seen in the pictures of *O. remota* is distinct from the pinkish gray to reddish pink tarsi seen in *O. guttata* spp. and browner, less bluish than the gray tarsi of *O. squamata*.

Remarks. The distribution of *Ortalis remota* occupies a geographically intermediate position between its related taxa, i.e. the Amazonian *O. guttata*, the Atlantic *O. squamata* and *O. araucuan*, and perhaps another one, the peripheral Chaco representative *O. canicollis*. It is probably an endemic of the central region of the “Bosque Paranaense” Province (Morrone 2001), an area severely modified even before adequate biological inventories could be taken. These regions include riparian habitats of the Parana River, ranging from its major tributaries (Grande, Paranaíba and Aporé Rivers), along the western border of São Paulo, and ending at the extreme west of the state of Paraná, near 24°S. Unfortunately, the lack of information on its distribution makes unfeasible any hypothesis of former and actual distributions. Even skilful naturalists (e.g. Johann Natterer), who worked near confirmed localities within the species’ range, did not obtain specimens of *Ortalis* there, suggesting that it was probably already rare even in the early 19th century. The explorers Telêmaco and Nestor Borba, when traveling to northwest of the state of Paraná, mention the presence of “aracuans” (i.e., “chachalacas”) with “johós” (*Crypturellus undulatus*, a species locally extinct since the 1950s) perhaps near the mouth of the Paranapanema River (Borba 1908; Straube 2013), but without further details. Kozák *et al.* (1979) reported that the extinct Xetá ethnic group from Serra dos Dourados (northwest of Paraná) hunted regularly aracuans (“*Ortalis* sp.”), but they did not record this activity in their field journals, photographs, and films, nor is it evidenced in the plumary art collected by him during his work in the 1950s. In addition, a specimen (MHNCI 1574) from the “Passeio Público - Paranavaí” (northwest of Paraná) is, in fact, an individual *Ortalis squamata* that died in captivity at a local zoo.

There are several conservation implications for *O. remota*. The recent recordings in the northwest of São Paulo indicate that this species occurs in the remaining woodlands of secondary vegetation and the border of gallery forests of the Grande, Paraná and Tietê rivers basins in southeastern Brazil. Unfortunately, the habitats that still



FIGURE 2. Ventral view of representative specimens of *Ortalis guttata* (a, MZUSP 58097, Urucurituba, Pará); *O. remota* (b, MZUSP 11359, holotype); *O. squamata* (c, MZUSP not yet accessioned, Florianópolis, Santa Catarina); *O. araucuan* (d, MZUSP 93110, Chapada Diamantina, Bahia). Inset: detail of breast pattern in the same specimens.



FIGURE 3. Lateral view of representative specimens of *Ortalis g. guttata* (a, MZUSP 58097, Urucurituba, Pará); *O. remota* (b, MZUSP 11359, holotype); *O. squamata* (c, MZUSP not yet accessioned, Florianópolis, Santa Catarina); *O. araucuan* (d, MZUSP 93110, Chapada Diamantina, Bahia).

sustain this species were drastically reduced to small fragments or are disappearing along rivers due to human impacts (Fig. 6). Much is known about the destructive process caused by humans in the remaining semideciduous Atlantic forest and Cerrado in countryside São Paulo State (Durigan *et al.* 2007; Ribeiro *et al.* 2009). An old history of disturbance caused by the expansion of pastures and livestock, monoculture plantations (currently, sugarcane

and soybeans), and urbanization associated with a ‘hoodwinking’ attitude towards Brazilian environmental laws are current threats to the biodiversity of the region. A major threat to the species’ survival has been the construction of dams in the main rivers of the Paraná basin. Most of the riverine forests of the upper Paraná River, including those at the type locality, as well as the lower stretches of the Tietê and Grande Rivers, have been flooded by many large reservoirs for hydroelectric power. A quick measurement with Google Earth images shows that, from the type locality up river to about 500 m a.s.l. (the known upper limit of the species) on the main channels of the Tietê, Grande and Paranaíba Rivers, about 1070 km of riverine forests out of 1360 km (78%) are now flooded (Fig. 3). Not surprisingly, most of the recent records of *O. remota* come from the Turvo River basin in São Paulo, which is one of the few main rivers of the upper Paraná basin not transformed by dams, and which may be a stronghold for the species. In this sense, a few of the rare, unflooded tributaries of the upper Paraná River, such as the Aguapeí and do Peixe Rivers in western São Paulo, are potential candidates to hold unknown populations and should be urgently surveyed in their lower portions.



