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Short Communications

Schefflera morototoni (Araliaceae) como importante recurso alimentar para as aves durante a estação seca na Amazônia central

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Fifty-one bird species were observed consuming *Schefflera morototoni* (Araliaceae) fruits at Parque Nacional da Amazônia, Pará, Brazil, during the dry season. Approximately 44% of the recorded bird species are known frugivores. Because *S. morototoni* attracts a large number of birds from different trophic guilds and is also a common tree species in the study area, this study suggests that *S. morototoni* is a key species during the dry season in this national park, serving as an important resource for frugivorous birds.

Schefflera morototoni (Aubl.) Maguire, Steyerm. & Frodin (Araliaceae) é uma árvore amplamente distribuída no Neotrópico, ocorrendo no Brasil desde a região amazônica até o Rio Grande do Sul em várias formações vegetais[2,5]. A árvore alcança 20–30 m de altura desenvolvendo-se em formações secundárias, capoeiras ou orlas de matas sendo que a maturação dos frutos ocorre de agosto a outubro[5]. Os frutos são drupas carnosas comprimidas lateralmente de 4 a 12 mm de comprimento geralmente com duas sementes[2]. Na Amazônia brasileira a árvore é conhecida popularmente pelo nome morototó.

Snow[13] apontou a existência de muito mais registros de aves consumindo frutos de *S. morototoni* do que qualquer outra planta da família Araliaceae, revelando também que esta espécie de planta possui frutos nutritivos os quais são importantes tanto para aves frugívoras especializadas como não especializadas em ampla área que se estende desde o Panamá e Colômbia até o leste das Guianas. O valor energético dos frutos do morototó, ricos em nutrientes como lipídeos e proteínas, foi relatado por Snow[12,13].

Saracco *et al*.[10] reportou que os frutos de *S. morototoni* foram os mais comumente consumidos por dez espécies de aves em florestas de Porto Rico. Carvalho[2], por sua vez, ressaltou o grande poder de dispersão zoocórica da espécie, principalmente exercida por aves e mamíferos.

O objetivo deste trabalho foi relacionar as espécies de aves que foram observadas consumindo os frutos de *S. morototoni* durante diferentes excursões empreendidas na época mais seca do ano ao Parque Nacional da Amazônia e, paralelamente, discutir a importância desta espécie vegetal como recurso alimentar para as aves.

Material e métodos

O presente estudo foi realizado no Parque Nacional da Amazônia (04°16'S 55°59'W), conhecido, também, pelo antigo nome 'Tapajós'[7], Estado do Pará, Brasil, ao longo da estrada Transamazônica (BR-230), entre as estações de Tracoá (km 53) e Capelinha (km 80). Essa região situa-se na margem esquerda do baixo rio Tapajós e tem como vegetação predominante as florestas de terra firme, com a estação menos chuvosa ('estação seca') entre os meses de junho e novembro[6].

S. morototoni é uma árvore comum em orlas de matas e capoeiras entre as estações de Tracoá e Capelinha. Cerca de 167 árvores da espécie *S. morototoni* foram contabilizadas na orla de mata neste setor do parque, incluindo árvores que produziam frutos (pelo menos 40% das árvores) e outras mais jovens não produtivas.

A coleta de dados ocorreu nas seguintes datas: 24–25 de julho de 2000, 2–5 de setembro de 2000, 2–6 de agosto de 2001, 21–26 de julho de 2003 e 18–22 de agosto de 2010.

Pelo fato de *S. morototoni* ser uma espécie de árvore abundante na área de estudo, o principal método utilizado foi o de transecto, o qual consistiu em percorrer a estrada Transamazônica nas primeiras horas das manhãs (07h00–09h00) e finais de tardes (16h30–18h30). Em média despendeu-se quatro horas de observação por dia (total: 87,5 h). Em cada encontro com pelo menos uma espécie de ave se alimentando em uma determinada árvore da espécie estudada, efetuamos paradas, com até vinte minutos de duração, de forma a registrar as espécies de aves que consumiam frutos e o padrão de visitação (ave solitária, par ou bando). Uma visita foi considerada como o encontro de uma espécie de ave consumindo frutos independentemente do número de indivíduos e tempo despendido por eles na árvore.

Para a observação das aves se alimentando, foram, também, estabelecidos alguns pontos da estrada onde se pudesse monitorar, conjuntamente, de duas a quatro árvores com frutos. Nestes casos, foram despendidos períodos de quatro a vinte minutos de acordo com a presença de aves se alimentando.

Usamos binóculos (Zeiss 10 × 40 e Nikon 10 × 42) e cadernetas para a observação e registro de dados obtidos no campo. As aves foram enquadradas em categorias tróficas segundo Willis[15], Snow[13] e Sick[11]. Para a identificação da espécie vegetal consultou-se bibliografia especializada[2,5].

Resultados e discussão

Cinquenta e uma espécies de aves, pertencentes a quatorze famílias (Tabela 1), foram observadas se alimentando dos frutos do morototó *Schefflera morototoni*. O tamanho / peso das aves variou entre *Lepidothrix nattereri* (8 cm, 9 g) e *Ara chloropterus* (90 cm, 1,5 kg)[11]. O consumo de frutos do morototó por *Tyrannus albogularis* e *Dacnis lineata*, foi citado anteriormente por Parrini & Pacheco[8], em trabalho que focou registros inéditos para o Parque Nacional da Amazônia.

A guilda de aves consumidoras de frutos do morototó englobou espécies pertencentes a diferentes categorias tróficas, incluindo insetívoras como os pica-paus (Picidae), onívoras como Tyrannidae e Thraupidae e outras com alimentação basicamente frugívora como Cracidae, Psittacidae, Capitonidae, Ramphastidae, Pipridae e Cotingidae.

Todas as espécies das famílias Capitonidae (1) e Ramphastidae (6) e, a maioria (4 dentre 5) dos cracídeos, que são conhecidas para o Parque Nacional da Amazônia[7], foram observadas consumindo os frutos de *S. morototoni* (ver Tabela 1). Estas três famílias, ao lado de outras como Pipridae e Cotingidae são conhecidas pelo elevado consumo de frutos em suas dietas[9,11,13] tendo sido consideradas por Snow[13] como frugívoras especializadas.

É relevante o fato de que cerca de 44% (n = 22) dos consumidores de frutos de *S. morototoni* sejam espécies de aves basicamente frugívoras (Tabela 1). Além disso, dez dentre as 15 espécies com maior número de visitas (n >8) foram pertencentes a algumas destas famílias, destacando-se dois cracídeos (*Penelope pileata* e *Aburria cujubi*), um capitonídeo (*Capito brunneipectus*), quatro ramphastídeos (*Ramphastos tucanus*, *R. vitellinus*, *Selenidera gouldii* e *Pteroglossus inscriptus*), um cotingídeo (*Cotinga cayana*) e dois pirídeos (*Lepidothrix nattereri* e *Pipra rubrocapilla*).

Dentre os onívoros, as famílias Tyrannidae e Thraupidae se destacaram devido ao elevado número de espécies visitantes. Algumas espécies como *Ramphocelus carbo*, *Thraupis episcopus* e *T. palmarum* exibiram elevado número de visitas.

Tabela 1. Espécies de aves observadas consumindo frutos de *Schefflera morototoni* (Araliaceae) no Parque Nacional da Amazônia, Estado do Pará, Brasil. A ordem taxonômica e os nomes científicos seguem a Lista de aves do Brasil do CBRO[3]. *Número de visitas*: os números entre parênteses se referem ao total de árvores visitadas. *Período das visitas*: (1) 24–25 de julho de 2000; (2) 2–5 de setembro de 2000; (3) 2–6 de agosto de 2001; (4) 21–25 de julho de 2003; (5) 18–23 de agosto de 2010. *Padrão de visitação*: S = ave solitária; P = par; B = bando mono-específico. *Categoria trófica*: F = principalmente frugívoros; I = principalmente insetívoros; O = onívoros.

Famílias / Espécies de aves	Número de visitas*	Período das visitas	Padrão de visitação	Categoria trófica
CRACIDAE				
Ortalis guttata	1 (1)	1–2	S	F
Penelope superciliaris	2 (2)	5		F
Penelope pileata	9 (7)	1–2,5	S,P,B	F
Aburria cujubi	14 (10)	1,5	S,P	F
COLUMBIDAE				
Patagioenas speciosa	5 (4)	1	S,P	F
PSITTACIDAE				
Ara chloropterus	1 (1)	1–2	P	F
Guarouba guarouba	2 (2)	3	P,B	F
Pionus menstruus	7 (6)	1,5	S,P,B	F
Amazona amazonica	2 (2)	5	S	F
Amazona ochrocephala	1 (1)	5	P	F
TROGONIDAE				
Trogon viridis	2 (1)		S	O
CAPITONIDAE				
Capito brunneipectus	9 (7)	1–2,4–5	S,P	F
RAMPHASTIDAE				
Ramphastos tucanus	10 (7)	4–5	S,P	F
Ramphastos vitellinus	19 (16)	1–2,4–5	S,P	F
Selenidera gouldii	9 (7)	2,5	S,P	F
Pteroglossus inscriptus	18 (14)	1–5	S,P,B	F
Pteroglossus bitorquatus	8 (6)	1,3–5	S,P,B	F
Pteroglossus aracari	6 (5)	3,5	S,P,B	F
PICIDAE				
Melanerpes cruentatus	4 (4)	4–5	S,P	I
Celeus grammicus	2 (2)	4	S	I
Celeus elegans	1 (1)	5	S	I
Dryocopus lineatus	2 (2)	4	P	I
TYRANNIDAE				
Mionectes oleagineus	6 (5)	4–5	S	O
Myiopagis gaimardii	1 (1)	5	S	I
Legatus leucophaius	4 (3)	4–5	S,P	O
Myiozetetes cayanensis	7 (6)	1–2,5	S,P	O
Myiozetetes luteiventris	8 (7)	2–3,5	S,P	O
Pitangus sulphuratus	1 (1)	5	S	O
Myiodynastes maculatus	3 (3)	4–5	S	O
Tyrannopsis sulphurea	1 (1)	5	P	I
Empidonomus varius	10 (8)	4–5	S,P	I
Tyrannus albogularis	3 (3)	2,5	S	I
Tyrannus savana	3 (3)	4–5	S,P	I
COTINGIDAE				
Cotinga cayana	13 (10)	2–5	S,P,B	F
Gymnoderus foetidus	4 (4)	2,5	S,B	F
PIPRIDAE				
Lepidothrix nattereri	13 (7)	4–5	P,B	F

Famílias / Espécies de aves	Número de visitas*	Período das visitas	Padrão de visitação	Categoria trófica
Manacus manacus	2 (2)	2,5	S	F
Pipra rubrocapilla	16 (10)	2–4	S,P,B	F
TITYRIDAE				
Tityra semifasciata	3 (3)	5	S,P	O
Pachyramphus minor	2 (2)	4–5	S,P	O
TURDIDAE				
Turdus fumigatus	2 (2)	5	S	O
Turdus albicollis	8 (6)	3–5	S	O
THRAUPIDAE				
Saltator maximus	9 (7)	1,4–5	S,P	O
Ramphocelus carbo	16 (12)	1,4–5	S,P	O
Thraupis episcopus	16 (12)	1–5	S,P,B	O
Thraupis palmarum	17 (13)	2–5	S,P,B	O
Tangara chilensis	3 (3)	4	S	O
Tersina viridis	3 (3)	3,5	B	O
Dacnis lineata	2 (2)	4	S	O
Dacnis cayana	6 (4)	3–4	S,B	O
ICTERIDAE				
Cacicus cela	2 (2)	4	S	O

Plantas como o morototó, com época de frutificação na estação seca, comuns em seus respectivos habitats, capazes de produzir grandes quantidades de frutos e de atrair elevado número de espécies de aves e / ou mamíferos têm sido consideradas como recursos-chave na alimentação de aves e mamíferos[4,14]. Galetti & Stotz[4] sugeriram que *Miconia hypoleuca* (Melastomataceae) fosse considerada 'planta-chave' pelo fato de atrair um número (34) elevado de espécies de aves durante a estação seca em florestas do litoral do Espírito Santo, Brasil.

Carrano[1] considerou *Didymopanax* (*Schefflera*) *morototoni*, ao lado de mais quatro espécies vegetais, como espécies-chave para as aves em florestas situadas no município de Paranaguá, litoral do Estado do Paraná, sul do Brasil. Este último autor observou a utilização dos frutos desta planta por vinte espécies de aves.

Por outro lado, no que diz respeito à espécie vegetal, ter um elevado número de espécies de aves possuidoras de dietas e comportamentos alimentares diversos (ver padrão de visitação na Tabela 1) consumindo seus frutos, deve ampliar as chances de dispersão das sementes em ambientes variados desde capoeiras e orlas de matas até o interior das florestas de terra firme.

O presente estudo tanto reforça a utilização dos frutos de *S. morototoni* por aves pertencentes a diversas categorias tróficas como destaca a importância desta planta para várias espécies de aves frugívoras, incluindo aves de médio / grande porte (Cracidae, Psittacidae e Ramphastidae), durante a estação seca na região central da Amazônia brasileira.

Finalmente, propomos que estudos de frugivoria por aves que foquem plantas abundantes em seus respectivos habitats, como é o caso de *S. morototoni*, sejam feitos em áreas contínuas e ao longo de diferentes anos de forma a ampliar o conhecimento da assembléia de aves que utilizam os frutos e, potencialmente, possam estar atuando como dispersoras das espécies vegetais. Neste sentido, o emprego de metodologias mais 'flexíveis' com relação ao local, época e contagem de espécies visitantes pode ampliar sobremaneira o conhecimento das interações entre aves e uma dada espécie vegetal e, adicionalmente, fornecer subsídios a estudos mais específicos sobre a dispersão de diásporos e outros temas associados.

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New records of rare screech owls (*Megascops*) and pygmy owls (*Glaucidium*), with taxonomic notes and a conservation assessment of two globally imperilled species in Ecuador

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El conocimiento sobre las aves nocturnas del Ecuador, y del Neotrópico en general, es deficiente. Apenas se han documentado ciertos detalles de la historia natural de la mayoría de búhos (Strigidae); mientras, la distribución en este país de al menos 11 especies de las 28 existentes todavía no se comprende bien. Presentamos nuevos registros de distribución de ocho especies de autillos (*Megascops*) y mochuelos (*Glaucidium*) en Ecuador, con algunas extensiones de rango altitudinal y geográfico. Además, hacemos una evaluación más detallada del estado de conservación de una especie globalmente amenazada (Mochuelo de Bosque Nublado *G. nubicola*) y una casi amenazada (Autillo Colombiano *M. colombianus*). Concordamos que *M. colombianus* se considere Casi Amenazada en el país porque su declive poblacional aparenta ser leve, el grado de protección es moderado (44%) y las poblaciones colombianas pueden proveer inmigrantes. Por su parte, *G. nubicola* podría calificar como En Peligro por densidades poblacionales bajas, pocas localidades, declinación moderada y escasa protección; sin embargo, una aproximación más conservadora sería asignarle la categoría Vulnerable, en concordancia con las evaluaciones actuales. Sugerimos una revisión de su categoría global.

Amongst Neotropical birds, nocturnal species are some of the least known[7]. For example, of 28 species occurring in Ecuador a mere two taxa, Barn Owl *Tyto alba punctatissima* and Short-eared Owl *Asio flammeus galapagoensis*, both subspecies endemic to the Galápagos archipelago, have been studied in some detail[12]. Knowledge of the natural history of no fewer than 24 species inhabiting mainland Ecuador is deficient, and even the Ecuadorian distributions are poorly known for at least 11 of these[10].

The two richest genera of Strigidae occurring in Ecuador, *Megascops* screech owls (eight species) and *Glaucidium* pygmy owls (six)[23] range throughout the country, a few of them widespread (e.g., Andean Pygmy Owl *G. jardinii*, Tropical Screech Owl *M. choliba*)[26], but many species are confined to narrow altitudinal belts or small sections of the Andes, including some restricted to Endemic Bird Areas[29].

An assessment of species at risk in Ecuador, published in 2002[11], ranked one pygmy owl (Central American *G. griseiceps*) as Vulnerable, and two screech owls (Choco *M. guatemalae* (*centralis*) and Colombian *M. colombianus*) as Near Threatened. At a global scale[4], *M. colombianus* is ranked Near Threatened, whilst Cloud-forest Pygmy Owl *G. nubicola* is ranked Vulnerable. The latter species was also suggested to be Vulnerable in Ecuador by Freile *et al*.[9].

To understand the current distribution and status of rare *Megascops* and *Glaucidium* in Ecuador, we undertook field work and a thorough compilation of museum, literature and unpublished records in order to model species distributions and evaluate them against habitat loss and protection. Evaluation of the distribution and conservation status of nine focal species is underway. Here, we summarise new records, range extensions and new altitudinal data obtained for all focal species except West Peruvian Screech Owl *M. roboratus*. Furthermore, we discuss in more detail the status of those species of global concern (*M. colombianus* and *G. nubicola*) whose ranges are confined to the Andean slopes of the Chocó region. Taxonomy follows SACC[23], but subspecies recommended by Ridgely & Greenfield[26] as valid species were also evaluated. Sound-recordings of most new records are archived on www.xenocanto.org (XC80927 *M. guatemalae roraimae* (*napensis*); 80928, 80930 *M. guatemalae centralis*; 80934, 80940 *M. colombianus*). Museum acronyms: ANSP = Academy of Natural Sciences, Philadelphia; MECN = Museo Ecuatoriano de Ciencias Naturales, Quito.

