

Avifauna and conservation of the Cerro Negro-Cazaderos area, Tumbesian Ecuador

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La región Tumbesina está entre las áreas de endemismo de aves más importantes a nivel mundial. Sin embargo, enfrenta graves problemas de conservación debidos principalmente a la pérdida y fragmentación del hábitat. Presentamos los resultados de inventarios realizados en tres localidades de bosque seco en el área Cerro Negro-Cazaderos, prov. Loja—una de las pocas áreas no protegidas que aún mantiene extensiones considerables de bosque seco en la región Tumbesina del suroeste del Ecuador. Registramos 127 especies de aves, incluyendo 41 de las 59 especies restringidas a la región Tumbesina, cuatro especies en peligro y cinco vulnerables a nivel mundial. En términos del número de especies amenazadas, estas localidades son comparables con otros sitios de bosque seco que han sido bien inventariados en el del suroeste del Ecuador y el noreste del Perú.

The Equatorial Pacific or Tumbesian biome^{7,22} extends 130,000 km² through Ecuador and Peru, and is one of the principal areas of avian endemism worldwide, with at least 59 restricted-range species¹⁸. The region faces critical conservation problems due to habitat loss and fragmentation caused by large-scale agriculture and ranching (especially in Ecuador), slash-and-burn agriculture and timber extraction³. Some authors^{3,8} have suggested that <5% of the original vegetation of the area is well preserved (i.e. with understorey). Although others²¹ support a figure of 20% in Ecuador, this figure is now considered an overestimate as it includes any areas that retain tree cover (without considering understorey).

Although the region is a global conservation priority^{15,22}, little on-the-ground action has been taken to prevent further habitat loss, particularly in Ecuador⁹. There are three moderately large officially protected areas (Machalilla National Park, Manglares-Churute Ecological Reserve, Arenillas Ecological Reserve; Fig. 1) and some small, sparsely distributed privately or communally protected areas (e.g., Cerro Blanco Forest Reserve, Reserva El Tundo, Reserva Tumbesia-La Ceiba, Reserva Comunal de Loma Alta). However, intervening areas are largely deforested²¹.

In the last 20 years, Tumbesia has been subject to several ornithological expeditions^{2,5,12,17,23,24} crucial in highlighting its conservation importance. Although field surveys are still in progress (R. S. R. Williams *et al.* unpubl.), other areas remain poorly known. The Cerro Negro-Cazaderos, in extreme western prov. Loja, Ecuador, is one of these which still support important areas of primary and secondary forests. Herein, we present the results of field surveys in this region.

Study area / Methods

Three dry forest sites in western prov. Loja (Fig. 1), were surveyed in 2001–02. All localities hold mainly deciduous *Ceiba trichistrandra* forests¹³,

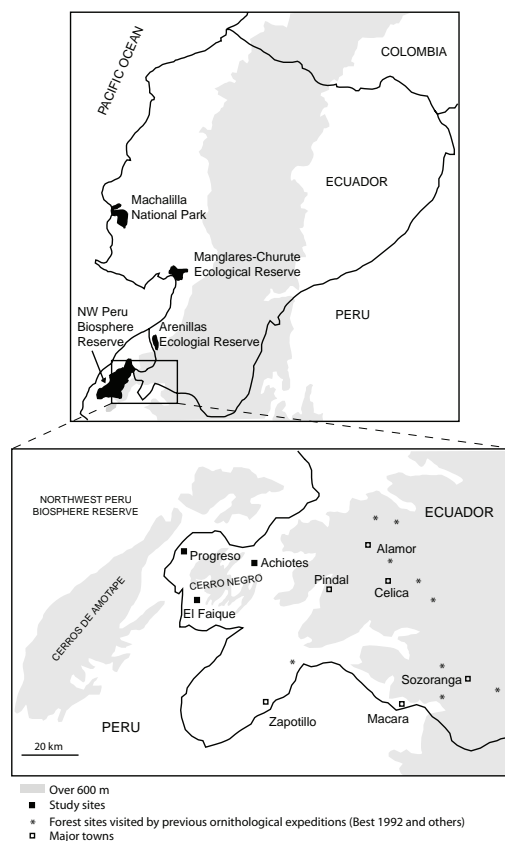


Figure 1. Map of Ecuador showing the major protected areas in the Tumbesian region (above) and the study area in western Loja Province (below).

and are influenced by similar climatic conditions as other south-west Ecuadorian dry forests (rains in January–March and a dry season from June–September¹⁴). Differences in plant species composition and forest coverage between sites are as follows.