FIGURE 4. Photographs of the four species in the wild to show the breast and tail pattern: a: *O. g. guttata* (WA48023 and WA4333); b: *O. remota* (WA2436278 and WA2377617); c: *O. squamata* (WA659770 and WA2311089); d: *O. araucuan* (WA1986594 and WA2248299).

Furthermore, the vulnerability of *O. remota* to extinction increases substantially given that cracid species are culturally (though illegally) considered game birds in Brazil. The larger body size and greater source of proteins in relation to other smaller birds are prominent characteristics sought by rural people (Peres & Palacios 2007). Since the 19th century, hunters’ reports revealed the presence of chachalacas in São Paulo state (Ihering 1898). However, these birds may be negatively affected by hunting in concert with unsustainable forest destruction, due to loss of sites for feeding, nesting, and roosting (Schmitz-Ornés 1999). Regarding ecological functions, the disappearance of *O. remota*, will potentially lead to losses in terms of seed dispersal and plant recruitment, since part of the diet of chachalaca species is composed of a variety of fruits (in addition to seeds, green shoots, flowers, leaves, and small invertebrates; Caziani & Protomastro 1994; del Hoyo *et al.* 1994; Sick 1997).

Given the preliminary few records of *O. remota* presented in this study, a proper estimation of the species’ geographic distribution and abundance is urgently needed to classify its degree of threat. Despite any controversy on its taxonomic status, *O. remota* was recently declared as a Critically Endangered taxon in the Red Lists of Brazil (MMA 2014) and São Paulo State (Silveira *et al.* 2009). For these reasons, and in a second step, conservation

measures such as restoration of native habitats and connection of vegetation fragments using ecological corridors are needed. If severe risk of species extinction is detected by population estimates, the use of captive breeding focusing on increasing population and posterior releases of individuals in restored native habitats will be the most appropriated measures to conserve the species.