Species accounts

Rufescent Screech Owl *Megascops ingens*

Four new sites at 1,500–1,780 m (Table 1). Very few records—though presumed to range continuously over the entire east Andean slope[26]—even from Napo and other northern provinces[19], despite its presence in neighbouring Colombia[16]. Sympatric with closely related Cinnamon Screech Owl *M. petersoni* at Chontayacu (1,614 m). Also found in syntopy at the edge of stunted forest on sandy soil at 2,100 m in Tapichalaca reserve, prov. Zamora-Chinchipe, by N. Krabbe (XC85949–950), with *M. petersoni* responding aggressively to *M.*

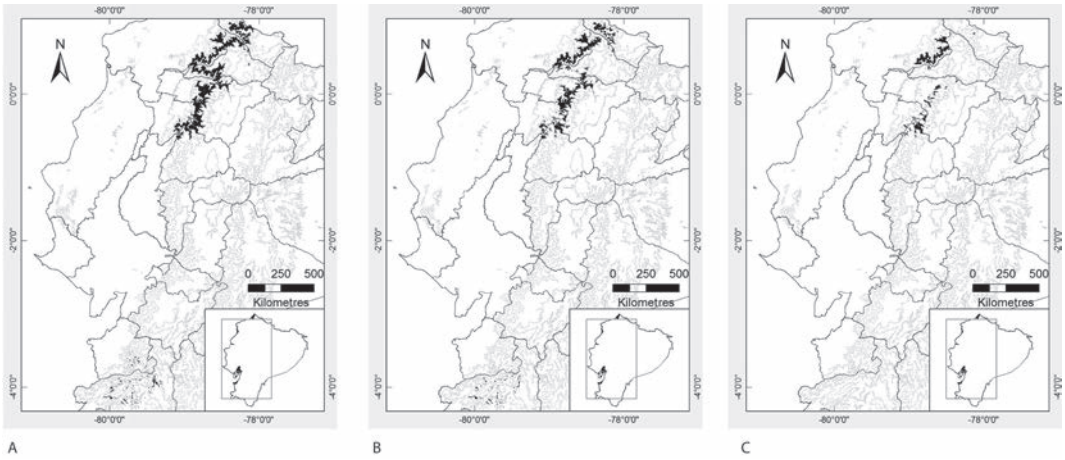

Figure 1. Historic, current and protected range of Colombian Screech Owl *Megascops colombianus* in Ecuador. Pale grey areas indicate elevations of 500–2,000 m. Black lines indicate provincial boundaries.

ingens song. At Chinapinza, Zamora-Chinchipe, both were collected, *ingens* at 1,450 and 1,950 m (ANSP), *petersoni* on a stunted ridge at 1,700 m where no *ingens* was heard (ANSP, MECN). Both species broadly overlap altitudinally[10,26]. It has been hypothesised that they segregate elevationally where syntopic, with the smaller *M. petersoni* ranging above *M. ingens*[17], but clarification of their ecological requirements is needed.

Cinnamon Screech Owl *Megascops petersoni*
Three new localities at 1,230–1,740 m found during field work, and two unpublished museum records from prov. Morona-Santiago (Table 1). Very few records of this recently described species[8] exist. It is thought to range along the entire east Andean slope[19,26]. Additional records were obtained by N. Krabbe at Tapichalaca reserve (XC85950), at 2,100 m (see above), and south-east of Chito, in the Zumba region of southernmost Zamora-Chinchipe[18].

Vermiculated (Foothill or Napo) Screech Owl *Megascops guatemalae roraimae* (*napensis*)
Discontinuous records throughout the entire eastern Andean foothills. Found at four new localities (Table 1), with two previously unpublished specimens at MECN, from Cerro Guayusa (MECN 7772) and Unnsuants (MECN 7637), prov. Morona-Santiago. Recorded at 1,400 m in the Nangaritza region, where syntopic with *M. petersoni* (heard at the same point, but *M. petersoni* ranging slightly higher). Intricate taxonomy unresolved. Following Hardy *et al.*[13], Ridgely & Greenfield[26] treated these birds as subspecies *napensis* of a specific *M. roraimae*, but suggested that *napensis* might be specifically distinct.

Vermiculated (Chocó) Screech Owl *Megascops guatemalae* '*centralis*'
Known from a single record in south-western prov. El Oro[18,26]. Thorough searches resulted in four new localities in El Oro and one in Azuay (Table 1), at 800–1,500 m. That in Azuay sets a new upper elevational limit, as it had previously been reported only to 1,000 m[26]. Not found in the area between western Pichincha and El Oro, but our field work in this region was limited and it remains poorly explored ornithologically[19]. This taxon, described by Hekstra[14] is not recognised by some authors[17,20] who merge it and Hekstra's[14] *pallidus* of north Venezuela with *vermiculatus* of Costa Rica. *M. centralis* is not always recognised[6], but was treated at species level by Hardy *et al.*[13] and Ridgely & Greenfield[26]. A simple comparison of recordings at www.xeno-canto.org revealed apparently qualitative differences in length (number of notes) and inflection at the end. For example, XC65705 (Puerto Viejo, Heredia, Costa Rica), labelled as *vermiculatus*, is markedly longer and less inflected than all recordings of *centralis* (XC60677 and 47011 from Panama; 71402, 12952, 9902; 9861 from Ecuador; and 10835 from Colombia). Taxonomy in the *M. guatemalae* 'species' is very complex, and as many as 3–4 species are probably involved[17]. Whether *vermiculatus* and *centralis* co-occur in eastern Costa Rica requires confirmation (N. Krabbe *in litt.* 2011). A thorough analysis of vocal variation is needed.

Subtropical Pygmy Owl *Glaucidium parkeri*
Found at four new localities (Table 1), including an unpublished record by L. Ordóñez[22]. Its distribution is probably continuous over the entire Andean foothills of Ecuador (1,000–2,000 m)[19,27], possibly reaching neighbouring Colombia, where unrecorded to date.

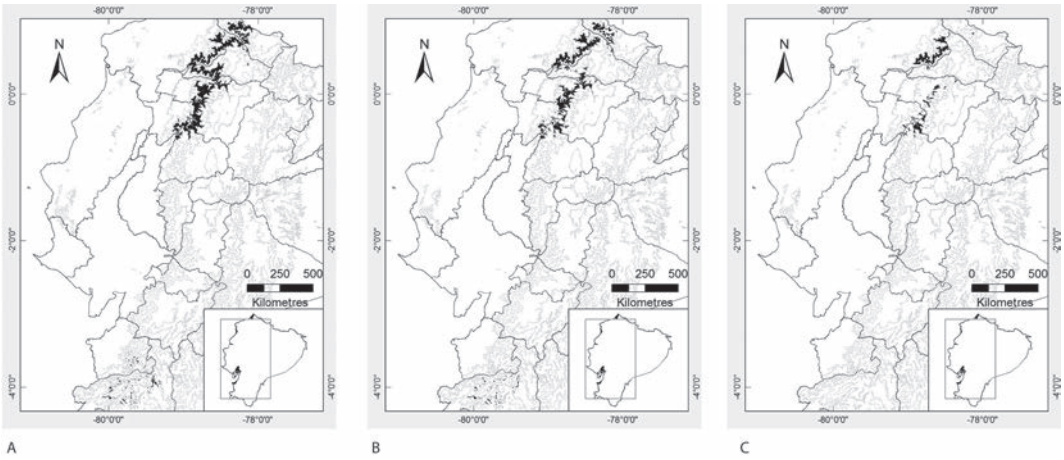

Figure 2. Historic, current and protected range of Cloud-forest Pygmy Owl *Glaucidium nubicola* in Ecuador. Pale grey areas indicate elevations of 500–2,000 m. Black lines indicate provincial boundaries.

Central American Pygmy Owl *Glaucidium griseiceps*

Four additional localities for this poorly known species (Table 1), which was only recently discovered in Ecuador[26], including the southernmost ever (10 km west of Puerto Quito, Pichincha). Observed by P. Moscoso & JFF at c.600 m (La Sabalera, Carchi); previously recorded up to 350–400 m.

Threatened species conservation assessment

Colombian Screech Owl *Megascops colombianus*

Endemic to Andean slopes of the Chocó region, ranging along the Pacific slope of the western Andes in Colombia (dpto. Chocó), south to northern Cotopaxi[3]. We found it at two sites in Bolívar (Table 1), extending its range c.140 km south, and a little above its previously documented upper elevational limit (2,400 m[26]). Also, it was recently found further west, in the Mache-Chindul coastal range[5].

Distribution of *M. colombianus* in Ecuador was modelled using ArcMap 9.3 with 26 locality points (Fig. 1a). Unlike previous attempts to illustrate the species' range[19,26], our model extends it south to western prov. Chimborazo via a narrow altitudinal band, and includes the Mache-Chindul range, with an overall original range of 6,762 km^2. However, versus the current deforestation scenario (Fig. 1b), range size shrinks to 4,142 km^2; i.e. a reduction of 39% of its original distribution. Further constraining the model (Fig. 1c) revealed that 1,840 km^2 (44%) of its Extent of Occurrence is currently protected (state-run and private / communal protection forests). It should be noted that protection forests are not part of the National Network of Protected Areas, and that the current state of many protection forests is either undetermined[1] or known to be undergoing severe degradation.

An assessment of the species' current status in Ecuador using IUCN[30] criteria for regional assessments resulted in Near Threatened status at national level, in accordance with previous assessments[11]. An estimated reduction in range of 30% over the last ten years or three generations, as well as in the next ten years or three generations, as inferred from the percentage of range loss (39%) satisfies Vulnerable (although range and population decline might actually be lower). Similarly, Extent of Occurrence (i.e., distributional range) <20,000 km^2, where ongoing deforestation suggests continuous decline, might also comply with Vulnerable. However, Colombian populations could represent a source of immigrants, as there are no major geographic or deforestation barriers to impede this[30]. Likewise, the species appears fairly tolerant of habitat modification, persisting in secondary forest and forest edge. This, coupled with a moderate degree of protection, including known populations within large protected areas (e.g., Cayambe-Coca, El Ángel, and Illinizas Ecological Reserves), might suggest that Ecuadorian populations are stable or only experiencing a slow decline.

Taxonomic status is still controversial[23]. Vocal differences between *M. colombianus* and *M. ingens* are subtle, less marked than between populations referred to nominate *ingens*[15,17] (N. Krabbe unpubl.) and a thorough analysis might demonstrate that *M. colombianus* does not merit species status (N. Krabbe *in litt*. 2011).

Table 1. New localities for rare, poorly known and threatened screech and pygmy owls in Ecuador. Habitat: primary forest (PF), primary forest edge (PFE), secondary forest (SF), secondary forest edge (SFE), forest edge (FE), forest fragments (FF). Record: tape-recorded (T), heard (H), seen (S), specimen (M).

Species	Locality	Province	Coordinates	Elevation	Habitat	Record
Megascops ingens	15 km E of Chontayacu	Tungurahua	01°16'S 78°09'W	1,614 m	PF	T
	Nueva Alianza	Morona-Santiago	02°05'S 78°09'W	1,500 m	PFE	H
	9 de Octubre	Morona-Santiago	02°13'S 78°14'W	1,740 m	FF	H
	Sardinayaku	Morona-Santiago	02°04'S 78°12'W	1,774 m	PF	T
Megascops colombianus	Tiquibuzo	Bolívar	02°01'S 79°08'W	2,400 m	SF	T
	San Vicente	Bolívar	01°55'S 79°08'W	1,890 m	FF	T
Megascops petersoni	15 km E of Chontayacu	Tungurahua	01°16'S 78°09'W	1,614 m	PF	T
	Warintz, Cordillera Kenkuim	Morona-Santiago	03°12'S 78°25'W	1,738 m	PF	M
	Leonidas Plaza	Morona-Santiago	02°59'S 78°19'W	1,592 m	PF	M
	Huambi, Cordillera Kutukú	Morona-Santiago	02°33'S 78°09'W	1,234 m	SF	T
	Las Orquídeas	Zamora-Chinchipe	04°25'S 78°67'W	1,350–1,500 m	PF	T
Megascops guatemalae napensis	El Paraíso, 20 km S of Puyo	Pastaza	01°46'S 77°09'W	950 m	SFE	H
	Guamote–Macas road	Morona-Santiago	02°13'S 78°07'W	1,150 m	FE	H
	Cordillera Domono	Morona-Santiago	02°19'S 78°07'W	982 m	PF	T
	Yayu, Cerro Guayusa	Zamora-Chinchipe	02°33'S 77°53'W	1,030 m	PF	M
	Las Orquídeas	Zamora-Chinchipe	04°25' S 78°67 W	1,450 m	PF	T
Megascops guatemalae 'centralis'	Molleturo–Mullopungo	Azuay	03°13'S 79°38'W	1,577 m	SF	H
	Paccha	El Oro	03°29'S 79°43'W	809 m	FE	T
	Paccha	El Oro	03°30'S 79°43'W	1,163 m	FE	T
	Sambo Tambo	El Oro	03°38'S 79°43'W	1,750 m	FF	T
	Ñalacapac	El Oro	03°41'S 79°45'W	895 m	FF	T
	Palosolo	El Oro	03'72'S 79°83'W	1,250 m	FE	T
Glaucidium nubicola	Mashpi reserve	Pichincha	00°16'N 79°94'W	1,200 m	PF	H
Glaucidium parkeri	Wambula, Colonso forest	Napo	00° 89'S 77°86'W	1,000 m	PF	H
	15 km E of Chontayacu	Tungurahua	01°16'S 78°09'W	1,614 m	PF	S
	San Luis de Iñinques	Morona Santiago	02°23'S 78°02'W	1,450 m	PFE	H
	Las Orquídeas	Zamora-Chinchipe	04°25'S 78°67'W	1,350 m	PF	T
Glaucidium griseiceps	La Sabalera	Carchi	00°58'N 78°30'W	600 m	PF	S
	río Bogotá, Awacachi reserve	Esmeraldas	01°05'N 78°41'W	44 m	PF	T
	Tundaloma	Esmeraldas	01°11'N 78°40'W	100 m	SF	T
	10 km W of Pto. Quito	Pichincha	00°18'N 79°30'W	355 m	SF	T

Cloud-forest Pygmy Owl *Glaucidium nubicola*

This recently described species[28] has a rather similar distribution to *M. colombianus*, being also endemic to the Andean portion of the Chocó[2]. Its range extends from Risaralda, Colombia, to northern Cotopaxi, with a seemingly isolated population in south-west El Oro[9] (Fig. 2).

During our field work we visited 13 localities within its presumed range, but it was detected at just three (Santa Lucía and Mashpi reserves, Pichincha, and Chical, Carchi). It should be noted that previous records from localities close to Santa Lucía and Chical make our record at Mashpi the only addition to what was already known of the species' distribution in Ecuador[9]. Mashpi (1,200 m) represents its lowest altitudinal record, along with an unpublished report from Milpe Bird Sanctuary (1,100 m; P. J. Greenfield *in litt*. 2012) as it was previously reported to 1,400 m in the north-west[26].

The modelled distribution of *G. nubicola* predicts a continuous distribution south to southern Cotopaxi, and again along the Pacific slope in Azuay, El Oro and Loja, comprising 3,834 km^2 (Fig. 2a) (*contra* Ridgely & Greenfield[26]). However, there are no actual records from Azuay or Loja, and just one in Carchi, one in Cotopaxi and a recent one (February 2012) in Imbabura (Los Cedros Reserve; JFF unpubl.). Constraining the distribution according to current deforestation resulted in 2,570 km^2 (33% of range lost) (Fig. 2b); c.990 km^2 (39%) of its current Extent of Occurrence is protected (Fig. 2c). Nonetheless, there are no confirmed

records from state-run protected areas (Cotacachi-Cayapas and Illinizas Ecological Reserves), despite the existence of apparently suitable habitat.

This species' responsiveness to playback is apparently low and might partially explain the lack of records from potentially appropriate habitat, including extensively forested areas within reserves. For instance, field work at Chical, where specimens were collected in 1988[28] resulted in a single encounter during four evening surveys. Notably, passerines and hummingbirds reacted on several occasions to playback of *G. nubicola* vocalisations[25]. Likewise, at Santa Lucía the species responded and approached one afternoon and at dusk (within a presumed territory), but not the previous day at another creek at the same site. Response is therefore comparatively weak compared to some congeners (e.g., Pacific Pygmy Owl *G. peruanum*; JFF pers. obs.).

The species is currently ranked Vulnerable globally owing to severe ongoing deforestation within its reduced global range[2]. Likewise, it is ranked Vulnerable in Colombia[24] whilst Freile *et al*.[9] also suggested Vulnerable status in Ecuador. Our assessment of the species' current conservation status suggests it faces a rather gloomy future in the country. A population decline >30% over the last or during the next ten years or three generations can be inferred based on 33% range loss, although a more conservative approach suggests lower rates of decline. Therefore, it meets criteria A2c and A3c for Vulnerable. With low population density and less than 55% remaining range in Colombia[25], immigration appears unlikely. Further, its current Extent of Occurrence is smaller than 5,000 km^2, can be considered fragmented and in continuous decline, meeting the Endangered category for criterion B1a,b. BirdLife International[2] suggested that declines are slow, but the few records, rate of habitat loss and apparently low population densities should be taken into account when assessing its population. The species benefits little from existing conservation units, with no records from large protected areas, leading us to suggest a re-assessment of its global status.

Concluding remarks

Research on nightbirds, from presence / absence surveys to population assessments or natural history studies, has been unduly neglected by Neotropical ornithologists, excepting some important research in Mexico, Argentina and Chile[7]. Nonetheless, it is widely recognised that increased knowledge of a species' ecology and distribution yields a better understanding of their vulnerability to extinction.

Current trends of habitat loss throughout the Ecuadorian Andes and the western lowlands[21] are provoking population declines even of species not yet ranked as threatened or Near Threatened (e.g., *M. roboratus*, *G. griseiceps*). *Megascops colombianus* and *Glaucidium nubicola* are among the most range-restricted owls in mainland South America[17]. Although some extensive tracts of potentially suitable forest remain within the large Cotacachi-Cayapas Ecological Reserve, habitat loss outside protected areas is rampant. Smaller private reserves contribute to species conservation, and provide the only protected sites where *G. nubicola* has been recorded (e.g., Maquipucuna, Otonga, Bellavista, Santa Lucía, Mashpi, Milpe reserves).

This study is part of a larger project (the Cuscungo Initiative) to investigate and document the natural history, distribution and status of nocturnal birds in Ecuador, as well as human perceptions about them. Current work includes an assessment of populations and habitat use of four owls in an Andean dry forest; a survey of the distribution and conservation of Buff-fronted Owl *Aegolius harrisi*; natural history observations of subtropical species; and a study of how people perceive nightbirds. Owl research in Ecuador is only beginning[10]. The Cuscungo Initiative is open to new proposals, volunteering or any other type of collaboration from the Neotropical ornithology and birding communities.

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Nesting biology of Coscoroba Swan *Coscoroba coscoroba* at La Angostura Dam, Tafí del Valle, Tucumán, Argentina

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El Cisne Coscoroba *Coscoroba coscoroba* nidifica en latitudes mayores a 33ºS desde Buenos Aires (Argentina) y Chiloé (Chile) hasta Isla Grande en Tierra del Fuego y, ocasionalmente, en las islas Malvinas. Mostramos el primer registro de nidificación a 26º55'06"S 65º41'36"O y 2.000 msnm. Nuestro objetivo fue estudiar la nidificación de *C. coscoroba* para contribuir con información sobre la reproducción de esta especie. Llevamos a cabo nuestro estudio desde agosto de 2004 a noviembre de 2005 en el dique La Angostura, Argentina. Registramos 26 individuos e identificamos ocho nidos, cinco de los cuales mostraron actividad, con un total de cinco puestas.