Quebrada Achiotes (04°04'S 80°17'W; 330 m) is characterised by low hills with few areas of level ground. The landscape is a mosaic of mature forest and forest fragments in varying degrees of succession, surrounded by cultivated areas (e.g. rice, peanut, corn), cattle pastures, and small settlements. Common trees include *Cavanillesia platanifolia* and *Ceiba trichistrandra* (Bombacaceae). *Acacia macracantha* (Mimosaceae) and *Piscidia carthagenensis* (Fabaceae) are dominant in secondary forests, whereas *Simira* spp. (Rubiaceae), *Cordia macrantha* (Bignoniaceae) and *Guazuma ulmifolia* (Sterculiaceae) are abundant in less-disturbed forests. *Tabebuia chrysantha* (Bignoniaceae) and *Bursera graveolens* (Burseraceae), once abundant in the area, have been practically extirpated by logging. Because all areas are moderately grazed, the understorey is relatively open. Visited by TS, EB and JFF on 30 March–7 April 2001 (late wet season)

El Faique-Balneario del Inca (04°07'S 80°24'W; 450–550 m) is hillier, with more pronounced slopes than Achiotes; probably as a result, the area has not been cultivated or logged intensively. Dominant plant species include *Ceiba trichistrandra* (Bombacaceae), *Tabebuia chrysantha* (Bignoniaceae), *Bursera graveolens* (Burseraceae), *Terminalia valverde* (Combretaceae), *Cochlospermum vitifolium* (Bixaceae), *Erythrina* sp. (Fabaceae), *Caesalpinia paipai* (Caesalpinaceae) and *Acacia macracantha* (Mimosaceae). Compared to Achiotes, more seedlings and young trees are present, the forest is more continuous, and the understorey is less disturbed because grazing is limited to the few areas of level ground. Visited by TS, EB and JFF on 26 April–3 May 2001 (late wet season).

Progreso (04°00'S 80°38'W; 170–450 m) is located on the río Puyango, on the border between Ecuador and Peru. Although the landscape is mostly flat, the site includes a low mountain range, with a strong altitudinal gradient over a short distance. The dominant vegetation is *Ceiba trichistrandra* dry forest in varying stages of succession/regeneration. On areas of level ground the understorey has been grazed heavily and its density reduced dramatically. However, forest on the slopes is in better condition and seems to be an important avifaunal refuge. Visited by FR, BT and R. S. R. Williams on 23–25 June 2002 (dry season).

Field work in Achiotes and El Faique was oriented towards developing a preliminary avifaunal inventory. We conducted systematic and intensive observations, nocturnal walks (104 hours observation/person at Achiotes, 128 hours/person at El Faique), mist-netting (using 12 m nets: 155 net-hours at Achiotes, 220 net-hours at El Faique), and sound-recordings. Recordings have been deposited at Fundación EcoCiencia, and photographs at Fundación Numashir and Fundación EcoCiencia. Taxonomy follows Ridgely & Greenfield^{18,19}. Identification of some species was corroborated using specimens held at the Museo Ecuatoriano de Ciencias Naturales, Quito. The species list for Progreso was the result of three days of preliminary observations.

Results and Discussion

Species diversity and composition

We recorded 127 species—84 at Achiotes, 91 at El Faique and 74 at Progreso (Table 1). The list includes 41 of the 59 restricted-range species of the Tumbesian region¹⁸, four globally Endangered (Grey-backed Hawk *Leucopternis occidentalis*, Grey-cheeked Parakeet *Brotogeris pyrrhopterus*, Blackish-headed Spinetail *Synallaxis tithys*, Slaty Becard *Pachyramphus spodiurus*) and five globally Vulnerable species (Rufous-headed Chachalaca *Oreotyrax erythroptera*, Ochre-bellied Dove *Leptotila ochraceiventris*, Rufous-necked Foliage-gleaner *Syndactyla ruficollis*, Henna-hooded Foliage-gleaner *Hylocryptus erythrocephalus*, Grey-breasted Flycatcher *Lathrotricus griseipectus*)⁴. Detailed accounts for threatened and endemic species (excluding those at Progreso) are summarised elsewhere¹¹.