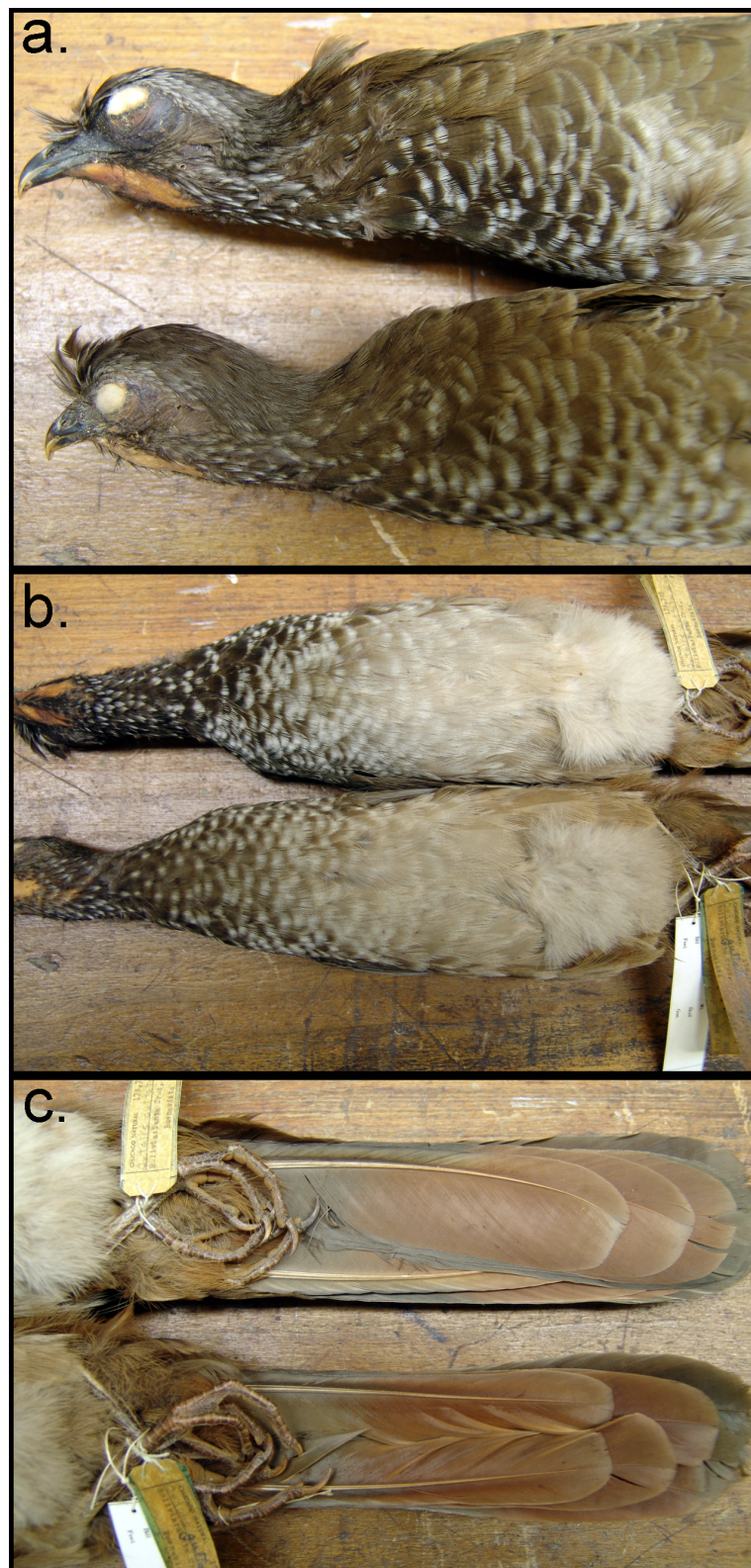


FIGURE 5. Lateral (a), ventral (b), and tail pattern (c) of representative specimens of *Ortalis guttata subaffinis* (FMNH 17878 above, and FMNH 178787, below, both from Bolivia, Santa Cruz, Buenavista).