One of two species of swans in South America[9], Coscoroba Swan *Coscoroba coscoroba* inhabits shallow brackish lagoons with abundant fringing vegetation[3]. Documented nesting records outside the main breeding area are scarce[8]. It nests at latitudes above 33ºS from Buenos Aires (Argentina) and Chiloé (Chile) to Isla Grande in Tierra del Fuego and, occasionally, in the Falkland Islands. In winter, the species moves north to northern Argentina, central Chile, southern Paraguay, south-east Brazil and Uruguay[9,10,14]. The highest altitude at which nesting has been recorded is 1,300 m[4], but we recorded the species at a dam in northern Argentina at 2,000 m. Ours are the first nesting records at this altitude and latitude. This study provides additional data on certain aspects of this swan's breeding biology, from a high-altitude artificial lake. In addition, we highlight the importance of artificial waterbodies as habitat for waterfowl[7].

Methods

Study site.—La Angostura Dam is located at 2,000 m (26º55'06"S 65º41'36"W) in the Tafí intermontane valley, Tafí del Valle department, Tucumán, Argentina. The dam has a perimeter of 12 km and extent of 980 ha including the flooded area. It is situated in a high-altitude semi-arid region, with a mean max. temperature of 18.6ºC in summer and min. of 8ºC in winter. Precipitation is <410 mm p.a. and falls only in summer[1]. This study was part of an ongoing project to assess the dam's bird community, in August 2004–November 2005. However, the study species has been present at the dam since 2001.

Sampling.—We surveyed the dam's perimeter using line transects[2]. Each transect was 1 km long and 100 m wide, centred on the shoreline. We established 12 consecutive transects; however, they were sampled rotationally, switching the first transect to be sampled on each visit. Nests found during transects were colour flagged and designated by a number. We visited each nest once per week and recorded data on materials and nest and egg measurements. In addition, we recorded nest activity (adults in the environs of nests and nest stage) during each visit. We spent 30 minutes observing each nest during each weekly visit p.a., with a total of 1,140 minutes of observation.

Results

We recorded 26 adults and eight nests, five of them active and one of them used three times. The first nest was found at the río Tafí mouth (26º54'04"S 65º42'10"W). Nests 2 and 3 were 2 m from each other in the floodplain of the río Tafí, 600 m from nest 1. Nest 4 was on the east side of the dam, 400 m from Provincial Route 307, and 1.7 km from nests 2 and 3 (Fig. 1). Adults were always observed

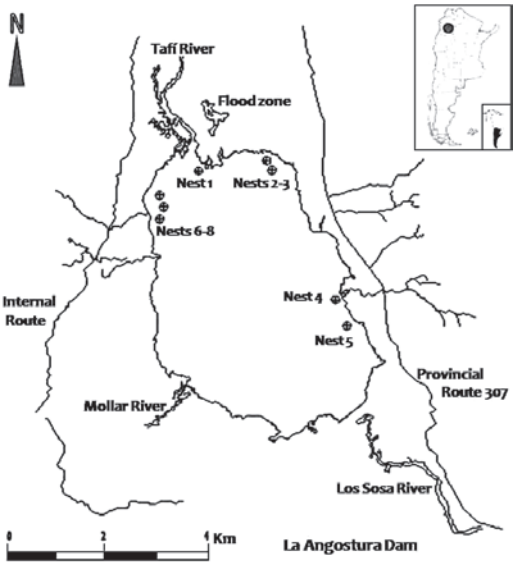

Figure 1. Map showing location of nests in the study area, Tafí intermontane valley, Tucumán, Argentina.

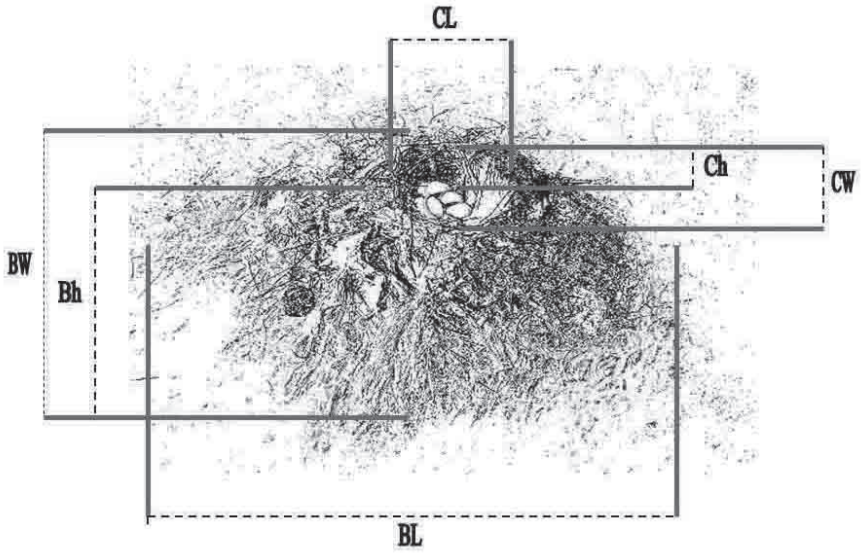

Figure 2. Model illustrating measurements (cm) of Coscoroba Swan *Coscoroba coscoroba* nests: basal width (BW), basal length (BL), basal height (Bh), chamber width (CW), chamber length (CL), chamber height (Ch).

near or on the nests when with eggs. Once nests were abandoned, adults stayed nearby. We did not observe inter- or intraspecific interactions.

Nests were built near (c.1–7 m) the dam's margins, in shallow water 12–50 cm deep, on marshy soil. The nests were truncated, cone-shaped, solid structures of mud and aquatic plants (*Ludwigia longifolia*, *Myriophyllum quitense*), and their interior was lined with aquatic plants and down feathers (Fig. 2). Mean nest height was 33.4 cm above water level. Mean cup diameter was 33.6 cm and depth 13.9 cm; basal length was 78.4 cm and width 77.5 cm. Nests lacked platforms (Table 1).

We recorded egg laying in June–October 2005, with a total of four active nests and five clutches (25 eggs total). In Table 2 we summarise these data. Eggs were elliptical, and ranged from white (52%), cream (32%) to buff (16%)[3]. Mean clutch size was 4.2 eggs (range 1–6 eggs), which were a mean 6.33 cm × 9.44 cm in size. Eggs were always completely covered with down feathers.

Table 1. Quantitative characters measured (cm): basal width (BW), basal length (BL), basal height (Bh), chamber width (CW), chamber length (CL), chamber height (Ch).

Nest	BW	BL	Bh	CW	CL	Ch
1	50	50	33	26	26	9.5
2	77.5	67.5	29	33.5	31.5	17.5
3	72.5	76	21.5	30	31.5	13.5
4	110	120	50	45	45	15

Discussion

This swan is included in CITES Appendix II with an estimated 10,000–25,000 individuals in Argentina[4–6]. *C. coscoroba* is considered a partial austral migrant, moving to lower latitudes in autumn–winter[10]. However, we recorded a constant number of birds throughout August 2004–November 2005. For this reason, we considered this population resident.

Breeding activity was observed in June–October coincident with the observations of Navas[12] (July–December) and Nores & Izurieta[13] (May–October) for Argentina, and with those of Silva-Garcia & Brewer[16] (July–December) in central Chile.

Shape, material and location of nests agree with previous descriptions[12,13]. However, nests were not sited in marshy vegetation, despite the presence of rushes (*Juncus* sp.), sedges (*Cyperus* sp. and *Eleocharis* sp.) and buttercups (*Ranunculus* sp.) at the dam's margins. Probably as a result, we did not see cygnets because the nests were almost certainly predated. Regarding nest size, dimensions were smaller than found by Navas[12]. Clutch size was also lower than suggested by de la Peña[15], Jugtlar[9], Navas[12] and Nores & Izurieta[13]. Egg size matched previously reports[12,15].

We found Andean Coot *Fulica ardesiaca* eggs in swan nests on three occasions. Once the swan's nests had been abandoned or failed, coots used the nests for their own clutches. No interactions were observed while the adults were at the nest or in the environs, although nest defence against species like White-winged Coot *Fulica leucoptera* has been observed by Black-necked Swan *Cygnus melancoryphus*[11].

Table 2. Nest timeline data for Coscoroba Swan *Coscoroba coscoroba* at La Angostura Dam, Tafí del Valle, Tucumán, Argentina.

Nest	Date	Activity	No. eggs	Observations
1	30 June 2005	Incubating first clutch	6	Eggs covered
	28 July 2005	Incubating first clutch	5	
	5 August 2005	Failed	0	
	25 August 2005	Incubating second clutch	4	
	22 September 2005	Incubating third clutch	4	
	20 October 2005	Empty	0	Probably fledged (faeces in nest), although fledgings never observed
	23 November 2005	Abandoned	-	
2	30 June 2005	Prelaying	0	
	8 July 2005	Incubating first clutch	1	
	28 July 2005	Failed	4	*Fulica ardesiaca* incubating
	5 August 2005	Empty	0	
	11 August 2005	Empty	0	
	18 August 2005	Empty	0	
	25 August 2005	Empty	0	
	20 October 2005	Abandoned	-	Untidy
	10 November 2005	Abandoned	-	Untidy
	23 November 2005	Abandoned	-	Untidy
3	30 June 2005	Built	0	
	8 July 2005	Empty	0	
	28 July 2005	Empty	0	
	5 August 2005	Failed	1	*Fulica ardesiaca* initiating first clutch
	11 August 2005	Failed	2	*Fulica ardesiaca* initiating first clutch
	25 August 2005	Empty	0	
	20 October 2005	Incubating first clutch	5	Eggs not covered
	10 November 2005	Failed	0	
	23 November 2005	Abandoned	-	
4	13 October 2005	Incubating first clutch	5	
5	3 November 2005	Building		
	10 November 2005	Abandoned		
6	28 July 2005	Built	-	Eggs never laid
7	28 July 2005	Built	-	Eggs never laid
8	28 July 2005	Built	-	Eggs never laid

The year-round availability of floating and rooted aquatic vegetation means that La Angostura Dam provides the resources required for breeding (nesting material, locations, protection against predators) and therefore has the potential characteristics needed for Coscoroba Swan and other wildfowl to become established there. Our study highlights the importance of artificial waterbodies to wildfowl, but further research is required to evaluate nesting success in artificial wetlands.

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Avifauna of a relict *Podocarpus* forest in the Cachil Valley, north-west Peru

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Describimos la avifauna del Bosque Cachil, un remanente de bosque de *Podocarpus* en el noroeste del Perú, basados en evaluaciones realizadas entre 1997 y 2012. Este bosque constituye una reserva aislada en una región que ha sido en gran medida deforestada y convertida en tierras agrícolas. Se encuentra muy cerca o en el límite extremo sur de los bosques húmedos de la vertiente occidental de los Andes peruanos y, en consecuencia, define el límite de distribución para muchas especies de aves de bosque húmedo. Reportamos un total de 92 especies, incluyendo 11 extensiones de rango y altitud (*Parabuteo leucorrhous*, *Ciccaba albitarsis*, *Lafresnaya lafresnayi*, *Grallaria guatimalensis*, *G. ruficapilla*, *Scytalopus unicolor*, *Phyllomyias uropygialis*, *Phaeomyias murina*, *Campylorhynchus fasciatus*, *Catharus fuscater* y *Arremon assimilis*).

Montane forests of the western Andes historically constituted a near-continuous strip from Colombia to northern Peru, but they have been reduced to numerous relicts due to human activities. It is estimated that 90% of these forests have been destroyed in north-west Peru, and that their destruction has accelerated rather than declined in recent years[22]. Specifically, most of Cajamarca, within which the Cachil Valley is located, was continuously forested in the 1940s, but advancement of roads, subsequent human colonisation, agriculture, grazing and demand for quality hardwood *Podocarpus* trees have resulted in rampant and continuing deforestation[20]. Additionally, deforestation of the west slope of the Andes in southern Peru has brought about severe desertification over the last 1,500 years[4]. Although similar anthropogenic and desertification pressures still exist in north-west Peru, relictual patches of humid and semi-humid forest remain on the west slope south to southern Cajamarca and northern La Libertad[8,15,22,23].

The Cachil Valley is at the southern edge of the biodiverse Amotape-Huancabamba zone in north-west Peru[21,22]. It lies at the southern border of Cajamarca directly adjacent to La Libertad[15] (Fig. 1), at c.2,200–3,200 m on the Pacific slope of the western Andes and drains into the upper río Cascas Valley of the larger río Chicama watershed. The valley is formed by the confluence of Quebrada Cachil to the west and Quebrada Piojo to the east, which join to form the río Cachil. Most of the upper Cachil Valley is privately owned by the Marco Antonio Corcuera family and is maintained as a forest reserve. It is accessed from the road that connects the towns of Cascas, La Libertad, and Contumazá, Cajamarca.

The Corcuera property, which is c.500 ha, comprises elements of humid forests found to the north and east as well as those of semi-humid habitats on the Pacific slope of northern Peru[8]. Specifically, semi-humid scrub and forest, as well as a well-preserved humid forest relict known as Bosque Cachil, comprise the major habitats. The semi-humid scrub and semi-humid forest habitats are extensive on the steep west side of the Cachil Valley along the entrance road to Bosque Cachil. The semi-humid scrub ranges from 1–2 m tall and is variable in density with scattered *Chusquea scandens* thickets. Semi-humid forest is characterised by columnar cacti and small trees up to 4 m tall, heavily laden with *Tillandsia* spp. bromeliads. Other features of the habitat surrounding Bosque Cachil include rocky slopes with large cliff faces and stands of non-native *Eucalyptus* trees.

Humid forest (Fig. 2C) at Bosque Cachil comprises a narrow, c.100 ha strip of forest between Quebradas Cachil and Piojo, at c.2,350–3,000 m in the uppermost Cachil Valley[18]. Bosque Cachil represents one of the southernmost of 23 identified relict forest fragments of the western Andes in north-west Peru and is one of the best known botanically[8,22,23]. An inventory of flowering plants, gymnosperms and ferns of Bosque Cachil listed 84 families, 171 genera and 228 species, including eight species endemic to Peru[15]. Humid forest is dominated by two species of native conifers in the genus *Podocarpus*[8,20], and *Podocarpus* trees comprise most of the c.15 m-tall canopy. Moss and epiphytic bromeliads of the genera *Tillandsia* and *Vriesea* are abundant. The midstorey and understorey are open to dense with terrestrial ferns and sapling *Podocarpus* (Fig. 2D). The densest areas of understorey are predominately *Chusquea scandens* thickets. Finally, the lower portions of the forest below the entrance road are mesic with vine tangles and abundant terrestrial ferns.

The avifauna of the Cachil Valley, as a result of its geographic location, is an amalgam of the

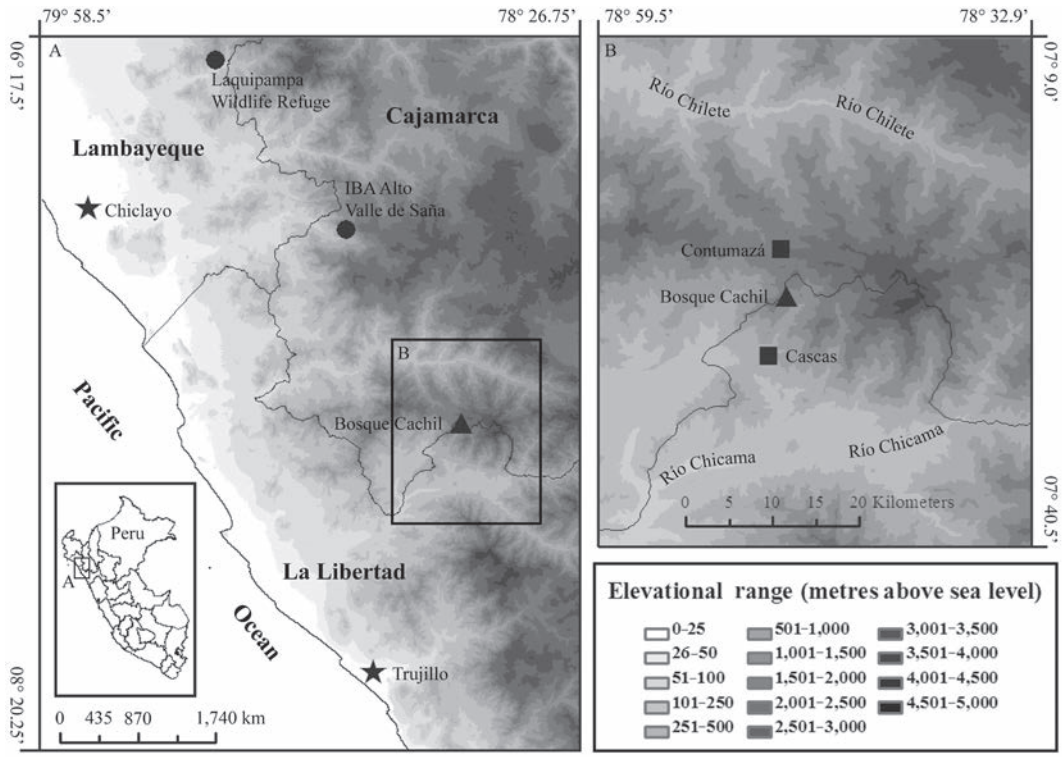

Figure 1. Panel A: Map of the southern Amotape-Huancabamba Zone in north-west Peru showing Bosque Cachil (triangle) relative to Chiclayo and Trujillo (star). Laquipampa Wildlife Refuge (LWR) and the Important Bird Area Alto Valle de Saña (AVS) are indicated by a circle. The box inlayed in panel A is the area enlarged in panel B. Panel B shows Bosque Cachil (triangle) relative to Cascas, La Libertad (square) and Contumazá, Cajamarca (square).

highly threatened Tumbesian, Southern Central Andes, and Peruvian High Andes Endemic Bird Areas (EBAs)[18]. Also, many bird species typical of humid forests on the east slope of the Andes occur in localised populations in the Cachil Valley. The uniqueness of the bird communities and the high level of threat from deforestation[8,9,18,19,22] highlight the urgent need for information on the status and distribution of birds in this poorly studied region. We present an annotated list of the avifauna of the Cachil Valley based on surveys, mist-netting and specimen data compiled over a 16-year span.

Methods

We made ten visits to the Cachil Valley between 1997 and 2010 (4–11 May 1997, 6–8 December 2009, 23–24 January 2010, 6–26 July 2010, 19–21 August 2010, 25 May–27 June 2011, 2–7 July 2011, 11–14 August 2011, 29 October–2 November 2011 and 15–20 January 2012). During July 2010, we used mist-nets and daily surveys of birds to estimate relative species abundance. These methods were used in combination because each is associated with different detection biases[13].

Up to 13 mist-nets (12 × 2 m; 32–36 mm mesh diameter) were opened before daylight (usually by 05h00) and closed after dusk (usually after 18h00) daily. Occasionally, 1–2 mist-nets were opened for brief periods at night to capture nocturnal birds. While open, mist-nets were checked every 20 minutes. We documented each species caught in mist-nets using digital photographs or a specimen for species known to be present at high density in the Cachil Valley. Specimens were deposited at the Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos (UNMSM), Centro de Ornitologia y Biodiversidad (CORBIDI) and Museum of Southwestern Biology, University of New Mexico (MSB).