Overall, the three localities represent typical Tumbesian dry forest sites with respect to species composition¹. Despite differences in vegetation and conservation status, they share a high percentage (60–69%) of species. Amongst species found at all sites, the psittacids Red-masked Parakeet *Aratinga erythrogenys*, Pacific Parrotlet *Forpus coelestis* and *Brotogeris pyrrhopterus* have extensive home ranges and our limited observations are insufficient to assess the degree to which these species are using the areas studied. All the other shared endemics are relatively common and widespread in the region^{12,18}.

Despite the similarities, some threatened species are unique to each site (*Leucopternis occidentalis* at Achiotes; *Pachyramphus spodiurus* and *Syndactyla ruficollis* at El Faique; *Synallaxis tithys* and *Leptotila ochraceiventris* at Progreso). Thus, additional surveys are required to determine if these are really exclusive to each site. Many endemics could have been in post-breeding

Table 1. Bird species recorded at Achiotes, El Faique, and Progreso, Loja province, Ecuador, in April-May 2001 and June 2002.

Species	Achiotes	El Faique	Progreso
Crypturellus transfaciatus NT	V,O	S,O	
<i>Phalacrocorax brasilianus</i>		O	O
<i>Ardea cocoi</i>		O	
<i>Ardea alba</i>	O	O	O
<i>Egretta thula</i>			O
<i>Bubulcus ibis</i>	O	O	
<i>Butorides striatus</i>	O		
<i>Nycticorax nycticorax</i>			O
<i>Mycteria americana</i>		N,P	
<i>Sarcoramphus papa</i>		O	O
<i>Coragyps atratus</i>	O	O	O
<i>Cathartes aura</i>	O	O	O
<i>Chondrohierax uncinatus</i>		O	
<i>Geranospiza caerulescens</i>			O
Leucopternis occidentalis E	O		
<i>Buteogallus meridionalis</i>		O	
<i>Buteogallus urubitinga</i>	O		
<i>Parabuteo unicinctus</i>	O	O,S	O
<i>Buteo brachyurus</i>		O	
<i>Buteo polyosoma</i>			O
<i>Caracara cheriway</i>	O	O	O
<i>Herpetotheres cachinnans</i>	O	O,S	
<i>Falco sparverius</i>	O	O	O
<i>Falco rufigularis</i>			O
Ortalis erythroptera V	O	O,S	
<i>Actitis macularia</i>	O	O	
<i>Charadrius vociferus</i>			O
<i>Zenaida auriculata</i>	O		
<i>Zenaida meloda</i>	O		
Columbina buckleyi	O	O	
<i>Columbina cruziana</i>			O
<i>Claravis pretiosa</i>			O
<i>Leptotila verreauxi</i>	V	O	O
Leptotila ochraceiventris V			O
Aratinga erythrogenys NT	O	O	O
Forpus coelestis	O	O	O
Brotoperyx pyrropterus E	O	O	O
<i>Coccyz lansbergi</i>	O	O	
<i>Piaya cayana</i>	V,O		
<i>Crotophaga sulcirostris</i>	O		O
<i>Tapera naevia</i>	O		
Otus roboratus	N	O	
Glaucidium peruanum	N,P,V	V	S
<i>Pulsatrix perspicillata</i>		V	
<i>Nyctibius griseus</i>		O,S	
<i>Chordeiles acutipennis</i>			O
<i>Nyctidromus albicollis</i>			O
Caprimulgus anthonyi			O
<i>Streptoprocne zonaris</i>	O	O	
<i>Chaetura ocyptes</i>			O
<i>Panyptila cayennensis</i>		O	
Leucippus baeri			O
<i>Amazilia amazilia</i>	N,P,V	N	O
<i>Heliomaster longirostris</i>	O	O	
Trogon mesurus	V,O	O	O
<i>Megasceryle torquata</i>	O	O	O
<i>Chloroceryle americana</i>	N	O	
<i>Momotus momota</i>	N,P,S		O
Picumnus sclateri	O	O	O
<i>Piculus rubiginosus</i>	O	O	
<i>Dryocopus lineatus</i>			O
Veniliornis callonotus	N,P	O	
Campephilus guayaquilensis NT	O	O,S	O
Furnarius cinnamomeus	N,S	O	O
Synallaxis tithys E			O
<i>Syndactyla ruficollis</i> * V		N	
Hylocryptus erythrocephalus V	N, P		O
<i>Sittasomus griseicapillus</i>		N	O