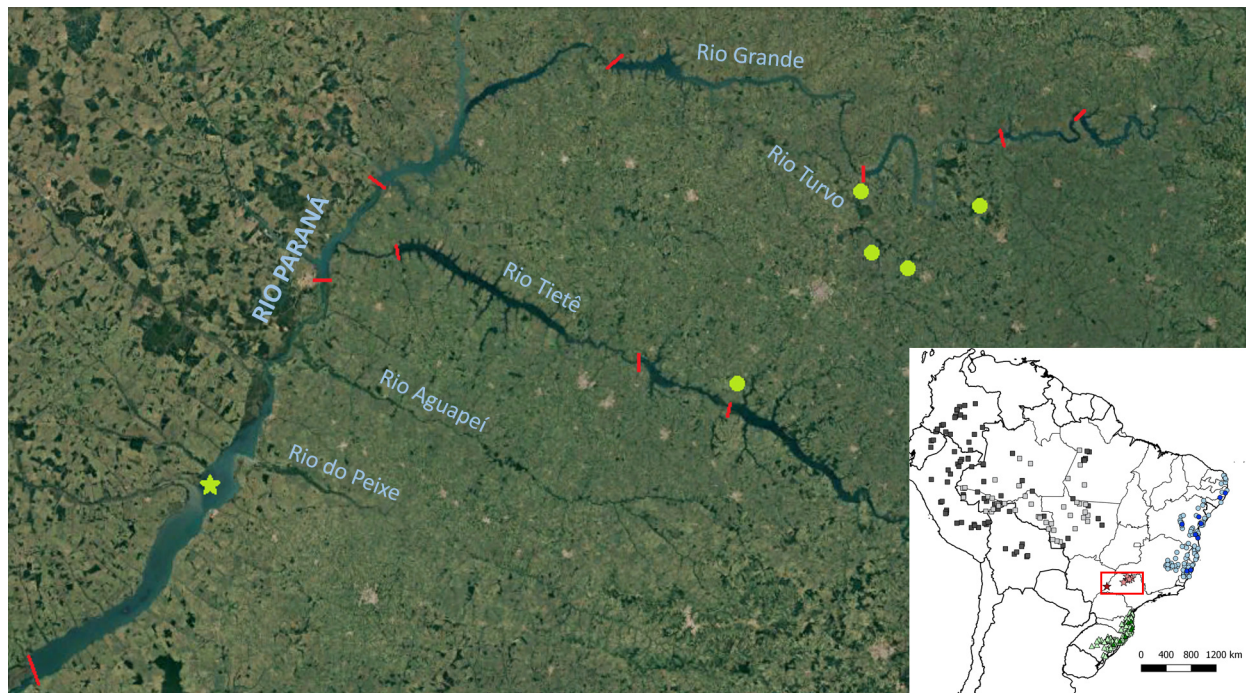


FIGURE 6. Satellite image showing the great habitat alteration on the upper Parana River system—the range of *Ortalis remota*—due to the construction of dams and deforestation. Red lines: major dams; lemon-yellow symbols: localities where *O. remota* was recorded (star = type-locality). The major rivers mentioned in the text are indicated by their names; the inset map is the same as Figure 1. Based on image by Google Earth (Feb. 2017).

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APPENDIX. Examined specimens.

Ortalis remota (n = 1): **Mato Grosso do Sul**: Porto do Sapé (MZUSP 11359, holotype).

Ortalis araucuan (n = 18): **Alagoas**: Fazenda Petrópolis Ibateguara (MN 36031). **Bahia**: Chapada Diamantina (MZUSP 93110); Curupeba, prox. Ilha Madre de Deus (MZUSP 14027); Ilhéus (MZUSP 32913, 32914, 32915); Lamarão (AMNH 471462); Macaco Secco, Andaraí (FMNH 47164); Rio Gongogy (MZUSP 14026); not specified (AMNH 163103). **Espirito Santo**: Colatina (MZUSP 32912); Linhares (MN 26278, 26035, 26042, 26380, 26739, 26740, 24799). **Pernambuco**: Engenho Pirajá Mercês (MN 24799).