Daily surveys using the area-search method[3,12] were conducted individually or by groups of 1–3 experienced observers familiar with the regional avifauna. The majority of surveys were conducted during periods of peak bird activity at c.05h30–08h00 and c.17h00–18h30. Observers counted birds seen and heard along existing trails at 2,400–2,650 m in the interior of humid *Podocarpus* forest, semi-humid scrub and semi-humid forest. Birds

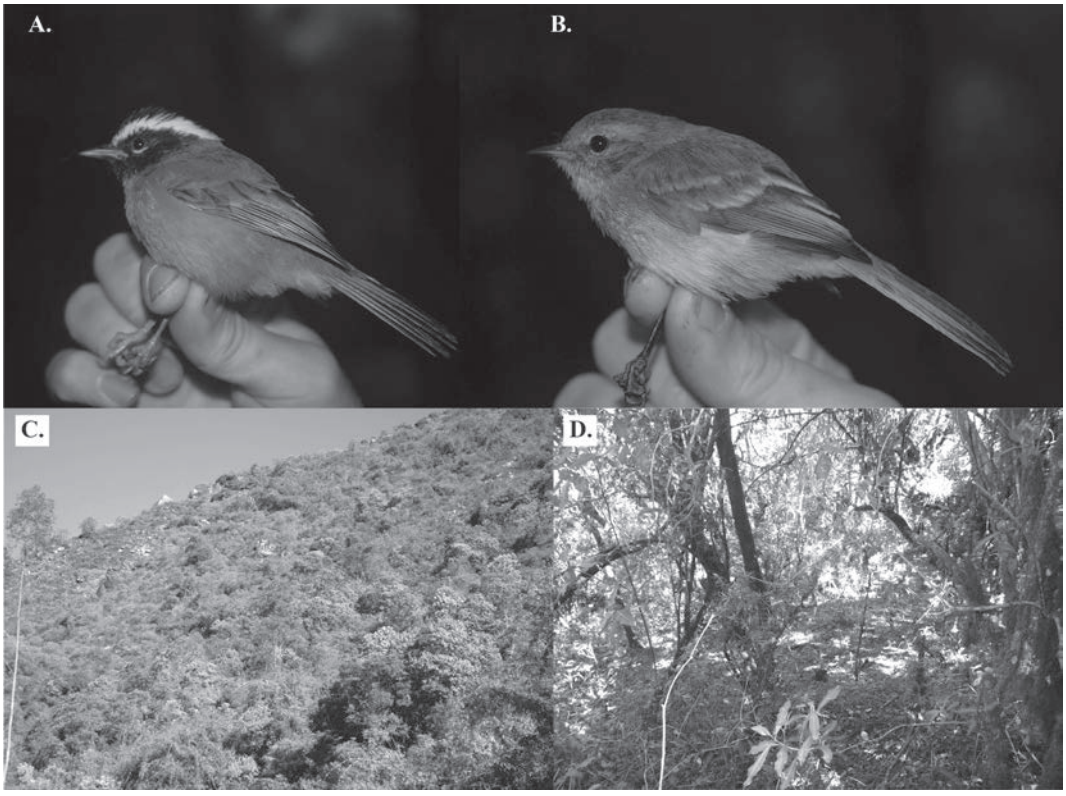

Figure 2. (A) Black-eared Hemispingus *Hemispingus melanotis* ssp. *piurae* or *macrophrys*; note the solid black crown, broad white supercilium and grey nape band typical of both subspecies. (B) Mouse-coloured Tyrannulet *Phaeomyias murina tumbezana*; note the grey upperparts, buffy wingbars and yellow wash to belly which separate *P. m. tumbezana* from *P. m. inflava*. (C) Typical semi-humid forest habitat in the Cachil Valley. (D) Typical humid forest interior of Bosque Cachil. All photos by C Jonathan Schmitt.

were counted by sight and sound using binoculars and a Sony PCM-D50 recorder with Sennheiser ME-66 microphone, an Olympus VN-3100 recorder with internal microphone, and a Sony TCM 5000 recorder with a Sennheiser ME-66 microphone. All efforts were made to avoid double-counting individual birds and observers attempted to survey the area as systematically as possible. The total number of individuals mist-netted and detected on surveys during 6–26 July 2010 are provided as an index of relative abundance (Appendix 1). For poorly known species and species of special interest, we also recorded natural history observations when possible. Taxonomy and nomenclature follow the South American Checklist Committee[14]. Finally, copies of all sound-recordings made in the Cachil Valley by CJS are archived on xeno-canto.org.

Results

A total of 92 species of birds was recorded during the ten trips to the Cachil Valley, spanning a 16-year period. Sixty-five of these were documented with specimens, and an additional 13 with either a photograph or a sound-recording. The remaining 14 species were not documented (Appendix 1). During our netting effort on 8–25 July 2010, we logged 2,544 total mist-net hours. These comprised 720 hours in humid *Podocarpus* forest and 1,824 hours in semi-humid scrub and forest. Twelve species were detected only in humid *Podocarpus* forest. An additional 42 species were found only in semi-humid montane scrub, forest and scrubby field edges on the west slope of the Cachil Valley. The remaining 38 species were detected throughout the Cachil Valley in all habitats (Appendix 1). We documented five species endemic to Peru (Unicoloured Tapaculo *Scytalpus unicolor*, Koepcke's Screech Owl *Megascops koepckeae*, Piura Chat-Tyrant *Ochthoeca piurae*, Rusty-crowned Tit-Spinetail *Leptasthenura pileata* and Black-necked Woodpecker *Colaptes atricollis*) and at least two endemic subspecies (Rusty-crowned Tit-Spinetail *Leptasthenura pileata cajabambae* and Rainbow Starfrontlet *Coeligena iris eva*).

We recorded range extensions for seven humid montane forest species that are typically found further north on the west slope of the Andes. Southward range extensions for three of these species, White-rumped Hawk *Parabuteo leucorrhous*, Rufous-banded Owl *Ciccaba albitarsis* and Scaled Antpitta *Grallaria guatimalensis*, were c.100 km[17], while range extensions for the remaining four species, Mountain Velvetbreast *Lafresnaya lafresnayi*, Chestnut-crowned Antpitta *Grallaria ruficapilla*, Tawny-rumped Tyrannulet *Phyllomyias uropygialis* and Grey-browed Brush Finch *Arremon assimilis*, were c.30 km south of the west Andean portion of their known ranges[17]. In addition, the discovery of *Scytalopus unicolor* represents the first well-documented record for the Pacific slope of the west Andes and a c.80–90 km range extension north-west. We found Fasciated Wren *Campylorhynchus fasciatus* and Slaty-backed Nightingale-Thrush *Catharus fuscater* c.1,000 m higher in elevation than reported previously for the west slope in Peru[17]. Similarly, we found Mouse-coloured Tyrannulet *Phaeomyias murina* c.500 m higher than reported previously for the west slope in Peru[17].

Species accounts

Koepcke's Screech Owl *Megascops koepckeae*

We detected this poorly known species in humid *Podocarpus* forest, semi-humid forest, and 1–2 m-tall semi-humid scrub with *Eucalyptus* trees. In response to playback on 25 July 2010, a presumed male gave a 2.5–3.0-second series of c.18 rapid hoots with a mean pace of one series every nine seconds for >6 minutes (XC75957). Only arthropod remains comprising insects (Coleoptera), large spiders and millipedes were identified in stomach contents of four specimens.

Scaled Antpitta *Grallaria guatimalensis*

Our observation of *G. guatimalensis* suggests it is rare or extremely difficult to detect in humid *Podocarpus* forest of the Cachil Valley. On 23 January 2010, song by one individual was recorded by JTC at 2,500 m in the interior of humid *Podocarpus* forest just above the entrance road on a cloudy day with rain. JTC did not detect this species during visits on 6–8 December 2009 and 19–21 August 2010, and it was not detected on 4–11 May 1997 and 6–26 July 2010. Nevertheless, JTC's recording documents a range extension of c.100 km south and an upslope extension of 750 m[17].

Unicoloured Tapaculo *Scytalopus unicolor*

This poorly known, narrowly distributed species[17] was only recently elevated to species status based on vocal evidence[6]. We found it in the Cachil Valley at 2,400–2,950 m. *S. unicolor* is known from similar elevations in the Marañón drainage of La Libertad[16,17], and has been reported from the Pacific slope of the west Andes in southern Cajamarca[10,24]. However, previous reports from the Pacific slope did not address vocalisations, raising the possibility of confusion with the near-identical Blackish Tapaculo *S. latrans subcinereus* which also occurs in southern Cajamarca at similar elevations[6,17]. The presence of *S. unicolor* in the Cachil Valley represents a range extension to the north-west of c.80 km and 90 km respectively from the Cajabamba and Huamachuco localities[16].

We detected most individuals in *Chusquea scandens* or dense undergrowth within humid *Podocarpus* forest and semi-humid scrub. Individuals usually foraged in pairs <1 m above ground and behaved like other *Scytalopus*[17]. Body mass, an important character for identification of *Scytalopus*[11], is unlikely to have been recorded previously for this species (N. K. Krabbe pers. comm.). We found that females averaged 14.88 g (13.90–16.47 g, S.D.= 1.04 g, *N*=5) and males averaged 16.39 g (16.18–16.60 g, S.D.= 0.30, *N*=2).

Vocalisations recorded in the Cachil Valley were similar to descriptions in the literature[6,17] and were confirmed as *S. unicolor* by N. K. Krabbe, T. S. Schulenberg & D. F. Lane (pers. comm.). Songs consisted of multiple accelerating notes, each descending and becoming shorter during the phrase. The first overtone of each note was clearly louder than the fundamental overtone as described elsewhere[6] (XC75847). Although we did occasionally hear song (especially in response to playback) that consisted of continually repeated phrases of 3–6 notes as previously described[6,17], we noted that most song, and particularly natural song, was given in an accelerating counting rhythm. Counting songs began with c.0.1-second phrases comprising one note and rhythmically accelerated to 5–12 notes per phrase in a 1,2,2,3,3,3,…6,6,6,6,6,6…, or similar pattern (XC75844). As the number of notes per phrase increased, the phrases also grew to 0.4–0.65 seconds. In longer songs, the initial part accelerated rhythmically until reaching a steady pace of continually repeated series' of 3–6 notes.

Mouse-coloured Tyrannulet *Phaeomyias murina tumbezana*

We mist-netted one at 2,550 m in semi-humid scrub on the west slope of the Cachil Valley. The specimen (MSB 35328) was identified as *P. m. tumbezana* based on comparison with four specimens (MSB 34711, 34719, 34751, 34754) of *P. m. inflava* collected near Virú, La Libertad. Compared to the *inflava* specimens, the individual from the Cachil Valley had greyer upperparts, chin, upper breast and head-sides. The wingbars were more buffy and pronounced in the Cachil specimen than the *P. m. inflava*. Additionally, the Cachil

Valley specimen had a yellow wash to the lower belly, which was absent in the *P. m. inflava* (Fig. 2B). These differences are consistent with plates[17], and a detailed description[2]. The presence of this subspecies in the Cachil Valley was unexpected as it is currently known from further north in Tumbes and northern Piura, and it was previously not known above 2,000 m[17]. Its presence in the Cachil Valley suggests that *tumbezana* occurs further south than previously known, where it may occupy semi-humid scrub at higher elevations than *inflava*.

Piura Chat-Tyrant *Ochthoeca piurae*
We mist-netted, observed, photographed and sound-recorded endemic *O. piurae* in semi-humid forest on the west slope of the Cachil Valley. The semi-humid forest consisted of tall dense shrubbery, various trees as tall as 4 m, scattered columnar cacti and abundant *Tillandsia* sp. bromeliads. Interestingly, in these areas *O. piurae* and White-browed Chat-Tyrant *O. leucophrys* were syntopic. The presence of *O. piurae* in the Cachil Valley is significant as this species is known from relatively few localities[7,17] and is perhaps more widespread than previously thought.

Black-eared Hemispingus *Hemispingus melanotis*
We detected this species throughout the Cachil Valley. We were unable to identify individuals to subspecies; they represent either *piurae* or *macrophrys*, each narrowly endemic to the west slope of the Andes in north-west Peru. Specimens from the Cachil Valley had solid black crowns, broad white supercilia and grey nape bands typical of *H. m. piurae* and *H. m. macrophrys* (Fig. 2A). These characters differ from the solid grey crown and slight or absent supercilium of *H. m. melanotis* of the east slope north of the Marañón and *H. m. berlepschi* of the east slope south of the Marañón[17]. *H. m. piurae* occurs in north-west Peru as far south as Chugur and Nancho, Cajamarca[25] while *H. m. macrophrys* is known from the type locality at Sunchubamba in southernmost Cajamarca[10]. The Cachil Valley lies roughly equidistant between these localities, and within the Chicama watershed, where the type locality for *H. m. macrophrys* is located. *H. m. piurae* is described as having a narrow grey nape band between the head and mantle[5], while *H. m. macrophrys* has a conspicuous nape band formed by a broad grey nape and grey neck-sides[10]. Individuals from the Cachil Valley had grey nape bands, but without comparative material of *piurae* and *macrophrys*, we hesitate to identify them to subspecies.

Discussion
As a result of its proximity to the Tumbesian dry forests, humid forests of north-west Peru and the high Peruvian Andes, the Cachil Valley supports a unique avifauna with overlap between species typical of the Tumbesian, Southern Central Andes, and Peruvian High Andes Endemic Bird Areas (EBAs). For example, *O. piurae*, Bay-crowned Brush Finch *Atlapetes seebohmi* and Three-banded Warbler *Basileuterus trifasciatus* are typical of the Tumbesian EBA, *Coeligena iris* and Purple-throated Sunangel *Heliangelus viola* are typical of the Southern Central Andes EBA[4], and *Leptasthenura pileata* is typical of the Peruvian High Andes EBA[18]. Additionally, the presence of the Peruvian endemics *Megascops koepckeae*, *Scytalopus unicolor* and *Colaptes atricollis* add to the uniqueness of the area's avifauna and emphasise its importance for conservation. The overall diversity of 92 species in the Cachil appears slightly lower than other valleys in the western Andes of north-west Peru[1,2]. Specifically, 103 species were reported from the Important Bird Area (IBA) Alto Valle del Saña[1], which lies in the upper Saña and Chancay valleys c.70 km north-west of the Cachil Valley. One hundred and eighty-seven species have been reported from Laquipampa Wildlife Refuge (LWR) in the upper La Leche Valley c.140 km north-west of the Cachil Valley[2]. The differences in overall diversity are entirely attributable to the small survey area at Cachil and the correspondingly narrow range of elevations and habitats.

We suggest that more field work be conducted in the Cachil Valley above and below the 2,400–2,700 m core elevational range of the surveys reported here. Additionally, efforts to systematically survey other relict patches of humid or semi-humid forest in south-west Cajamarca and adjacent La Libertad will be essential to elucidate the conservation status of bird populations in the region. Based on the survey presented here, the uniqueness, isolation and apparent vulnerability of the avifauna at Bosque Cachil may warrant its recognition as part of a regional conservation area for birds.

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Appendix 1. Ninety-two bird species detected in the Cachil Valley. Relative abundance is presented as two categories: mist-netting and surveys. The former is a measure of the total number of individuals captured on 6–26 July 2010, and the second the number of individuals detected per day during surveys on 6–26 July 2010 (* = the species was only detected on visits other than 6–26 July 2010). Habitat type where the majority of individuals of each species were reported is abbreviated as P: humid *Podocarpus* forest; S: semi-humid scrub and forest; and B: throughout the Cachil Valley in both humid *Podocarpus* forest and semi-humid scrub and forest. Documentation: SP: specimen; P: photograph; R: sound-recording; and V: seen or heard only. Species also reported from the Important Bird Area Alto Valle del Saña (AVS)[1] and Laquipampa Wildlife Refuge (LWR)[2] are indicated with an X.