<i>Lepidocolaptes souleyetii</i>		V	O,S
<i>Campyloramphus trochilirostris</i>			N
Sakesphorus bernardi	N,P,V	O	O
<i>Grallaria watkinsi</i> *	V,O	O	
Melanopareia elegans			O
<i>Phylomyias griseiceps</i>			O
<i>Campostoma obsoletum</i>	V,O	O,S	O
Phaeomyias tumbezana			O
Myiopagis subplacens	V	N,S	O
Mecocerculus calopterus	N,P	N	
<i>Euscarthmus meloryphus</i>			O
<i>Leptopogon superciliaris</i>		N	
<i>Lophotriccus pileatus</i>	O,S		
<i>Tolomyias sulphureus</i>	O		
<i>Myiophobus fasciatus</i>	O	O,S	
Contopus punensis			O
Lathrotricus grisepectus V	N,P	O	
<i>Sayornis nigricans</i>		O	O
<i>Pyrocephalus rubinus</i>		O	O
<i>Myiarchus tuberculifer</i>	O,S	O	
Myiarchus phaeocephalus	O	O,S	
<i>Megarynchus pitangua</i>	O	O,S	O
<i>Myiozetetes similis</i>		O	O
<i>Myiodynastes maculatus</i>	N,P	O,S	O
Myiodynastes bairdii	O	O	O
<i>Tyrannus melancholicus</i>	O		
Tyrannus niveigularis	O	O	O
Pachyrhamphus spodiurus E		O	
<i>Pachyrhamphus albogriseus</i>	N,P	N	
<i>Platysaris homochrous</i>	N,V	N	
Cyanocorax mystacalis	V,O	O	O
<i>Cyclarhis gujanensis</i>	V,O	O,S	O
<i>Vireo olivaceus</i>	O	N,S	O
Turdus reevei	N	O	O
<i>Mimus longicaudatus</i>	O	O	
<i>Progne tapera</i>	O	O	
<i>Progne chalybea</i>	O	O	
Petrochelidon rufocollaris		O	
Campylorhynchus fasciatus	O,S	O	O
Thryothorus superciliaris	O		
<i>Troglodytes aedon</i>		N	O
<i>Poliopitila plumbea</i>	O	O,S	O
<i>Parula pitayumi</i>	V	N,S	O
Basileuterus fraseri	O	N,S	O
<i>Euphonia lanirostris</i>	N,O	O	O
<i>Thraupis episcopus</i>	O,V	O	O
<i>Saltator striatipectus</i>		O	
<i>Pheucticus chrysogaster</i>	O	O	O
Rhodospingus cruentus		O,S	O
<i>Sporophila corvina</i>	O		
Sporophila peruviana		O	
<i>Sicalis flaveola</i>	O	O	O
Atlapetes albiceps	N,P	N	
Arremon abeillei	O	N	O
<i>Cacicus cela</i>	O	O,S	O
<i>Molothrus bonariensis</i>	O	O	O
<i>Molothrus oryzivorus</i>	O		
<i>Dives warszewiczi</i>	O	O	O
Icterus gracaenae	N	N	O
Number of species	84	91	74
Restricted-range species	30	31	27
Threatened species	8	7	6

NT = Near Threatened; E = Endangered; V = Vulnerable⁴.

Documentation: N = mist-netted, O = observed, P = photographed,

S = song, V = voice recorded

Bold = confined to the Tumbesian lowlands; *species shared with the South-western Highlands of Ecuador Endemic Bird Area¹⁸.

Grey-shaded rows indicate shared restricted-range species among sites.

dispersal during the period of the surveys and, therefore, could occur anywhere in the area.

Reproduction

At Achiotas and El Faique, we confirmed breeding for only a few species—Blue-crowned Motmot *Momotus momota*, Collared Antshrike *Sakesphorus bernardi* and Black-and-white Becard *Pachyrhamphus albogriseus* (brood patch); and West Peruvian Screech-Owl *Otus roboratus* (nest and brood patch)¹¹. Vocal activity was intense, suggesting territorial behaviour for Pale-browed Tinamou *Crypturellus transfaciatus*, White-tipped Dove *Leptotila verreauxi*, Squirrel Cuckoo *Piaya cayana*, all owls, Ecuadorian Trogon *Trogon mesurus*, *Momotus momota*, White-tailed Jay *Cyanocorax mystacalis* and Rufous-browed Peppershrike *Cyclarhis gujanensis*. At these localities, our visits were conducted at the end of the wet season, and it is thus possible that most species had already bred. No breeding activity was recorded at Progreso.