***Ortalis guttata* ssp.** (n = 242): **BRAZIL**: **Acre**: Capixaba (MPEG 63855); Porto Acre (MPEG 63462); Rio Branco (MPEG 61386); Rio Juruá (MPEG 28033, 48033, 28034, 28035, 28032, 28036); Rio Macauã (MZUSP 76352, 76353, 76354, 76355); Santa Rosa (MPEG 63245); Taracá (MPEG 60423). **Amazonas**: Canutama (FMNH 412033, 412034, 412035, 418527, 418528, 418529, 418530); João Pessoa (MZUSP 22815, 22816, 412418, 412419); Juruá (MZUSP 2679, 3588); Lábrea (FMNH 412030, 412031, 412032); Rio Javari (MPEG 18555); Rio Purus (MPEG 03179); Rio Solimões (ZSM 136165, holotype of *Penelope guttata* Spix). **Mato Grosso**: 4 km acima Rio São Benedito, margem E Rio Teles Pires (MPEG 54578); Fazenda Pantanalzinho (MN 33635); Garapu (MN 31525, 31524); Jacaré, Xingu (MN 31521, 27772, 27771); Porto Esperidião Rio Jauru (MN 18900, 7810); Fazenda São José (MPEG 34997); Tapirapoã (MN 18908, 18909); not specified (NHMUK 89.6.1.321). **Pará**: Arara, Rio Tapajós (FMNH 422552, 422553, 422554, 422555, 422556, 422557, 422558, 422559, 422560, 422561, 422562, 422563); Rio Tapajós (MZUSP 68852); Rio Tapajós (Oeste) Urucurituba (MZUSP 46268, 58097, 58102, 62912, 68853, 62590, 62911); Rio Tapajós (Oeste); Sumauma (MZUSP 46269, 46270, 46271, 46272, 58098, 58099, 58100, 58101, 58103); Santarém (MPEG, 64036); Uraçagui (Rio Tapajos, Oeste) (MZUSP 58499). **Rondônia**: Calama (AMNH 471444); Pimenta Bueno (MN 33269). **BOLÍVIA**: Alto Palmar Chapare (MNHN 172); Ichilo, Buenavista (MNHN 1960171, 1952400; FMNH 178783, 178784, 178785, 178786, 178787, 412557, 412620, 412621, 412622, 412623; topotypes of *Ortalis guttata subaffinis*); Marban, Rio Mamore (FMNH 416400, 416401, 416402, 416403); Nueva Moka (FMNH 178788); Rio Mamori (AMNH 791738, 791739); Rio Yapacani (FMNH 412558, 412624); Tilotilo, Yungas (NHMUK 89.6.1.323; NHMUK 89.6.1.322); Todos Santos Chapare (MNHN 174). **COLOMBIA**: Belén (FMNH 415872, 415873); Caño Sardinias Guacharaco Canaima (IAVH 4044); Caserio Kuiru del Rio Igará-Paraná (IAVH 672); Confluencia rios Apaporis e Pacoa (MCN 1521); La Macarena Sur (MCN 5122, 5123, 5124, 5125, 5126, 5128, 5129, 5130, 5131, 24066, 24084); Leticia Quebrada Urumutú (IAVH 4042, 4045, 2018); Los Micos, San Juan de Arama (FMNH 419446, 419447, 419450, 419461); Mocoa (FMNH 424987, 424988, 424989, 424990); Morelia (MCN 5132, 5133, FMNH 415868, 415869, 415870, 415871); Mitu (MCN 4687); Nova Granada (NHMUK 89.6.327); Quenane (MCN 34645); Remolino Caño Piedra de Fuego (MCN 18645); Río Caquetá, Comissaria del Amazonas Araracuara (MCN 24458, 24459); Rio Duda, Mt. Macarena (AMNH 460067); Rio Guapaya, Macarena (FMNH 419448, 419449, 419452); Rio Mecaya (FMNH 418780, 418781, 418782); San Antonio Guamez (FMNH 286757, 425301, 425302); San Jose del Guaviare (MCN 17611); Sudeste de San Martín (MCN 5120, 5121); Tres Troncos, La Tagua, Río Caquetá (FMNH 418779); Umbria (FMNH 417379, 417380, 417381, 417382); Villa Vicencio (MNHN 193260). **ECUADOR**: Boca, Rio Curaray (AMNH 230500); Cerro Guataraco (FMNH 409054); Concepcion (FMNH 407084, 407085, 407398, 408047, 408048, 408049); Rio Cotapino (FMNH 407086); Rio Suno (FMNH 409056, AMNH 178909, 178910, 178911); Sarayacu (NHMUK 89.6.1.326); U Occo Yacu (FMNH 409055). **PERU**: Alto Quimiri, 20 km E La Merced, Rio Chanchamayo (FMNH 415271, 415272, 415273); Apayacu, R. Amazona (AMNH 230499); Bolívar (FMNH 425294); Cadena (FMNH 417519); Chanchamayo (AMNH 471450, 471451); Chinchao (FMNH 402816); Guayabamba (AMNH 471453); Hda Villacarmen (FMNH 419732, 419736, 419737); Collpa, Rio Tambopata (FMNH 419735, 419738); Hacienda Amazonia (FMNH 315149, 315150, 320373, 320374); Inambari, Rio Madre de Dios, Rio Piedras (FMNH 419734); Iquitos, U. Amazon (NHMUK 89.6.1.325); Loreto (LSUMZ 52676); Rio Apurimac Luisiana (AMNH 781781, 781782, 819635); Lupuna (MNHN 415); Moskitania, 13.4 km NNW Atalaya, l bank Alto Madre de Dios (FMNH 433041); Orosa, R. Amazona (AMNH 230498); Quebrada Aguas Calientes, 2.75 km E Shintuya, Alto Madre de Dios (FMNH 397706, 397707); Quincemil Hda. Cadena (MNHN 1006, 19661154, 19661155, 19661156, 19661157); Paucartambo, Consuelo, 15.9 km SW Pilcopata (FMNH 433040); Perené (NHMUK 1902.3.13.1856); Pto. Indiana, R. Amazona (AMNH 230494, 230495, 230496, 230497); Rio Cosireni (AMNH 166488); Rio Inambari, boca (FMNH 419733); Rio Itayá (AMNH 406818); Rio Piedras, boca (FMNH 419730, 419731); Rio Ucayali (FMNH 412799); San Ramon (FMNH 415269, 415270, NHMUK 1902.3.13.1855); Sarayacu, R.

Ucayali (AMNH 237479, 237480, 237481, 237482); Tono (FMNH 320375); Vista Alegre (FMNH 402815); Vitoe Garita del Sol (AMNH 471452); Yurinaqui Alto (FMNH 425520).