		Relative abundance					
		Mist-netting	Surveys	Habitat	Documentation	AVS	LWR
TINAMIDAE							
Andean Tinamou	*Nothoprocta pentlandii*	3	3	S	SP		X
CATHARTIDAE							
Turkey Vulture	*Cathartes aura*	0	5	B	V	X	X
ACCIPITRIDAE							
Sharp-shinned Hawk	*Accipiter striatus*	*	*	B	P,V		X
Roadside Hawk	*Rupornis magnirostris*	0	1	B	R,V	X	
Harris's Hawk	*Parabuteo unicinctus*	*	*	B	P,V	X	X
White-rumped Hawk	*Parabuteo leucorrhous*	0	4	P	P,R,V		X
Variable Hawk	*Geranoaetus polyosoma*	0	10	B	P,V	X	X
Black-chested Buzzard-Eagle	*Geranoaetus melanoleucus*	0	1	B	V		X
COLUMBIDAE							
Croaking Ground Dove	*Columbina cruziana*	*	*	S	V		X
Band-tailed Pigeon	*Patagioenas fasciata*	2	70	B	SP,R,V	X	
Eared Dove	*Zenaida auriculata*	0	19	S	R,V	X	
White-tipped Dove	*Leptotila verreauxi decolor*	3	21	S	SP,R,V	X	X
CUCULIDAE							
Groove-billed Ani	*Crotophaga sulcirostris*	*	*	S	V	X	X
STRIGIDAE							
Koepcke's Screech Owl	*Megascops koepckeae*	4	20	B	SP,R,V		X
Rufous-banded Owl	*Ciccaba albitarsis*	0	3	P	R,V	X	
Peruvian Pygmy Owl	*Glaucidium peruanum*	1	1	B	SP		X
CAPRIMULGIDAE							
Band-winged Nightjar	*Caprimulgus longirostris atripunctatus*	0	10	S	SP,R,V		
APODIDAE							
Chestnut-collard Swift	*Streptoprocne rutila*	0	55	B	V		
White-collared Swift	*Streptoprocne zonaris*	0	450	B	V	X	X
TROCHILIDAE							
Sparkling Violetear	*Colibri coruscans*	51	108	S	SP,P,R,V	X	X
Purple-throated Sunangel	*Heliangelus viola*	17	28	B	SP,R,V	X	
Speckled Hummingbird	*Adelomyia melanogenys maculata*	58	75	B	SP,P,R,V	X	X
Green-tailed Trainbearer	*Lesbia nuna*	14	20	S	SP,V	X	X
Shining Sunbeam	*Aglaeactis cupripennis*	11	34	S	SP,P,V	X	

		Relative abundance					
		Mist-netting	Surveys	Habitat	Documentation	AVS	LWR
Rainbow Starfrontlet	*Coeligena iris eva*	43	62	B	SP,P,V	X	X
Mountain Velvetbreast	*Lafresnaya lafresnayi*	3	14	B	SP,V		
Giant Hummingbird	*Patagona gigas*	0	1	S	V		
Purple-collared Woodstar	*Myrtis fanny*	0	2	S	R,V		
White-bellied Woodstar	*Chaetocercus mulsant*	5	10	S	SP,V	X	
Amazilia Hummingbird	*Amazilia amazilia leucophoea*	1	2	S	SP,V		X
PICIDAE							
Smoky-brown Woodpecker	*Picoides fumigatus*	6	13	P	SP,R,V	X	X
Black-necked Woodpecker	*Colaptes atricollis*	3	5	S	SP,R,V		
FALCONIDAE							
American Kestrel	*Falco sparverius*	0	2	B	V	X	X
Peregrine Falcon	*Falco peregrinus*	0	4	B	V		X
PSITTACIDAE							
Scarlet-fronted Parakeet	*Aratinga wagleri*	0	22	B	V		
Pacific Parrotlet	*Forpus coelestis*	0	2	S	V		X
Andean Parakeet	*Bolborhynchus orbygnesius*	8	313	S	SP,R,V		
GRALLARIIDAE							
Scaled Antpitta	*Grallaria guatimalensis*	*	*	P	R		X
Chestnut-crowned Antpitta	*Grallaria ruficapilla*	5	45	B	SP,R,V	X	X
RHINOCRYPTIDAE							
Unicoloured Tapaculo	*Scytalopus unicolor*	7	138	B	SP,R,V	X	X
FURNARIIDAE							
Rusty-crowned Tit-Spinetail	*Leptasthenura pileata cajabambae*	8	8	S	SP		
Line-cheeked Spinetail	*Cranioleuca antisiensis*	2	135	B	SP,R,V	X	X
Azara's Spinetail	*Synallaxis azarae elegantior*	5	19	S	SP,R,V	X	X
TYRANNIDAE							
Tawny-rumped Tyrannulet	*Phyllomyias uropygialis*	1	2	B	SP		
White-crested Elaenia	*Elaenia albiceps*	14	21	B	SP,P,R,V	X	
Southern Beardless Tyrannulet	*Camptostoma obsoletum*	0	10	S	SP,R,V	X	X
White-banded Tyrannulet	*Mecocerculus stictopterus*	17	185	P	SP,R,V	X	
White-throated Tyrannulet	*Mecocerculus leucophrys brunneomarginatus*	4	4	P	SP,V	X	
Black-crested Tit-Tyrant	*Anairetes nigrocristatus*	1	4	S	SP,R,V		
Yellow-billed Tit-Tyrant	*Anairetes flavirostris*	5	7	S	SP,V		
Mouse-coloured Tyrannulet	*Phaeomyias murina tumbezana*	1	1	S	SP		X
Tawny-crowned Pygmy Tyrant	*Euscarthmus meloryphus fulviceps*	0	7	S	R,V		X
Tropical Pewee	*Contopus cinereus*	3	4	S	SP,R	X	X
Streak-throated Bush Tyrant	*Myiotheretes striaticollis*	2	7	S	SP,V	X	X
Jelski's Chat-Tyrant	*Ochthoeca jelskii*	10	23	B	SP,P,V	X	
Piura Chat-Tyrant	*Ochthoeca piurae*	3	8	S	SP,P,R,V		X
White-browed Chat-Tyrant	*Ochthoeca leucophrys*	1	1	S	SP		
Dusky-capped Flycatcher	*Myiarchus tuberculifer*	5	29	B	SP,R,V	X	X
COTINGIDAE							
Red-crested Cotinga	*Ampelion rubrocristatus*	13	27	B	SP,P,R,V	X	
VIREONIDAE							
Rufous-browed Peppershrike	*Cyclarhis gujanensis virenticeps*	9	86	B	SP,P,R,V	X	X
HIRUNDINIDAE							
Blue-and-white Swallow	*Pygochelidon cyanoleuca cyanoleuca*	5	235	B	SP,V	X	X
Brown-bellied Swallow	*Orochelidon murina murina*	0	75	B	R,V		
TROGLODYTIDAE							
House Wren	*Troglodytes aedon*	5	12	S	SP,R,V	X	X
Fasciated Wren	*Campylorhynchus fasciatus*	5	22	S	SP,R,V		X

		Relative abundance					
		Mist-netting	Surveys	Habitat	Documentation	AVS	LWR
CINCLIDAE							
White-capped Dipper	*Cinclus leucocephalus leucocephalus*	1	1	P	SP		
TURDIDAE							
Swainson's Thrush	*Catharus ustulatus*	*	*	P	P		
Slaty-backed Nightingale-Thrush	*Catharus fuscater*	6	108	P	SP,P,R,V	X	X
Great Thrush	*Turdus fuscater*	3	25	B	R,V	X	X
Chiguanco Thrush	*Turdus chiguanco*	1	54	B	SP,R,V		
THRAUPIDAE							
Black-eared Hemispingus	*Hemispingus melanotis*	31	199	B	SP,R,V	X	
Rufous-chested Tanager	*Thlypopsis ornata*	8	18	S	SP,P,V		X
Blue-and-yellow Tanager	*Thraupis bonariensis*	6	10	B	SP,V		
Fawn-breasted Tanager	*Pipraeidea melanonota*	0	1	B	V		X
Blue-and-black Tanager	*Tangara vassorii vassorii*	23	101	B	SP,P,R,V	X	
Cinereous Conebill	*Conirostrum cinereum littorale*	10	15	S	SP,V	X	
Rusty Flowerpiercer	*Diglossa sittoides*	3	7	S	SP,V		X
Plushcap	*Catamblyrhynchus diadema*	2	12	P	SP,P,R,V		
Blue-black Grassquit	*Volatina jacarina*	0	12	S	V		X
Black-and-white Seedeater	*Sporophila luctuosa*	0	6	S	V		
Band-tailed Seedeater	*Catamenia analis*	9	17	S	SP,V		
INCERTAE SEDIS							
Golden-billed Saltator	*Saltator aurantiirostris*	2	8	S	SP,R,V	X	X
EMBERIZIDAE							
Rufous-collared Sparrow	*Zonotrichia capensis*	32	67	S	SP,P,R,V	X	X
Grey-browed Brush Finch	*Arremon assimilis*	3	12	P	SP,R,V	X	X
Yellow-breasted Brush Finch	*Atlapetes latinuchus baroni*	9	26	S	SP,P,R,V	X	
Bay-crowned Brush Finch	*Atlapetes seebohmi*	14	31	S	SP,R,V		
CARDINALIDAE							
Hepatic Tanager	*Piranga flava*	3	5	B	SP,R,V	X	X
Golden-bellied Grosbeak	*Pheucticus chrysogaster*	6	30	S	SP,R,V	X	X
PARULIDAE							
Slate-throated Redstart	*Myioborus miniatus*	10	0	P	SP,R,V		X
Black-crested Warbler	*Basileuterus nigrocristatus*	13	92	B	SP,P,R,V		X
Three-banded Warbler	*Basileuterus trifasciatus*	5	38	B	SP,R,V	X	
ICTERIDAE							
Scrub Blackbird	*Dives warszewiczi*	2	13	S	SP,R,V		X
FRINGILLIDAE							
Hooded Siskin	*Sporagra magellanica*	16	40	S	SP,R,V	X	X

Noteworthy bird records from the northern Cerros del Sira, Peru

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Los cerros del Sira, una cadena montañosa aislada en el centro del Perú, abrigan una avifauna distintiva pero poco estudiada. En julio y agosto del 2010, una expedición ornitológica visitó las montañas y registró varias aves interesantes. Entre ellas, *Scytalopus parvirostris*, *Contopus nigrescens* y *Myiotheretes fumigatus* no habían sido reportadas antes en esta localidad. Ocho especies más han sido reportadas previamente en el extremo sur de las montañas, pero nunca en la parte norte, la cual queda separada de la parte sur por un filo que baja a 1.000 msnm. Algunas otras especies, incluyendo *Pauxi koepckeae*, *Cichlopsis leucogenys* y *Tangara phillipsi*, son de interés especial por su rareza, sus distribuciones limitadas o las elevaciones extremas en que fueron registradas.

A number of rare, poorly known and range-restricted bird species occur in the isolated foothills near the east slope of the Peruvian Andes, a region designated as an Endemic Bird Area by BirdLife International[9]. The Cerros del Sira of central Peru, separated from the main Andean chain by the río Pachitea and a broad swath of lowlands, harbour several of these birds, including at least three taxa endemic to the Sira[5,8,13] and numerous species largely confined to outlying Andean satellites. The potential for novel ornithological discoveries on the Cerros del Sira was highlighted by the recent finding of a new *Capito* barbet in the south of the range[8].

The Sira are also distinctive for the unique assemblage of Andean species that occupies their upper slopes. The range's isolation produces a pronounced 'island effect' near its peaks, with a substantial species deficit compared to similar elevations in the main Andean chain. This situation motivated the earliest ornithological expeditions to the Sira, which provided a test of the mechanisms governing the altitudinal distributions of Andean birds[11,12]. These early surveys resulted in the discovery of the endemic taxa *Pauxi koepckeae* and *Tangara phillipsi* as well as the first published bird list for the mountain range[12].

Since Terborgh and Weske's initial expeditions in 1969–72, few ornithologists have visited the Sira and its unique bird community remains poorly known. Expeditions in 2001 and 2008 furnished valuable data concerning the bird assemblages of the Sira and the status of range-restricted taxa, but the 2001 expedition did not reach elevations above 1,600 m[7], while that in 2008 visited the southernmost extension of the range, separated from the northern massif by a long ridge with saddles as low as 1,000 m[6]. Additional surveys during the last two decades were confined to lowland elevations[4] or focused on studying a single target species[3].

In 2010, we revisited Terborgh & Weske's 1969 transect to examine the avifauna of the montane portions of the northern Cerros del Sira, up to 2,220 m. Elsewhere, we have reported on the elevational range shifts of bird taxa relative to Terborgh & Weske's baseline[2]. Here, we present details of noteworthy bird records resulting from our expedition.

Methods

Birds were surveyed along Terborgh and Weske's original altitudinal transect on the western flank of the Cerros del Sira near the town of Yuyapichis. This transect was described in detail by Terborgh & Weske[12] and Forero-Medina *et al.*[2]. We mist-netted birds in the vicinity of five camps, located at c.690 m, 1,310 m, 1,570 m, 1,970 m and 2,220 m, respectively (Table 1). We briefly mist-netted at an additional camp near 1,750 m. All elevations were determined by GPS.

To supplement mist-netting effort, we recorded birds opportunistically by sight or sound along the entire transect. The transect was confined to a narrow ridgeline from 690 m to 2,220 m, the highest point surveyed. Where possible, we descended from the ridge along collateral ridges or the steep slopes towards streams. When possible, noteworthy birds

Table 1. Elevations and locations of mist-netting localities, and survey effort.

Elevation	Coordinates (WGS 84)	Days
690 m	09°28'48"S 74°46'59"W	5
1,310 m	09°25'55"S 74°44'56"W	5
1,570 m	09°25'30"S 74°44'02"W	5
1,750 m	09°25'12"S 74°43'48"W	2
1,970 m	09°25'23"S 74°43'12"W	4.5
2,220 m	09°25'26"S 74°42'50"W	4.5

Table 2. Montane* species not previously recorded in the northern Cerros del Sira.

* This list does not include species that presumably occur in the lowlands surrounding the Sira, even if we obtained the first record from the Sira proper.

Evidence:
P Mist-netted (photo)
V Sound-recorded
S Sight or aural record without documentation

Scientific name	English name	Elevations and dates	Evidence
Patagioenas fasciata	Band-tailed Pigeon	2,150 m, 11 August	V
Ciccaba albitarsis	Rufous-banded Owl	1,970 m, 9 August	V
Pulsatrix melanota	Band-bellied Owl	750 m, multiple dates; sound-recorded 21 July	V
Colibri coruscans	Sparkling Violetear	2,220 m, 17 August	P
Phlogophilus harterti	Peruvian Piedtail	1,000 m, date unknown; 1,310 m, 24 July	P
Momotus aequatorialis	Andean Motmot	1,570 m, 1 August	P
Scytalopus parvirostris	Trilling Tapaculo	2,150 m, 15 August	V
Elaenia albiceps	White-crested Elaenia	690 m, 22 July	P
Hirundinea ferruginea	Cliff Flycatcher	400 m, 21 July	S
Contopus nigrescens	Blackish Pewee	390 m, 21 July	S
Myiotheretes fumigatus	Smoky Bush Tyrant	1,970–2,050 m, 10–11 August	V
Myiodynastes chrysocephalus	Golden-crowned Flycatcher	1,950 m, 10 August	V
Piranga flava	Hepatic Tanager	2,220 m, 16 August	P
Cacicus uropygialis	Scarlet-rumped Cacique	1,970 m, 11 August	S

were sound-recorded using a Sennheiser ME-66 shotgun microphone and Tascam DR-07 digital recorder. Recordings are deposited in the online xeno-canto sound library (www.xeno-canto.org).

Avifauna

We recorded 214 bird species at ≥690 m and an additional 13 bird species exclusively below 690 m, but we invested little effort in the latter region. We recorded a total of 31 species not detected by Terborgh & Weske[12] or Mee *et al*.[7], 21 of these at elevations at ≥690 m. A single descent from our transect to the río Negro, a stream emptying into the río Yuyapichis, produced most of the novel records below 690 m. Among those species previously known from above 800 m on the northern Cerros del Sira, we documented elevational range extensions of at least 100 vertical metres (either upwards, downwards, or both) for 64 species. Appendix 1 presents max. / min. elevations for all species we recorded and a fully updated elevational checklist compiled from all expeditions to the northern Cerros del Sira.

Species accounts

Sira Curassow *Pauxi koepckeae*

This taxon, endemic to the Cerros del Sira, was recently split from Horned Curassow *P. unicornis* as a valid species[3]. The expedition encountered up to four separate individuals on multiple occasions, with records as low as 1,350 m and as high as 1,686 m. Sound-recordings were obtained and are deposited at xeno-canto. Two individuals had brown plumage similar to the 'barred morph' reported for other *Pauxi* curassows. Our record at 1,686 m is the highest elevation ever reported for this taxon, and extends the known range well into the cloud-forest zone. Habitat at this elevation was characterised by canopy heights of <10 m, a preponderance of mosses and a significant but patchy element of *Chusquea* bamboo.

Lined Forest Falcon *Micrastur gilvicollis*

This lowland species was trapped in a mist-net on 1 August at 1,570 m, an extraordinarily high elevation for the species in Peru, and far higher than it had previously been recorded in the Sira. It was carrying a short-tailed opossum *Monodelphis* sp. when captured.

Rio Suno Antwren *Myrmotherula sunensis yessupi*

This species' Peruvian range is oddly restricted. The poorly known endemic subspecies *yessupi* has been recorded only in lowland forests near the base of the Andes at a few locations in central Peru. Terborgh & Weske recorded it from the lowlands at the base of their transect (unpubl. data), but the taxon was unrecorded by Mee *et al*.[7] and Harvey *et al*.[6]. We encountered a male at c.450 m on 18 August as we exited our transect. The bird was associated with a mixed-species flock in *terra firme* forest with a relatively open understorey. We know of no additional records of *yessupi* other than the

type series[1], the records of Terborgh & Weske and a disjunct record from Brazil presumably referable to this subspecies[10].

Scytalopus tapaculos

The taxonomic status of *Scytalopus* tapaculos on the Sira is not well resolved. Terborgh & Weske[12] reported only White-crowned Tapaculo *S. atratus*, but their records pre-date the splitting of Rufous-vented Tapaculo *S. femoralis* from *S. atratus*. Mee *et al.*[7] reported only *S. femoralis*, but at elevations more characteristic of *atratus*. Harvey *et al.*[6] reported birds with vocal characters of both *S. atratus* and *S. femoralis* from the southern Cerros del Sira. These species replace one another elevationally, with *atratus*-like birds below 1,600 m and *femoralis*-like birds above 1,700 m. We sound-recorded *Scytalopus* songs consistent with *S. atratus*, *S. femoralis* and Trilling Tapaculo *S. parvirostris*. We found *S. atratus* at the lowest elevations (1,310–1,570 m) on multiple days with a sound-recording from 28 July, *S. femoralis* at intermediate elevations (1,570–1,750 m) on several days with a sound-recording from 16 August, and *S. parvirostris* at the highest elevations (2,150 m) with a sound-recording on 15 August. This is the first record of *S. parvirostris* from the Cerros del Sira.

Blackish Pewee *Contopus nigrescens*

This rare species is known in Peru only from a few isolated sites on outlying ridges, mostly in the north of the country. We observed one at 390 m on 21 July along the río Negro, a tributary of the río Yuyapichis. It was observed flycatching from an arboreal perch beside a clearing associated with the río Negro's narrow floodplain. Although we are certain of our identification, this first record for the Sira should be considered provisional given the lack of documentation.

Smoky Bush Tyrant *Myiotheretes fumigatus*

Not previously recorded from the Cerros del Sira. We detected it twice, at 1,970 m on 10 August and at 2,050 m on 11 August. We obtained sound-recordings on 10 August.

Rufous-brown Solitaire *Cichlopsis leucogenys*

This poorly known species' Peruvian range is restricted to a few isolated ranges. It was encountered in the Sira by Terborgh & Weske (unpubl. data) and Mee *et al.*[7]. We found the species on multiple occasions at two widely separated elevations. At 690 m, records included a mist-netted adult on 16 July and sightings of an apparent family party with two juveniles. Another was netted at 1,570 m on 31 July. These records represent downward and upward elevational range extensions for the species in Peru.

Sira Tanager *Tangara phillipsi*

Endemic to the Sira. Graves & Weske[5] noted the elevational range as 1,300–1,570 m. Mee *et al.*[7] observed the taxon at 1,350–1,450 m, where it was a common member of mixed-species flocks. Harvey *et al.*[6] found the tanager at considerably higher elevations, at 1,600–2,200 m. We recorded the taxon on numerous occasions at elevations of 1,310–2,220 m. The tanager was a common participant in mixed-species flocks at 1,350–1,400 m, becoming increasingly rare up to 1,570 m. Our observations above this elevation consisted of a pair with a mixed-species flock at 1,700 m on 16 August and a single female-plumaged bird mist-netted at 2,220 m (the highest point of our transect) on 14 August.