Conservation

We chose these sites for three reasons: (1) they are relatively isolated from other dry forests previously surveyed in south-west Ecuador (Fig. 1); (2) all had relatively extensive forest based on satellite imagery, and (3) given the poor connectivity amongst forests in the region, we were curious as to species composition at these sites and, hence, their potential to function as corridors between the dry forests of south-west Ecuador and the adjacent and better-preserved forests of north-west Peru.

In terms of numbers of threatened and restricted-range species, Achiotas and El Faique are comparable to other well-surveyed dry forests in south-west Ecuador^{12,2} and north-west Peru¹⁶. Progreso requires more intensive surveys using mist-netting and systematic observations, and it is difficult to assess if any of the sites can sustain populations of threatened species, unless robust population estimates are conducted. At Progreso, for example, it appears that understorey endemics are mainly threatened by ongoing understorey degradation (R. S. R. Williams pers. comm.).

Conservation of the Progreso-Cazaderos-Cerro Negro region is complex. As elsewhere in south-west Ecuador, dry forest has been protected by restrictions imposed by the Ecuadorian environmental authority (MAE) since 1975 that prohibit logging and deforestation below 1,000 m elevation. Unfortunately, access to the region is complicated, making it difficult for MAE to enforce such restrictions. In recent years, most vigilance has been conducted by local organisations, which, to some degree, have incorporated local communities in the conservation process.

Our surveys formed part of a plan to protect the Cazaderos-Cerro Negro area by declaring it a Protection Forest (Bosque Protector), an initiative led by MAE and supported by Fundación EcoCiencia. However, Protection Forests are not part of the National Network of Protected Areas (SNAP). In Tumbesian Ecuador, at least 5,600 km² are designated Protection Forests, but only 25% retains original vegetation²⁰. Obtaining a higher protection status is liable to prove difficult, as there is a lack of extensive forest fragments under community or private ownership that can easily be officially protected; most properties being small and subdivided. Further conservation efforts should be directed towards studying connectivity amongst forest patches, followed by an inventory of land properties. This will permit assessing the possibility of creating a private reserve to conserve Cerro Negro. Of course, such efforts must be coupled with plans to incorporate adjacent communities in the conservation process, by improving land management, increasing the efficiency of cattle raising, creating job alternatives and undertaking a serious plan of sustainable natural resource management.

In terms of its significance for the conservation of the Tumbesian region, management of the Cerro Negro area appears strategic in maintaining connectivity between the NorthWest Peru Biosphere Reserve and the remaining dry forests of Loja (Fig. 1). Certainly, because of its location, it probably forms a natural corridor for local migratory and dispersal movements through the region, and even between adjacent regions (e.g. intra-tropical migrations¹⁸). However, although much research is required to confirm such statements, urgent conservation efforts must be put into effect in order to protect the 'potential' of the area.