Ortalis squamata (n = 18): **Paraná:** Rio do Meio (MHNCI- 1188); Cubatão (MHNCI-1408); [from captivity; see text] (MHNCI-1574). **Rio Grande do Sul:** Porto Alegre (ZMB b.295); Rolante (FMNH 408924); not specified (AMNH 471503, MZUSP 3852, MZUSP 3853). **Santa Catarina:** Araranguá (RMNH 5652-4, 5652-5, 5652-7, 5652-8, unnumbered); Blumenau (AMNH 471504); Florianópolis (MZUSP unnumbered); Paulo Lopes (MHNT 1458, 1486); Piçarras (MHNT 1495, 1783); Joinville (MHNCI-6515); “Santa Catharina” (MNHN 11942, holotype of *Ortalis squamata* Lesson).

No locality (MNHN 11945).

Additional material: photos from the online platform Wikiaves (www.wikiaves.com.br). Number of photos per location in parenthesis, except for *O. remota*, for which we provide the accession number of each photo. Last checked in February 2017.

Ortalis remota (n = 22): **São Paulo:** Barretos (WA 2115994); Guapiaçu (5: WA 478781, 1522419, 2368973); Icém (WA 1367257, 1367988, 1367990); Olímpia (WA 1472612, 1475301, 1475302, 1475439, 1475853, 1475894, 1493219, 1556204, 2367390, 2369571, 2377617, 2387033, 2434468, 2436278); Ubarana (WA 1868167).

Ortalis araucuan (n = 562): **Alagoas:** Maceió (9). **Bahia:** Alcobaça (2); Andaraí (2); Boa Nova (13); Cafarnaum (1); Camaçari (8); Caravelas (14); Conceição do Coité (1); Cravolândia (1); Entre Rios (1); Euclides da Cunha (1); Eunápolis (1); Ibicoara (1); Ibirataia (1); Igrapiúna (2); Ilhéus (8); Iraquara (1); Itabela (1); Itacaré (1); Itagibá (2); Itamaraju (1); Itapebi (2); Jaguaquara (2); Jequié (1); Jeremoabo (1); Lauro de Freitas (3); Lençóis (4); Macarani (5); Marau (6); Mata de São João (31); Morro do Chapéu (1); Mucugê (9); Nova Viçosa (5); Palmeiras (11); Paulo Afonso (1); Porto Seguro (85); Prado (7); Salinas da Margarida (1); Salvador (11); Santa Cruz Cabralia (2); São Francisco do Conde (1); São Sebastião do Passé (1); Ubaitaba (1). **Espírito Santo:** Afonso Cláudio (38); Águia Branca (1); Aracruz (2); Baixo Guandu (2); Barra de São Francisco (1); Colatina (16); Conceição da Barra (8); Domingos Martins (1); Itarana (5); Laranja da Terra (3); Linhares (20); Marilândia (2); Nova Venécia (3); Pancas (2); Rio Bananal (3); Santa Maria de Jetibá (6); Santa Teresa (74); São Domingos do Norte (1); São Gabriel da Palha (2); São Mateus (4); São Roque do Canaã (1); Serra (1); Sooretama (4); Venda Nova do Imigrante (2); Vila Valério (1); Vila Velha (5). **Minas Gerais:** Almenara (1); Angelândia (1); Araçuaí (1); Carlos Chagas (4); Conceição do Mato Dentro (4); Congonhas do Norte (1); Dolores de Guanhães (1); Governador Valadares (1); Guanhães (3); Iapu (3); Itueta (2); Mantena (1); Mathias Lobato (1); Morro do Pilar (1); Nova Belém (1); Paulistas (1); Pedra Azul (1); Presidente Kubitschek (2); Sabinópolis (18); São Gonçalo do Rio Preto (1); Sardoá (1); Serro (1); Umburatiba (1); Virginópolis (3). **Paraíba:** Areia (2); Rio Tinto (1). **Pernambuco:** Gravatá (1); Paulista (1). **Rio Grande do Norte:** Baía Formosa (1); Natal (18); Nísia Floresta (1); São Gonçalo do Amarante (1); Tibau do Sul (5). **Sergipe:** Indiaroba (1).