Additional noteworthy species

In addition to the species detailed above, we recorded 11 montane species new for the northern Cerros del Sira but already found by Harvey *et al.*[6] in the southern Cerros del Sira in 2008 (Table 2). We also documented the presence of numerous additional range-restricted or rare species. Among the noteworthy taxa highlighted by Mee *et al.*[7], we failed to find only Fiery-throated Fruiteater *Pipreola chlorolepidota*. We encountered many species outside their previously reported elevational ranges in the northern Cerros del Sira. An updated elevational checklist for the northern Cerros del Sira is presented as Appendix 1. For an elevational checklist of the birds of the southern Cerros del Sira, consult Harvey *et al.*[6].

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Appendix 1. Updated elevational checklist for the avifauna of the northern Cerros del Sira.

Elevational Range Elevational range for the present expedition is given as the min. / max. elevations at which we recorded a taxon. Elevational ranges in **bold** represent extensions of at least 100 vertical metres from previous known range on the northern Cerros del Sira. Elevational range for all expeditions is given as the min. / max. elevations compiled from the present expedition and the observations published in Graves & Weske[5], Mee *et al.*[7], Terborgh & Weske[12] and Weske & Terborgh[13]. A few unpublished observations from Terborgh & Weske's effort are also included. Terborgh & Weske[12] included only species shared between the Cerros del Sira and the Cordillera Vilcabamba in their checklist. Their additional records from Sira are largely unpublished (some were incorporated in Mee *et al.*[7]) and their specimens are at the American Museum of Natural History, New York.

Abbreviations used. L = lowlands at or below 350 m; **(F)** = observed only as a flyover at this elevation; **E** = extreme or abnormal elevation, apparently outside normal range.

Evidence Applies only when an elevational range is given for the present expedition:
P Mist-netted (photograph)
V Sound-recorded
(blank) sight or sound record without documentation

		Elevational range (m)		
Scientific name	**English name**	**Present expedition**	**All expeditions**	**Evidence**
TINAMIDAE				
Tinamus tao	Grey Tinamou	**690**	690–1,500	
Tinamus major	Great Tinamou		L–690	
Crypturellus cinereus	Cinereous Tinamou		200–400	
Crypturellus soui	Little Tinamou	690–822	L–900	
Crypturellus obsoletus	Brown Tinamou	1,350–1,575	1,350–1,575	
Crypturellus variegatus	Variegated Tinamou		950	
CRACIDAE				
Chamapetes goudotii	Sickle-winged Guan	1,550–**1,700**	1,450–1,700	
Penelope jacquacu	Spix's Guan		L–1,130	
Ortalis guttata	Speckled Chachalaca		L–400	
Mitu tuberosum	Razor-billed Curassow		L–900	
Pauxi koepckeae	Sira Curassow	1,350–**1,686**	1,200–1,686	V

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
ODONTOPHORIDAE				
Odontophorus speciosus	Rufous-breasted Wood Quail	1,570	1,100–1,970	
Odontophorus stellatus	Starred Wood Quail		L	
ARDEIDAE				
Pilherodius pileatus	Capped Heron		L	
CATHARTIDAE				
Cathartes aura	Turkey Vulture		L–450	
Cathartes melambrotus	Greater Yellow-headed Vulture	690 (F)	L–900	
Coragyps atratus	Black Vulture		L–450	
Sarcoramphus papa	King Vulture		L–1,570	
ACCIPITRIDAE				
Elanoides forficatus	Swallow-tailed Kite	690 (F)–2,220 (F)	L–2,220 (F)	
Harpagus bidentatus	Double-toothed Kite		L	
Ictinia plumbea	Plumbeous Kite		L–690	
Accipiter striatus	Sharp-shinned Hawk		1,310–2,220	
Harpyhaliaetus solitarius	Solitary Eagle	1,970–**2,100**	1,050–2,100	
Rupornis magnirostris	Roadside Hawk		L–450	
Pseudastur albicollis	White Hawk	690–1,350	L–1,450	
Leucopternis kuhli	White-browed Hawk		L	
Buteo brachyurus	Short-tailed Hawk	**2,220 (F)**	2,220 (F)	
Spizaetus tyrannus	Black Hawk-Eagle	**1,970 (F)**	L–1,970 (F)	
Spizaetus melanoleucos	Black-and-white Hawk-Eagle		L–2,220	
Spizaetus ornatus	Ornate Hawk-Eagle	1,000–**1,310**	1,000–1,310	
EURYPYGIDAE				
Heliornis fulica	Sungrebe		L	
CHARADRIIDAE				
Vanellus cayanus	Pied Lapwing		L	
SCOLOPACIDAE				
Actitis macularius	Spotted Sandpiper		L	
COLUMBIDAE				
Patagioenas speciosa	Scaled Pigeon	1,350	L–1,400	
Patagioenas fasciata	Band-tailed Pigeon	**2,150**	2,150	V
Patagioenas plumbea	Plumbeous Pigeon	690–1,570	L–1,570	V
Patagioenas subvinacea	Ruddy Pigeon	1,310–**1,970**	L–1,970	
Leptotila rufaxilla	Grey-fronted Dove		L–400	
Geotrygon frenata	White-throated Quail-Dove	1,350	1,150–2,220	
Geotrygon montana	Ruddy Quail-Dove	690	L–1,450	
CUCULIDAE				
Piaya cayana	Squirrel Cuckoo	460–1,570	L–2,220	
Piaya melanogaster	Black-bellied Cuckoo	**690**	690	
Crotophaga ani	Smooth-billed Ani		L–400	
STRIGIDAE				
Megascops choliba	Tropical Screech Owl		1,450–1,500	
Megascops ingens	Rufescent Screech Owl	1,570	1,450–2,220	
Megascops watsonii	Tawny-bellied Screech Owl		L–750	
Megascops guatemalae	Vermiculated Sceech Owl	1,350	900–1,350	
Lophostrix cristata	Crested Owl	**450**	450	
Pulsatrix perspicillata	Spectacled Owl		L–1,130	
Pulsatrix melanota	Band-bellied Owl	**750**	750	V
Ciccaba virgata	Mottled Owl		L	
Ciccaba albitarsis	Rufous-banded Owl	**1,970–2,220**	1,970–2,220	V
Glaucidium parkeri	Subtropical Pygmy Owl	1,570	L–1,570	P
Glaucidium brasilianum	Ferruginous Pygmy Owl		L–690	

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
NYCTIBIIDAE				
Nyctibius grandis	Great Potoo	**450**	450	
Nyctibius aethereus	Long-tailed Potoo		750	
Nyctibius griseus	Common Potoo	1,350–**1,970**	L–1,970	V
CAPRIMULGIDAE				
Nyctiphrynus ocellatus	Ocellated Poorwill	900	900–1,130	
Uropsalis lyra	Lyre-tailed Nightjar		1,570	
APODIDAE				
Streptoprocne rutila	Chestnut-collared Swift	1,970 (F)–2,220 (F)	750–2,220 (F)	
Streptoprocne zonaris	White-collared Swift	1,750 (F)–2,220 (F)	L–2,220 (F)	
Chaetura egregia	Pale-rumped Swift		L–450	
Chaetura brachyura	Short-tailed Swift		L–450	
TROCHILIDAE				
Florisuga mellivora	White-necked Jacobin	690	L–1,450	P
Eutoxeres condamini	Buff-tailed Sicklebill	690–1,570	690–1,570	P
Threnetes leucurus	Pale-tailed Barbthroat	690–**1,570**	L–1,570	P
Phaethornis guy	Green Hermit	1,310	750–1,350	P
Phaethornis hispidus	White-bearded Hermit		750	
Phaethornis superciliosus	Long-tailed Hermit	690	L–1,130	P
Phaethornis koepckeae	Koepcke's Hermit	900	750–900	
Doryfera ludovicae	Green-fronted Lancebill	1,970–2,220	750–2,220	P
Doryfera johannae	Blue-fronted Lancebill	1,310–**1,570**	750–1,570	P
Schistes geoffroyi	Wedge-billed Hummingbird	1,570	1,130–2,220	P
Colibri delphinae	Brown Violetear		1,450	
Colibri thalassinus	Green Violetear		1,350–1,500	
Colibri coruscans	Sparkling Violetear	**2,220**	2,220	P
Heliothryx auritus	Black-eared Fairy		750–900	
Lophornis delattrei	Rufous-crested Coquette		750–900	
Phlogophilus harterti	Peruvian Piedtail	**1,000–1,310**	1,000–1,310	P
Adelomyia melanogenys	Speckled Hummingbird	1,310–2,220	1,100–2,220	P,V
Aglaiocercus kingi	Long-tailed Sylph	**1,250**–2,220	1,250–2,220	P
Haplophaedia assimilis	Buff-thighed Puffleg	1,350–**2,220**	1,310–2,220	P
Coeligena coeligena	Bronzy Inca	1,500–2,220	1,130–2,220	P
Ocreatus underwoodii	Booted Racket-tail	1,350–1,570	1,310–1,570	P
Heliodoxa branickii	Rufous-webbed Brilliant	1,310–1,570	900–1,570	P
Heliodoxa aurescens	Gould's Jewelfront		690–1,130	
Heliodoxa leadbeateri	Violet-fronted Brilliant	**1,000**–1,750	1,000–2,220	P
Chlorostilbon mellisugus	Blue-tailed Emerald	**1,690**	1,690	
Thalurania furcata	Fork-tailed Woodnymph	690–1,000	L–1,400	P
Chrysuronia oenone	Golden-tailed Sapphire		750	
TROGONIDAE				
Pharomachrus pavoninus	Pavonine Quetzal	**400**	400	
Pharomachrus auriceps	Golden-headed Quetzal		1,030–1,130	
Pharomachrus antisianus	Crested Quetzal		1,450	
Trogon melanurus	Black-tailed Trogon		L	
Trogon viridis	Green-backed Trogon	690	L–900	V
Trogon curucui	Blue-crowned Trogon	1,310–**1,570**	L–1,570	
Trogon collaris	Collared Trogon	1,310	L–2,220	P
Trogon personatus	Masked Trogon	**1,350**–2,220	1,350–2,220	P
ALCEDINIDAE				
Megaceryle torquata	Ringed Kingfisher		L–450	
Chloroceryle amazona	Green Kingfisher		L–500	
Chloroceryle americana	Amazon Kingfisher	**400**	400	
MOMOTIDAE				
Electron platyrhynchum	Broad-billed Motmot		500	

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
Baryphthengus martii	Rufous Motmot	690	690	
Momotus momota	Amazonian Motmot		L	
Momotus aequatorialis	Andean Motmot	**1,570**	1,570	P
BUCCONIDAE				
Notharchus hyperrhynchus	White-necked Puffbird		400	
Notharchus tectus	Pied Puffbird		750	
Nystalus striolatus	Striolated Puffbird	690–**1,350**	690–1,350	P
Malacoptila fusca	White-chested Puffbird		L–900	
Malacoptila fulvogularis	Black-streaked Puffbird	**1,570**	1,450–1,570	P
Nonnula ruficapilla	Rufous-capped Nunlet		L	
Monasa nigrifrons	Black-fronted Nunbird		L–400	
Monasa morphoeus	White-fronted Nunbird		L–690	
Chelidoptera tenebrosa	Swallow-winged Puffbird	**L**	L	
CAPITONIDAE				
Capito auratus	Gilded Barbet	690–**1,570**	L–1,570	P
Eubucco richardsoni	Lemon-throated Barbet		L	
Eubucco versicolor	Versicoloured Barbet	**1,000–1,570**	1,000–1,570	
RAMPHASTIDAE				
Ramphastos tucanus	White-throated Toucan	690–**1,350**	L–1,350	
Aulacorhynchus prasinus	Emerald Toucanet		690	
Aulacorhynchus derbianus	Chestnut-tipped Toucanet	1,310–1,570	1,130–1,570	P
Selenidera reinwardtii	Golden-collared Toucanet	690–1,350	L–1,450	P
Pteroglossus castanotis	Chestnut-eared Aracari	L	L–400	
Pteroglossus azara	Ivory-billed Aracari		L–950	
Pteroglossus beauharnaesii	Curl-crested Aracari		L–690	
PICIDAE				
Picumnus lafresnayi	Lafresnaye's Piculet		800	
Melanerpes cruentatus	Yellow-tufted Woodpecker		L–690	
Picoides fumigatus	Smoky-brown Woodpecker	1,570–1,750	1,310–2,220	P
Veniliornis affinis	Red-stained Woodpecker		L–900	
Piculus leucolaemus	White-throated Woodpecker		750	
Colaptes rubiginosus	Golden-olive Woodpecker	1,350–1,700	1,260–1,970	
Colaptes punctigula	Spot-breasted Woodpecker	**L**	L	
Dryocopus lineatus	Lineated Woodpecker		L	
Campephilus rubricollis	Red-necked Woodpecker	690	L–800	
Campephilus melanoleucos	Crimson-crested Woodpecker		L–690	
FALCONIDAE				
Micrastur ruficollis	Barred Forest Falcon		690–1,150	
Micrastur gilvicollis	Lined Forest Falcon	1,570	1,570	P
Ibycter americanus	Red-throated Caracara	800–**1,350**	L–1,350	
Falco rufigularis	Bat Falcon		L–900	
PSITTACIDAE				
Ara macao	Scarlet Macaw		L–690	
Ara chloropterus	Red-and-green Macaw	450–690 (F)	L–800	
Ara severus	Chestnut-fronted Macaw		L–400	
Primolius couloni	Blue-headed Macaw		400	
Aratinga leucophthalma	White-eyed Parakeet	450	L–750	
Aratinga weddellii	Dusky-headed Parakeet		L–400	
Pyrrhura roseifrons	Rose-fronted Parakeet		L–900	
Pionus menstruus	Blue-headed Parrot		L–900	
Amazona ochrocephala	Yellow-crowned Parrot		L–690	
Amazona farinosa	Mealy Parrot	690	L–1,150	
THAMNOPHILIDAE				
Cymbilaimus lineatus	Fasciated Antshrike		L	

		Elevational range (m)		
Scientific name	**English name**	**Present expedition**	**All expeditions**	**Evidence**
Thamnophilus palliatus	Chestnut-backed Antshrike	1,570	1,380–1570	
Thamnophilus schistaceus	Plain-winged Antshrike		L–690	
Thamnophilus murinus	Mouse-coloured Antshrike	690	L–900	V
Thamnophilus caerulescens	Variable Antshrike	1,750–1,970	1,310–2,220	P
Thamnophilus aethiops	White-shouldered Antshrike	690	L–690	P
Thamnistes anabatinus	Russet Antshrike		1,310	
Dysithamnus mentalis	Plain Antvireo	1,310–**1,570**	750–1,570	P
Thamnomanes ardesiacus	Dusky-throated Antshrike		L–900	
Thamnomanes schistogynus	Bluish-slate Antshrike		L–690	
Pygiptila stellaris	Spot-winged Antshrike		L	
Epinecrophylla haematonota	Stipple-throated Antwren		900–1,150	
Epinecrophylla spodionota	Foothill Antwren		750–1,100	
Epinecrophylla ornata	Ornate Antwren		690	
Epinecrophylla erythrura	Rufous-tailed Antwren	450	L–690	
Myrmotherula brachyura	Pygmy Antwren		L–900	
Myrmotherula hauxwelli	Plain-throated Antwren		L	
Myrmotherula axillaris	White-flanked Antwren	690	L–690	
Myrmotherula schisticolor	Slaty Antwren	1,000	1,000–1,570	P
Myrmotherula sunensis	Rio Suno Antwren	450	L–690	
Myrmotherula menetriesii	Grey Antwren	390	L–750	
Herpsilochmus motacilloides	Creamy-bellied Antwren	1,310–1,350	1,310–1,500	
Herpsilochmus rufimarginatus	Rufous-winged Antwren	690–**1,000**	690–1,000	
Drymophila caudata	Long-tailed Antbird	1,650–2,220	1,400–2,220	P,V
Hypocnemis peruviana	Peruvian Warbling Antbird		L	
Cercomacra cinerascens	Grey Antbird	L–500	L–750	
Cercomacra nigrescens	Blackish Antbird	1,570	1,310–1,570	P
Cercomacra serva	Black Antbird	690–1,000	L–1,000	P
Myrmoborus myotherinus	Black-faced Antbird		L–1,000	
Schistocichla leucostigma	Spot-winged Antbird	**1,000**	1,000	
Myrmeciza hemimelanea	Chestnut-tailed Antbird	**1,350**	L–1,350	
Myrmeciza fortis	Sooty Antbird		690	
Pithys albifrons	White-plumed Antbird		L–690	
Rhegmatorhina melanosticta	Hairy-crested Antbird	690	690–900	P
Hylophylax naevius	Spot-backed Antbird		L–1,130	
Willisornis poecilinotus	Scale-backed Antbird	690	L–1,130	P
Phlegopsis nigromaculata	Black-spotted Bare-eye		L	
CONOPOPHAGIDAE				
Conopophaga peruviana	Ash-throated Gnateater		690	
Conopophaga castaneiceps	Chestnut-crowned Gnateater	1,100–1,570	1,100–1,570	P
GRALLARIIDAE				
Myrmothera campanisona	Thrush-like Antpitta	**1,000**	L–1,000	
Grallaricula flavirostris	Ochre-breasted Antpitta	1,650–**1,750**	1,310–1,750	P
RHINOCRYPTIDAE				
Liosceles thoracicus	Rusty-belted Tapaculo	**1,100**	750–1,100	
Scytalopus parvirostris	Trilling Tapaculo	**2,150**	2,150	V
Scytalopus femoralis	Rufous-vented Tapaculo	1,570–**1,750**	1,550–1,750	V
Scytalopus atratus	White-crowned Tapaculo	1,310–1,570	1,130–1,570	V
FORMICARIIDAE				
Formicarius colma	Rufous-capped Antthrush		L	
Formicarius analis	Black-faced Antthrush		L–850	
Chamaeza campanisona	Short-tailed Antthrush	1,310–**1,350**	900–1,350	P,V
FURNARIIDAE				
Sclerurus mexicanus	Tawny-throated Leaftosser	**1,310**	690–1,310	P
Sclerurus caudacutus	Black-tailed Leaftosser		L–690	