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References

1. Best, B. J. (ed.) (1992) *The threatened forests of southwestern Ecuador*. Leeds: Biosphere Publications.
2. Best, B. J. & Clarke C. T. (1991) *The threatened birds of the Sozoranga region, southwest Ecuador*. Cambridge, UK: International Council for Bird Preservation (Study Rep. 44).
3. Best, B. J. & Kessler, M. (1995) *Biodiversity and conservation in Tumbesian Ecuador and Peru*. Cambridge, UK: BirdLife International.
4. BirdLife International (2004) *Threatened birds of the world 2004*. CD-ROM. Cambridge, UK: BirdLife International.
5. Bloch, H., Poulsen, M. K., Rahbek, C. & Ramussen, J. F. (1991) *A survey of the montane forest avifauna of the Loja Province, southern Ecuador*. Cambridge, UK: International Council for Bird Preservation (Study Rep. 49).
6. Chapman, F. M. (1926) The distribution of bird-life in Ecuador. *Bull. Amer. Mus. Nat. Hist.* 55: 1–784.
7. Cracraft J. (1985) Historical biogeography and patterns of differentiation within the South American avifauna: areas of endemism. In: Buckley, P. A., Foster, M. S., Morton, E. S., Ridgely, R. S. & Buckley, F. G. (eds.) *Neotropical ornithology*. *Orn. Monogr.* 36.
8. Dodson, C. H. & Gentry A. H. (1991) Biological extinction in western Ecuador. *Ann. Miss. Bot. Gard.* 78: 273–295.
9. Freile, J. F. & Santander, T. (2005) Áreas importantes para la conservación de las aves en Ecuador. In: Boyla, K. & Estrada, A. (eds.) *Áreas importantes para la conservación de las aves en los Andes tropicales. Sitios prioritarios para la conservación de la biodiversidad*. Quito: BirdLife International (Conservation Series 14) & Conservation International.
10. Freile, J. F., Bonaccorso, E. A. & Santander, T. (2003) First nesting report of the West Peruvian Screech-Owl (*Otus roboratus*). *Orn. Neotrop.* 14: 107–111.
11. Freile, J. F., Moreano, M. V., Bonaccorso, E., Santander, T. & Chaves, J. A. (2004) Notas sobre la historia natural, distribución y conservación de algunas especies de aves amenazadas del suroccidente del Ecuador. *Cotinga* 21: 18–24.
12. Jiggins, C., Andrade, P., Cueva, E., Dixon, S., Isherwood, I. & Willis, J. (1999) *The conservation of three forest in south-west Ecuador*. Otley: Biosphere Publications (Research Rep. 2).
13. Kessler, M. (1992) The vegetation of south-west Ecuador. In: Best, B. J. (ed.) *The threatened forests of south-west Ecuador*. Leeds: Biosphere Publications.
14. Munday, M. & Munday, G. (1992) The climate of south-west Ecuador. In: Best, B. J. (ed.) *The threatened forests of south-west Ecuador*. Leeds: Biosphere Publications.
15. Olson, D. M. & Dinerstein, E. (2002) The global 2000: priority ecoregions for global conservation. *Ann. Miss. Bot. Gard.* 89: 199–224.
16. Parker, T. A., Schulenberg, T. S., Kessler, M. & Wust, W. H. (1995) Natural history and conservation of the endemic avifauna in north-west Peru. *Bird Conserv. Intern.* 5: 201–231.
17. Pople, R. G., Burfield, I. J., Clay, R. P., Cope, D. R., Kennedy, C. P., López-Lanús, B., Reyes, J., Warren, B. & Yagual, E. (1997) *Bird surveys and conservation status of three sites in western Ecuador: final report of Project Ortalis '96*. Cambridge, UK: CSB Conservation Publications.
18. Ridgely, R. S. & Greenfield, P. J. (2001) *The birds of Ecuador: status, distribution and taxonomy*. Ithaca, NY: Cornell University Press.
19. Ridgely, R. S. & Greenfield, P. J. (2001) *The birds of Ecuador: field guide*. Ithaca, NY: Cornell University Press.
20. Rodas, F. (2004) La región Tumbesina, una riqueza compartida. Quito: Ministerio del Ambiente/IRENA/Bosques sin Fronteras/BirdLife International/ Naturaleza y Cultura Internacional.
21. Sierra, R., Campos, F. & Chamberlain, J. (1999) *Áreas prioritarias para la conservación de la biodiversidad en el Ecuador continental: un estudio basado en la biodiversidad de Ecosistemas y su ornitofauna*. Quito: Ministerio del Ambiente, Proyecto Inefan-GEF-BIRF, Ecociencia & Wildlife Conservation Society.
22. Stattersfield, A. J., Crosby, M. J., Long, A. J. & Wege, D. C. (1998) *Endemic Bird Areas of the world: priorities for biodiversity conservation*. Cambridge, UK: BirdLife International (Conservation Series 7).
23. Wiedenfeld, D. A., Schulenberg, T. S. & Robbins, M. B. (1985) Birds of a tropical deciduous forest in extreme northwestern Peru. In: Buckley, P. A., Foster, M. S., Morton, E. S., Ridgely, R. S. & Buckley, F. G. (eds.) *Neotropical ornithology*. *Orn. Monogr.* 36.
24. Williams, R. S. R. & Tobias, J. A. (1994) *The conservation of southern Ecuador's threatened avifauna: final report of the Amaluza '91 project*. Cambridge, UK: BirdLife International (Study Rep. 60).

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