***Ortalis guttata* spp.** (n = 168): **Acre:** Acrelândia (1); Assis Brasil (3); Brasiléia (2); Bujari (1); Cruzeiro do Sul (2); Mâncio Lima (1); Manoel Urbano (3); Rio Branco (40); Sena Madureira (1); Senador Guiomard (5); Xapuri (4). **Amazonas:** Coari (2); Guajará (1); Itamarati (1); Lábrea (2); Tefé (1). **Mato Grosso:** Alta Floresta (8); Cláudia (3); Comodoro (4); Feliz Natal (1); Itaúba (1); Jauru (1); Juruena (1); Novo Mundo (2); Paranaíta (4); Pontes e Lacerda (11); Porto dos Gaúchos (2); São José do Rio Claro (12); Sinop (4); Vila Bela da Santíssima Trindade (3). **Pará:** Itaituba (1); Jacareacanga (8); Juruti (1); Novo Progresso (1). **Rondônia:** Ariquemes (3); Cabixi (3); Chupinguaia (1); Guajará-Mirim (11); Novo Horizonte do Oeste (1); Porto Velho (13); Rolim de Moura (5); Santa Luzia d'Oeste (1); Vilhena (2).

Ortalis squamata (n = 1402): **Paraná:** Antonina (6); Guaratuba (28); Matinhos (7); Morretes (36); Paranaguá (3); Pontal do Paraná (1). **Rio Grande do Sul:** Agudo (3); Alvorada (1); Anta Gorda (1); Arroio do Meio (5); Arroio do Sal (1); Barão (1); Barra do Ribeiro (2); Bento Gonçalves (8); Bom Princípio (1); Bom Retiro do Sul (1); Cachoeirinha (1); Camaquã (2); Capão da Canoa (1); Capão do Leão (2); Caraá (1); Carlos Barbosa (2); Colinas (1); Cruzeiro do Sul (1); Dois Irmãos (6); Dom Feliciano (1); Dom Pedro de Alcântara (2); Dona Francisca (1); Encantado (1); Encruzilhada do Sul (4); Estância Velha (3); Estrela (1); Gramado (9); Gravataí (4); Harmonia (1); Itati (2); Ivoti (5); Lajeado (5); Maquiné (6); Marques de Souza (1); Monte Belo do Sul (2); Montenegro (3); Morro Redondo (3); Morro Reuter (6); Nova Petrópolis (2); Novo Hamburgo (6); Osório (7); Passa Sete (1); Pelotas (5); Pinhal Grande (1); Portão (13); Porto Alegre (57); Rolante (1); Santa Cruz do Sul (8); Santo Antônio da Patrulha (8); São Francisco de Paula (2); São Gabriel (1); São Leopoldo (15); São Sebastião do Caí (1); São Sepé (1); Sentinela do Sul (1); Silveira Martins (1); Taquara (1); Teutônia (4); Torres (5); Travesseiro (1); Três Cachoeiras (1); Três Coroas (1); Vera Cruz (1); Viamão (13). **Santa Catarina:** Alfredo Wagner (2); Angelina (1); Antônio Carlos (2); Araquari (2); Araranguá (4); Balneário Barra do Sul (2); Balneário Camboriú (33); Balneário Gaivotas (1); Balneário Piçarras (9); Barra Velha (1); Benedito Novo (1); Biguaçu (3); Blumenau (44); Bom Retiro (1); Bombinhas (32); Brusque (37); Camboriú (7); Cocal do Sul (3); Corupá (14); Criciúma (16); Florianópolis (370); Garopaba (33); Gaspar (8); Governador Celso Ramos (11); Gravatal (1); Guaramirim (1); Ibirama (2); Içara (2); Imaruá (1); Imbituba (18); Indaial (7); Itajaí (42); Itapema (7); Itapoá (63); Jacinto Machado (1); Jaraguá do Sul (16); Joinville (79); Laguna (15); Laurentino (3); Lauro Muller (2); Meleiro (1); Navegantes (1); Nova Trento (9); Nova Veneza (1); Orleans (1); Paineira (2); Palhoça (11); Penha (6); Pomerode (27); Porto Belo (17); Praia Grande (5); Rio do Sul (2); Rio dos Cedros (2); Rodeio (1); Sangão (1); Santa Rosa de Lima (4); Santo Amaro da Imperatriz (15); São Bento do Sul (3); São Francisco do Sul (9); São José (5); São Martinho (2); São Pedro de Alcântara (1); Schroeder (2); Siderópolis (1); Taió (1); Timbé do Sul (1); Timbó (22); Treviso (3); Turvo (1); Urussanga (5); Vidal Ramos (3).