		Elevational range (m)		
Scientific name	**English name**	**Present expedition**	**All expeditions**	**Evidence**
Cranioleuca curtata	Ash-browed Spinetail	1,500	1,450–1,500	
Premnornis guttuliger	Rusty-winged Barbtail	1,750–1,970	1,310–1,970	P
Premnoplex brunnescens	Spotted Barbtail	1,200–2,220	1,130–2,220	P
Margarornis squamiger	Pearled Treerunner		2,220	
Pseudocolaptes boissoneautii	Streaked Tuftedcheek	1,750–2,220	1,570–2,220	P,V
Syndactyla subalaris	Lineated Foliage-gleaner	1,310–**2,220**	1,310–2,220	P
Syndactyla rufosuperciliata	Buff-browed Foliage-gleaner	1,310–2,220	1,310–2,220	P
Ancistrops strigilatus	Chestnut-winged Hookbill		750–900	
Hyloctistes subulatus	Eastern Woodhaunter	850–**1,550**	L–1,550	
Philydor ruficaudatum	Rufous-tailed Foliage-gleaner		900	
Philydor erythrocercum	Rufous-rumped Foliage-gleaner	**1,000–1,750**	1,000–1,750	P
Philydor erythropterum	Chestnut-winged Foliage-gleaner		L	
Philydor rufum	Buff-fronted Foliage-gleaner	1,000–**1,450**	750–1,450	
Thripadectes melanorhynchus	Black-billed Treehunter	1,310	1,310–1,450	P
Automolus ochrolaemus	Buff-throated Foliage-gleaner	690–1,570	690–1,570	
Automolus infuscatus	Olive-backed Foliage-gleaner		L	
Automolus rubiginosus	Ruddy Foliage-Gleaner		690	
Automolus rufipileatus	Chestnut-crowned Foliage-gleaner		L	
Lochmias nematura	Sharp-tailed Streamcreeper		1,310	
Xenops minutus	Plain Xenops		L–900	
Xenops rutilans	Streaked Xenops	1,570	1,130–1,570	P
Certhiasomus stictolaemus	Spot-throated Woodcreeper		690	
Dendrocincla tyrannina	Tyrannine Woodcreeper		1,310–2,220	
Dendrocincla fulginosa	Plain-brown Woodcreeper		L–900	
Dendrocincla merula	White-chinned Woodcreeper		L–690	
Sittasomus griseicapillus	Olivaceous Woodcreeper	460–1,000	L–1,130	
Deconychura longicauda	Long-tailed Woodcreeper		690–1,570	
Glyphorynchus spirurus	Wedge-billed Woodcreeper	690–**1,570**	L–1,570	P
Xiphocolaptes promeropirhynchus	Strong-billed Woodcreeper	690	690–850	
Dendrocolaptes certhia	Amazonian Barred Woodcreeper		L–900	
Dendrocolaptes picumnus	Black-banded Woodcreeper		910–1,310	
Xiphorhynchus ocellatus	Ocellated Woodcreeper	1,000–1,310	750–1,570	P
Xiphorhynchus elegans	Elegant Woodcreeper	690	L–690	P
Xiphorhynchus guttatus	Buff-throated Woodcreeper	690	L–690	
Xiphorhynchus triangularis	Olive-backed Woodcreeper	1,500–1,750	1,310–1,970	P
Lepidocolaptes albolineatus	Lineated Woodcreeper		900–2,220	
Campylorhamphus trochilirostris	Red-billed Scythebill	1,310–1,570	1,310–1,570	P
TYRANNIDAE				
Elaenia albiceps	White-crested Elaenia	**690–1,310**	690–1,310	P
Camptostoma obsoletum	Southern Beardless Tyrannulet	**690**	690	
Mecocerculus poecilocercus	White-tailed Tyrannulet	**1,000**	1,000–1,450	
Pseudotriccus pelzelni	Bronze-olive Pygmy Tyrant	1,570	1,350–2,220	P
Corythopis torquatus	Ringed Antpipit	**800**	L–800	
Zimmerius viridiflavus	Peruvian Tyrannulet	1,350–2,220	1,350–2,220	P,V
Phylloscartes ventralis	Mottle-cheeked Tyrannulet	1,350–2,220	1,160–2,220	P
Mionectes striaticollis	Streak-necked Flycatcher	**690**–2,220	690–2,220	P
Mionectes olivaceus	Olive-striped Flycatcher	400–1,310; **2,220 E**	L–1,310; 2,220 E	P
Mionectes oleagineus	Ochre-bellied Flycatcher	690	690–850	P
Leptopogon amaurocephalus	Sepia-capped Flycatcher		L	
Leptopogon superciliaris	Slaty-capped Flycatcher	690–1,570	690–1,570	P
Myiotriccus ornatus	Ornate Flycatcher	1,310–1,570	800–1,570	P
Myiornis ecaudatus	Short-tailed Pygmy Tyrant		L–900	
Lophotriccus pileatus	Scale-crested Pygmy Tyrant	1,310–**1,750**	1,310–1,750	P
Lophotriccus vitiosus	Double-banded Pygmy Tyrant		L	
Hemitriccus zosterops	White-eyed Tody-Tyrant	690	690–850	V

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
Hemitriccus rufigularis	Buff-throated Tody-Tyrant		1,310	
Todirostrum chrysocrotaphum	Yellow-browed Tody-Flycatcher		L–690	
Rhynchocyclus olivaceus	Olivaceous Flatbill		690	
Rhynchocyclus fulvipectus	Fulvous-breasted Flatbill		1,450	
Tolmomyias assimilis	Yellow-margined Flycatcher	690	L–900	
Platyrinchus mystaceus	White-throated Spadebill	1,310–1,570	1,130–1,570	P
Platyrinchus platyrhynchos	White-crested Spadebill		L–750	
Myiophobus flavicans	Flavescent Flycatcher		1,570	
Myiophobus roraimae	Roraiman Flycatcher	1,350	1,310–1,520	
Myiophobus fasciatus	Bran-coloured Flycatcher		1,970	
Myiobius villosus	Tawny-breasted Flycatcher	1,310–**1,500**	750–1,500	P
Myiobius barbatus	Sulphur-rumped Flycatcher		L–690	
Terenotriccus erythrurus	Ruddy-tailed Flycatcher		L–690	
Pyrrhomyias cinnamomeus	Cinnamon Flycatcher	1,570–**2,220**	1,450–2,220	P
Hirundinea ferruginea	Cliff Flycatcher	**450**	450	
Lathrotriccus euleri	Euler's Flycatcher		690–1,130	
Contopus fumigatus	Smoke-coloured Pewee	1,700	1,130–1,970	
Contopus nigrescens	Blackish Pewee	**390**	390	
Sayornis nigricans	Black Phoebe	400	L–550	
Knipolegus poecilurus	Rufous-tailed Tyrant	1,750–1,970	1,450–2,220	P
Ochthornis littoralis	Drab Water Tyrant	L	L–450	
Myiotheretes fumigatus	Smoky Bush Tyrant	**1,970–2,050**	1,970–2,050	V
Ochthoeca pulchella	Golden-browed Chat-Tyrant	1,970–2,220	1,970–2,220	P
Myiozetetes similis	Social Flycatcher		L–450	
Myiozetetes granadensis	Grey-capped Flycatcher		L–450	
Pitangus sulphuratus	Great Kiskadee		L–450	
Myiodynastes chrysocephalus	Golden-crowned Flycatcher	**1,970**	1,970	V
Myiodynastes maculatus	Streaked Flycatcher		L–900	
Tyrannus melancholicus	Tropical Kingbird		L–400	
Rhytipterna simplex	Greyish Mourner	690–1,310	L–1,310	P
Myiarchus tuberculifer	Dusky-capped Flycatcher		1,310	
Myiarchus cephalotes	Pale-edged Flycatcher	1,570–2,220	1,310–2,220	P
Attila spadiceus	Bright-rumped Attila		L–690	
COTINGIDAE				
Pipreola riefferii	Green-and-black Fruiteater	1,350–2,220	1,310–2,220	P,V
Pipreola frontalis	Scarlet-breasted Fruiteater	1,350–1,575	1,310–1,575	P
Pipreola chlorolepidota	Fiery-throated Fruiteater		1,450–1,500	
Rupicola peruvianus	Andean Cock-of-the-rock	690–1,575	450–1,575	P
Snowornis subalaris	Grey-tailed Piha		1,130	
Snowornis cryptolophus	Olivaceous Piha	1,570–**1,750**	1,050–1,750	P
Querula purpurata	Purple-throated Fruitcrow	**690**	L–690	
Cotinga cayana	Spangled Cotinga	**690**	690	
Lipaugus vociferans	Screaming Piha	690–800	L–900	
PIPRIDAE				
Tyranneutes stolzmanni	Dwarf Tyrant-Manakin		L–600	
Lepidothrix coronata	Blue-crowned Manakin	690	L–1,130	P
Lepidothrix coeruleocapilla	Cerulean-capped Manakin	1,310–1,570	750–1,570	P
Xenopipo holochlora	Green Manakin		690–1,130	
Xenopipo unicolor	Jet Manakin	1,310–1,570	1,130–2,220	P
Pipra pipra	White-crowned Manakin	690–1,570	L–1,570	P
Pipra fasciicauda	Band-tailed Manakin		L–690	
Pipra chloromeros	Round-tailed Manakin	690	L–1,310	P
TITYRIDAE				
Tityra semifasciata	Masked Tityra	690	400–750	
Schiffornis turdina	Thrush-like Schiffornis	**1,570**	750–1,570	P

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
Laniocera hypopyrra	Cinereous Mourner		750	
Laniisoma elegans	Shrike-like Cotinga		1,130–1,310	
Pachyramphus versicolor	Barred Becard		1,450–1,970	
Pachyramphus albogriseus	Black-and-white Becard	1,350–1,570	1,310–1,570	
Pachyramphus marginatus	Black-capped Becard		750	
INCERTAE SEDIS				
Piprites chloris	Wing-barred Piprites	1,350–**1,580**	690–1,580	
VIREONIDAE				
Cyclarhis gujanensis	Rufous-browed Peppershrike		1,130–1,570	
Vireolanius leucotis	Slaty-capped Shrike-Vireo		690–1,310	
Vireo leucophrys	Brown-capped Vireo		2,220	
Vireo olivaceus	Red-eyed Vireo		L–900	
Hylophilus hypoxanthus	Dusky-capped Greenlet	690	L–900	
Hylophilus olivaceus	Olivaceous Greenlet		750–850	
Hylophilus ochraceiceps	Tawny-crowned Greenlet		L–900	
CORVIDAE				
Cyanocorax violaceus	Violaceous Jay		L–450	
Cyanocorax yncas	Green Jay	**1,350**–2,220	1,350–2,220	P
HIRUNDINIDAE				
Pygochelidon cyanoleuca	Blue-and-white Swallow		L–2,220	
Atticora fasciata	White-banded Swallow	400	L–450	
TROGLODYTIDAE				
Microcerculus marginatus	Scaly-breasted Wren		L–1,130	
Microcerculus bambla	Wing-banded Wren	**400**	400–750	
Troglodytes aedon	House Wren		L–450	
Troglodytes solstitialis	Mountain Wren		2,220	
Henicorhina leucophrys	Grey-breasted Wood Wren	1,350–2,220	1,310–2,220	P,V
Cyphorhinus arada	Musician Wren		L–690	
POLIOPTILIDAE				
Microbates cinereiventris	Tawny-faced Gnatwren		690–900	
TURDIDAE				
Catharus dryas	Spotted Nightingale-Thrush	1,310–1,570	1,310–1,570	P,V
Catharus ustulatus	Swainson's Thrush		750–1,500	
Entomodestes leucotis	White-eared Solitaire	1,350–2,220	900–2,220	P
Cichlopsis leucogenys	Rufous-brown Solitaire	690–**1,575**	690–1,575	P
Turdus leucops	Pale-eyed Thrush		900–1,310	
Turdus lawrencii	Lawrence's Thrush	**460**	460	
Turdus nigriceps	Andean Slaty Thrush	**1,310**	900–1,310	P
Turdus serranus	Glossy-black Thrush	1,310–2,220	900–2,220	P
Turdus albicollis	White-necked Thrush	690	L–690	P
THRAUPIDAE				
Paroaria gularis	Red-capped Cardinal		L–450	
Cissopis leverianus	Magpie Tanager		L–450	
Hemispingus frontalis	Oleaginous Hemispingus	1,970	1,310–2,220	P
Trichothraupis melanops	Black-goggled Tanager	**1,000**–1,570	1,000–1,570	P
Tachyphonus rufiventer	Yellow-crested Tanager		L–1,130	
Tachyphonus surinamus	Fulvous-crested Tanager	690	L–690	
Lanio versicolor	White-winged Shrike-Tanager	**1,000**	690–1,000	
Ramphocelus carbo	Silver-beaked Tanager		L–500	
Thraupis episcopus	Blue-grey Tanager		L–450	
Thraupis palmarum	Palm Tanager		L–1,450	
Calochaetes coccineus	Vermillion Tanager	1,350–1,570	1,130–1,570	
Anisognathus somptuosus	Blue-winged Mountain Tanager	1,350–2,220	1,310–2,220	P
Iridosornis analis	Yellow-throated Tanager	**1,000**–2,220	1,000–2,220	P

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
Chlorochrysa calliparaea	Orange-eared Tanager	**900**–1,570	900–1,570	
Tangara ruficervix	Golden-naped Tanager		1,450	
Tangara viridicollis	Silver-backed Tanager	1,350	1,310–2,220	
Tangara phillipsii	Sira Tanager	1,310–**2,220**	1,300–2,220	P,V
Tangara nigrocincta	Masked Tanager	1,000	750–1,130	
Tangara cyanicollis	Blue-necked Tanager	1,100–**1,570**	L(?)–1,570	
Tangara vassorii	Blue-and-black Tanager	2,220	1,970–2,220	
Tangara nigroviridis	Beryl-spangled Tanager	1,570–2,220	1,130–2,220	P
Tangara cyanotis	Blue-browed Tanager	1,570–1,750	1,310–1,750	
Tangara mexicana	Turquoise Tanager		750	
Tangara chilensis	Paradise Tanager	400–**1,350**	L–1,350	
Tangara velia	Opal-rumped Tanager		750	
Tangara gyrola	Bay-headed Tanager	460–1,350	L–1,500	
Tangara xanthocephala	Saffron-crowned Tanager	1,570–**2,220**	1,310–2,220	P
Tangara parzudakii	Flame-faced Tanager		2,220	
Tangara schrankii	Green-and-gold Tanager	460–1,030	L–1,130	
Tangara arthus	Golden Tanager	**1,000**–1,570	1,000–1,570	
Dacnis lineata	Black-faced Dacnis	460–**1,350**	L–1,350	
Dacnis cayana	Blue Dacnis	690–**1,570**	L–1,570	
Cyanerpes caeruleus	Purple Honeycreeper		L–1,970	
Chlorophanes spiza	Green Honeycreeper	**1,350**	L–1,350	
Iridophanes pulcherrimus	Golden-collared Honeycreeper		1,450	
Hemithraupis flavicollis	Yellow-backed Tanager	900	750–1,100	
Conirostrum albifrons	Capped Conebill		2,220	
Diglossa glauca	Golden-eyed Flowerpiercer	1,970–2,220	1,130–2,220	P
Diglossa caerulescens	Bluish Flowerpiercer	1,570–2,220	1,310–2,220	P
Haplospiza rustica	Slaty Finch		1,970–2,220	
Parkerthraustes humeralis	Yellow-shouldered Grosbeak	750	750	
INCERTAE SEDIS				
Saltator grossus	Slate-coloured Grosbeak	690	L–900	
Saltator maximus	Buff-throated Saltator	1,020–**1,570**	750–1,570	P,V
Saltator coerulescens	Greyish Saltator		540	
EMBERIZIDAE				
Arremon brunneinucha	Chestnut-capped Brush Finch	1,310–**1,750**	950–1,750	P
Atlapetes tricolor	Tricoloured Brush Finch	**1,970**–2,220	1,970–2,220	P
Chlorospingus ophthalmicus	Common Bush Tanager	1,500–2,220	1,500–2,220	P,V
Chlorospingus flavigularis	Yellow-throated Bush Tanager	1,000–1,570	900–1,570	
CARDINALIDAE				
Piranga flava	Hepatic Tanager	**2,220**	2,220	P
Piranga rubra	Summer Tanager		1,450	
Piranga olivacea	Scarlet Tanager		1,450	
Piranga leucoptera	White-winged Tanager	1,350–1,500	1,310–1,570	
Habia rubica	Red-crowned Ant Tanager	L–900	L –900	
Chlorothraupis carmioli	Carmiol's Tanager	400–1,310	400–1,310	P
Cyanocompsa cyanoides	Blue-black Grosbeak		L–900	
PARULIDAE				
Parula pitiayumi	Tropical Parula	1,310–1,570	900–1,570	V
Dendroica fusca	Blackburnian Warbler		1,400–1,500	
Wilsonia canadensis	Canada Warbler		1,450–1,500	
Myioborus miniatus	Slate-throated Whitestart	1,000–1,970	900–2,175	P
Basileuterus chrysogaster	Golden-bellied Warbler		750–900	
Basileuterus coronatus	Russet-crowned Warbler	1,310–2,220	1,310–2,220	P
Basileuterus tristriatus	Three-striped Warbler	1,310–**1,750**	900–1,750	P
Phaeothlypis fulvicauda	Buff-rumped Warbler		690	

Scientific name	English name	Elevational range (m) Present expedition	All expeditions	Evidence
ICTERIDAE				
Psarocolius angustifrons	Russet-backed Oropendola		L–500	
Psarocolius decumanus	Crested Oropendola		L–450	
Clypicterus oseryi	Casqued Oropendola	**460**	460	V
Cacicus cela	Yellow-rumped Cacique		L–750	
Cacicus uropygialis	Scarlet-rumped Cacique	**1,970**	1,970	
Icterus croconotus	Orange-backed Troupial		L–500	
Icterus cayanensis	Epaulet Oriole		750	
Molothrus oryzivorus	Giant Cowbird		L–450	
FRINGILLIDAE				
Euphonia laniirostris	Thick-billed Euphonia		L–750	
Euphonia chrysopasta	White-lored Euphonia		900	
Euphonia mesochrysa	Bronze-green Euphonia		900–1,130	
Euphonia xanthogaster	Orange-bellied Euphonia	690–1,970	690–2,220	P
Euphonia rufiventris	Rufous-bellied Euphonia		L–900	
Chlorophonia cyanea	Blue-naped Clorophonia	**690**–1,350	690–1,450	

Distribución y estado de conservación del Cola-Espina de Cabeza Negruzca *Synallaxis tithys* en el noroeste de Perú

Segundo Crespo y Alexander More

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Blackish-headed Spintetail *Synallaxis tithys* is a Tumbesian endemic and globally threatened species that occurs from west-central Ecuador to extreme north-west Peru. In Peru, the species is poorly known, so in order to assess its conservation status we conducted surveys between December 2009 and October 2011. Known areas and those of probable occurrence in Tumbes and Piura, north-west Peru, were visited. Additionally, we compiled information from previous expeditions, the literature and museum specimens. We detail 19 new localities for *S. tithys* and extend its known distribution range further south in the country. Threats and the species' conservation status are also discussed.

El Cola-Espina de Cabeza Negruzca *Synallaxis tithys* es una especie endémica de la región Tumbesina[15] cuya área de distribución se extiende desde las provincias de Manabí, Santa Elena, Guayas, El Oro y Loja, al suroeste del Ecuador, hasta Tumbes, noroeste de Perú[2,5,12,13]. La especie habita el sotobosque denso de bosques perennes y deciduos, desde el nivel del mar hasta 1.100 m[5]; en Perú su rango altitudinal documentado hasta la fecha es de 400–750 msnm[14]. Debido a su pequeño rango de distribución y hábitat fuertemente fragmentado, *S. tithys* es considerado En Peligro a nivel global[3] y nacional[7]. Por ser una especie prioritaria para acciones de conservación, el objetivo del presente trabajo es presentar una revisión actualizada de su distribución y estado de conservación en Perú.

Área de estudio y métodos

Inicialmente se hizo una revisión de la literatura publicada y no publicada (informes, reportes y observaciones de campo) referente a la especie y su hábitat. Luego, se hizo un análisis preliminar de hábitat remanente a partir de los mapas de cobertura vegetal de los bosques secos de la región de Tumbes y Piura[9,10], imágenes de Google Earth, datos de la ecología de la especie, su distribución conocida[1,4,5] y la experiencia de especialistas en especies tumbesinas. Mediante este análisis se determinaron sitios posibles de ocurrencia de la especie en Tumbes y Piura, considerando principalmente la distribución de los bosques secos deciduos dominados por *Ceiba trichistandra* y el bosque tropical del Pacífico en Tumbes. Realizamos búsquedas intensivas de la especie entre diciembre 2009 y octubre 2011 en 32 localidades. Se siguieron los caminos o senderos encontrados en los sitios evaluados, anotando los registros visuales y auditivos; asímismo, se empleó *playback* de una vocalización previamente grabada[6]. De cada registro se tomó nota de ubicación georeferenciada y altitud con GPS, número de individuos, notas ecológicas y amenazas potenciales sobre la especie y su hábitat.

Se revisaron también las colecciones científicas del Museo de Historia Natural Javier Prado de Lima (MHNJP), el Centro de Ornitología y Biodiversidad (CORBIDI) y Louisiana State University Museum of Zoology (LSUMZ). En el Anexo 1 se detalla los especímenes provenientes de Perú encontrados en dichas colecciones. Las coordenadas usadas son aquellas mostradas en las etiquetas de cada espécimen.

Resultados

Se reporta un total de 22 localidades de registro de la especie en Perú, de las cuales 19 son nuevas (Fig. 1). La especie fue registrada en 14 localidades de 32 visitadas durante el trabajo de campo. En estas localidades obtuvimos 101 encuentros visuales y/o auditivos, sea de individuos solitarios, parejas y grupos de hasta cinco individuos. A continuación se describen las 22 localidades.

Localidades históricas

Región Tumbes

(1) *Lechugal* (03°37'S 80°12'O; 60 msnm) Constituye la localidad tipo de la especie[16]. El 30 de abril de 1956, M. Koepcke colectó un individuo hembra cerca al sitio, pero el espécimen no presenta coordenadas. La mañana del 3 de julio de 2010, SC visitó Pueblo Nuevo (Zarumilla), un sitio cercano a Lechugal (c.3 km al sur) y no registró a la especie.

2) *Quebrada Faical–El Caucho, Parque Nacional Cerros de Amotape* (03°49'S 80°17'O; 400–540 msnm) La especie fue reportada como 'común' entre el 14 de junio y el 5 de julio de 1979[19], cuando se colectaron 15 especímenes en la quebrada Faical, al este del Puesto Militar El Caucho (Anexo 1). También fue registrada entre el 23 y el 27 de julio de 1988[11], mediante grabaciones de su vocalización que están depositadas y disponibles en Macaulay Library, Cornell Lab of Ornithology

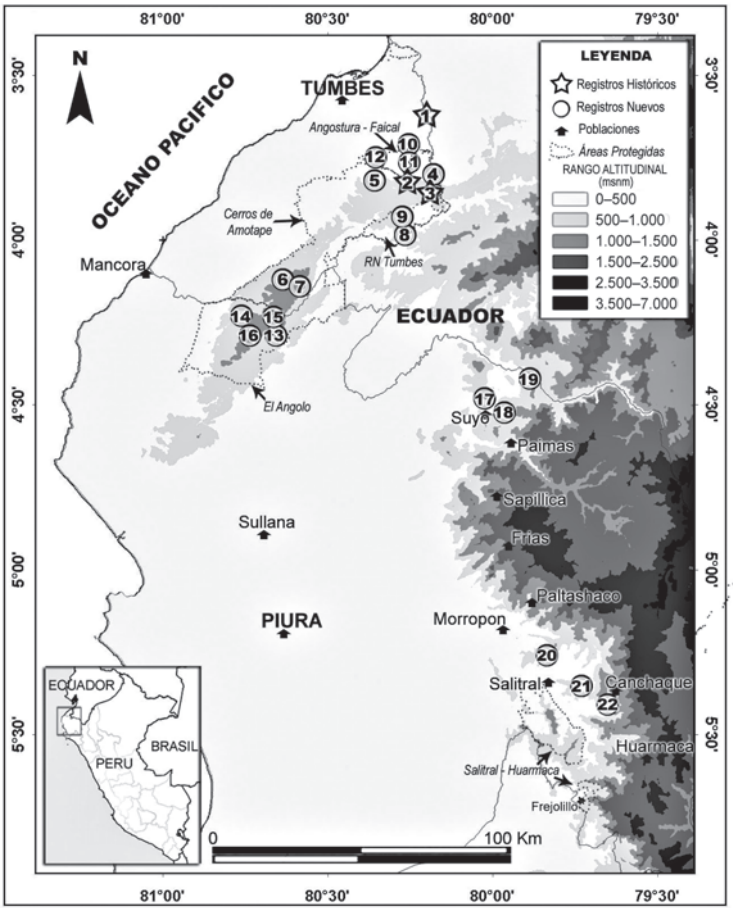

Figura 1. Mapa de localidades y distribución de *Synallaxis tithys* en el noroeste de Perú.

(http://macaulaylibrary.org). En abril de 2000, fue escuchada ocasionalmente cerca a la quebrada Faical[18], mientras que no se registró en junio de 2009 por investigadores de LSUMZ y CORBIDI. SC visitó la zona el 6–7 julio de 2010 y no la encontró; aunque en octubre del mismo año registró seis individuos y W. Vargas colectó un macho depositado en CORBIDI (Anexo 1). Los registros se realizaron a 540 msnm, en una zona de matorral y vegetación secundaria. Adicionalmente, una pareja fue observada forrajeando junto a Hojarasquero de Capucha Rufa *Hylocryptus erythrocephalus* y Limpia-Follaje de Cuello Rufo *Syndactyla ruficollis*.

(3) *Campo Verde, Parque Nacional Cerros de Amotape* (03º51'S 80º12'O; 750 msnm) Reportada como común en junio y julio de 1979[19]. Entre el 25 de febrero y el 3 marzo de 1986 la especie también fue registrada en la zona[11]. El registro más actual en la zona corresponde a una pareja observada cerca a Pozo del Pato (camino a Campo Verde) en enero de 2001[17].

Nuevas localidades

Región Tumbes

(4) *Cotrina, Parque Nacional Cerros de Amotape* (03°50'S 80°11'O; 800 msnm) Una pareja fue grabada por K. Zyskowski el 6 de diciembre de 1997. Las vocalizaciones se encuentran depositadas en Macaulay Library, Cornell Lab of Ornithology.

(5) *Quebrada Huarapal, Parque Nacional Cerros de Amotape* (03°47'25"S 80°21'25"O; 363 msnm) El 25 y 26 de octubre de 2010, SC registró dos parejas a aproximadamente 2 km al sur de la cascada Huarapal. Una pareja se encontró en la cuesta El Pato, en la margen derecha de la quebrada Huarapal y el otro registro fue en una colina de la margen izquierda de la quebrada. Ambos sitios estuvieron separados por 1 km.

(6) *El Plátano, Parque Nacional Cerros de Amotape* (04°07'46"S 80°37'13"O; 955 msnm) Durante una evaluación ornitológica en julio 2009,

Figura 2. Un individuo adulto de *Synallaxis tithys* forrajeando en la localidad de Huabal, Canchaque, Piura, Perú, 7 marzo 2010 (Segundo Crespo)

personal de LSUMZ y CORBIDI colectaron seis individuos, preparando cinco pieles y un esqueleto.

(7) *Cerro El Encanto, Parque Nacional Cerros de Amotape* (04°08'36"S 80°35'11"O; 1.150 msnm) Un individuo macho fue colectado el 14 de julio de 2009 por S. Figueroa y depositado en CORBIDI.

(8) *Quebrada Jurupe, Reserva Nacional de Tumbes* (03°57'55"S 80°16'44"O; 477 msnm) El 19 de junio de 2008 en la parte alta de la quebrada, AM escuchó vocalizaciones de la especie, en una bandada mixta con Gorrión de Gorro Negro *Arremon abeillei* y Reinita Gris y Dorada *Basileuterus fraseri*. El 27–28 junio de 2010, SC registró seis individuos cerca al paraje de ganaderos El Mango. En una ocasión se observó y grabó la vocalización de la especie junto con Batarito de Cabeza Gris *Dysithamnus mentalis*.

(9) *Agua Nueva de Pachacas, Reserva Nacional de Tumbes* (03º55'51"S 80º16'45"O; 670 msnm) Es la zona más húmeda de la Reserva Nacional de Tumbes y visitada por los autores en junio de 2008, donde se escuchó la vocalización de un individuo.

(10) *Quebrada El Guabo, Área de Conservación Regional Angostura–Faical* (03º44'07"S 80º15'23"O; 167 msnm) AM escuchó un individuo vocalizando el 17 de abril de 2010.

(11) *El Pitón, Área de Conservación Regional Angostura–Faical* (03º45'32"S 80º15'42"O; 360 msnm) El 19 de mayo del 2009, un individuo fue observado por SC y otro individuo vocalizando reportado por AM el 18 de abril de 2010.

(12) *Mirador de Angostura, Área de Conservación Regional Angostura–Faical* (03º45'25"S 80º21'13"O; 322 msnm) F. Angulo grabó vocalizaciones de la especie el 2 de enero del 2007 y el 17 de diciembre de 2009. Estas vocalizaciones se encuentran disponibles en www.xeno-canto.org (XC9635, XC9634, XC34858). Durante las mañanas del 16 y 17 de junio de 2009, F. Angulo y SC grabaron vocalizaciones de la especie.

Región Piura

(13) *Cerro El Padre, Coto de Caza El Angolo* (04º15'24"S 80º40'45"O, 900–1.200 msnm) En la parte este del cerro (sector La Falda), se reportó el avistamiento de un individuo en julio y otro en noviembre 2006, a 1.100 y 900 msnm respectivamente[8]. En junio de 2007 se avistó una pareja a 900 msnm[8]. Además, el 16 octubre de 2011 AM observó tres individuos diferentes en un transecto de 420 m de longitud sobre la parte alta del cerro, a los 1.200 msnm (sector El Lindero). Estos individuos estaban forrajeando sobre el suelo junto a Matorralero de Cabeza Blanca *Atlapetes*

albiceps, Matorralero de Ala Blanca *A. leucopterus* e *Hylocryptus erythrocephalus*.

(14) *Cruce al Agua de Cherrelique, Coto de Caza El Angolo* (04°13'46"S 80°44'36"O; 1.000 msnm) Un individuo forrajeando sobre sotobosque reportado por AM, el 25 de junio de 2010.

(15) *Quebrada Los Naranjos–Huayuros, Coto de Caza El Angolo* (04°14'58"S 80°41'07"O; 1.110 msnm) El 19 de agosto de 2010, AM capturó un individuo en un área cercana al paraje de ganaderos 'Los Naranjos'. Al día siguiente, otro individuo fue observado junto a una bandada mixta compuesta por *Syndactyla ruficollis*, Batará Acollarado *Thamnophilus bernardi*, Cucarachero de Pecho Jaspeado *Pheugopedius sclateri*, *Atlapetes albiceps*, *A. leucopterus* y *Arremon abeillei*. El 17 de octubre de 2011, una pareja fue observada forrajeando sobre el suelo. Otro individuo fue observado 2,1 km quebrada abajo, forrajeando junto a *Pheugopedius sclateri*, Hornero de Pata Pálida *Furnarius leucopus*, *Hylocryptus erythrocephalus*, *Syndactyla ruficollis* y *Atlapetes albiceps*.

(16) *Cocha El Polo–Coto de Caza El Angolo* (04°16'35"S 80°42'34"O; 1.290 msnm) El 16 de octubre de 2011, AM observó dos individuos forrajeando en una zona de matorral secundario junto con *Hylocryptus erythrocephalus*, *Atlapetes leucopterus* y *A. albiceps*.

(17) *Cerro El Pindo, Suyo* (04°29'12"S 80°0'30"O; 550–750 msnm) El 25 de febrero de 2010, SC registró una pareja a 550 msnm y cuatro individuos a 750 msnm. Este sitio se encuentra al noroeste del pueblo de Suyo y es el área mejor conservada en toda la zona.

(18) *Cerro Morocho, Suyo* (04°30'04"S 79°58'28"O; 545–775 msnm) El 26 de febrero de 2010, SC registró dos parejas, un grupo de cuatro individuos y siete individuos solitarios.

(19) *Cerro Piedra Tabla, Suyo* (04°24'60"S 79°53'43.06"O; 667 msnm) Esta localidad se encuentra pasando el pueblo de Surpampa camino hacia Vado Limón. El 27 de febrero de 2010, SC reportó seis individuos. Es un área con vegetación densa y húmeda, donde se registraron otras especies como Tororoi de Watkins *Grallaria watkinsi* y Cacique de Lomo Amarillo *Cacicus cela*.

(20) *Quebrada Tumberos, Salitral* (05°15'51"S 79°49'38"O; 1.092 msnm) Esta quebrada se encuentra en el bosque de Mangamanga y desemboca en el margen derecha del río Piura. AM observó un individuo forrajeando sobre el suelo junto a un *Arremon abeillei* en la parte más alta, el 20 de noviembre de 2009.

(21) *Quebrada La Peña, San Juan de Bigote* (05°21'10"S 79°43'14"O; 266–500 msnm) Esta quebrada se ubica en el bosque de Dotor. El 10 de marzo de 2010, SC observó un grupo de cuatro individuos en la unión de la quebrada La Peña con la quebrada Jaguey Largo (280 msnm). En la parte alta de la quebrada La Peña (500 msnm) se registraron cuatro individuos, una pareja y dos individuos solitarios. Otro individuo fue visto en el camino de regreso pasando la quebrada Hualtacal, c.500 m antes de llegar al poblado Campo Nuevo. Este registro fue a 266 msnm, constituyéndose como el registro a menor altitud reportado en Piura.

(22) *Huabal, Canchaque* (05°23'60"S 79°39'16"O, 726 msnm) SC encontró 36 individuos. El 7 de marzo de 2010, en las faldas del cerro La Antena se observaron 31 individuos y se colectó uno; al siguiente día se observaron cinco individuos en las faldas del cerro Picho–El Limonal. Se encontraron grupos de cuatro a cinco individuos, en parejas y solitarios (Fig. 2). Además se encontró dos juveniles y tres nidos, que serán descritos por separado.

Discusión

Distribución y hábitat

La primera revisión de la distribución de *S. tithys* publicada en 1992, reportó 13 localidades desde Manabí, Ecuador, hasta Tumbes, Perú[5]. En la identificación de Áreas de Importancia para la Conservación de Aves (AICAs) en Perú[4] se documentó su presencia en dos AICAs en Piura: Coto de Caza El Angolo (PE002) y Suyo-La Tina (PE004). En la AICA Suyo-La Tina, se menciona que la localidad de registró fue Vado Limón cerca al cerro Piedra Tabla. En este último sitio, SC registró la especie durante el trabajo de campo. En el Coto de Caza El Angolo se menciona que un ejemplar fue atrapado cerca al límite con el Parque Nacional Cerros de Amotape por A. Begazo en la década de 1990.

El presente trabajo adiciona 19 nuevas localidades de registro de *S. tithys* en el noroeste del Perú, nueve en Tumbes y diez en Piura. El área más austral donde se había reportado previamente es la AICA Suyo-La Tina, por lo que nuestro registró en Huabal, Canchaque, extiende su rango de distribución c.110 km hacia el sur. Esta ampliación de registros sobre la cadena principal de la cordillera de los Andes incrementa significativamente su área de distribución en Perú, considerada formalmente restringida a los bosques semideciduos del extremo norte de Tumbes[5,14]. En Ecuador la especie ya es reportada anteriormente sobre la cadena principal de los Andes al oeste de Loja[5,12].

Nuestros registros también amplían el rango altitudinal anteriormente conocido en Perú (400–750 msnm[14]); con registros desde 167 msnm (localidad 10) hasta 1.290 msnm (localidad 16). El registro altitudinal más bajo encontrado para Perú, es Lechugal (60 msnm), no habiendo registros

desde 1956, pero en Ecuador está reportada incluso cerca del nivel del mar[5].

De las 22 localidades mencionadas en el trabajo, 12 (54,5%) están ubicadas sobre el bosque seco denso de colina[9,10], un tipo de bosque dominado por *Terminalia valverdae* (Combretaceae), *Ceiba trischistandra* (Malvaceae), *Eriotheca ruizii* (Malvaceae), *Cochlospermum vitifolium* (Bixaceae), *Simira ecuadorensis* (Rubiaceae), *Piscidia carthagenensis* (Fabaceae) y *Tabebuia chrysantha* (Bignoniaceae) con sotobosque semidenso y denso. Este tipo de vegetación parece ser el más importante para la especie debido al mayor número de localidades registradas.

Hacia el sur de la cordillera de los Amotapes, la especie ha sido registrada en zonas altas por encima de los 900 msnm (localidades 6–7 y 13–16), donde se encuentran bosques más húmedos y densos. Mientras, hacia el norte de esta cadena montañosa costera, la humedad y densidad de la vegetación es mayor desde las partes bajas (50 msnm) y es posible encontrar *S. tithys* tan bajo como en Lechugal (60 msnm) hasta partes altas como Campoverde y Cotrina (750–800 msnm). Sobre la cadena principal de la cordillera de los Andes la humedad del hábitat está asociada a una mayor altitud y la especie se ha registrado mayormente entre 500–1.090 msnm. Un registro excepcionalmente bajo (266 msnm) fue la en quebrada La Peña (Morropón). Este fue durante la época de lluvias (marzo) cuando la humedad y cobertura del sotobosque se incrementan sobre todo en los bordes de las quebradas. Aunque observamos una aparente relación entre la humedad del hábitat y la presencia de la especie, se recomienda evaluar con mayor detalle la misma.

En la vertiente occidental de la cordillera de los Andes en Piura, el hábitat disponible en Paimas, Sapillica, Frias y Paltashaco está fuertemente presionado por la ganadería y la agricultura extensiva, con lo cual existiría un 'cuello de botella' que fragmentaría las poblaciones entre Suyo y Morropón (Mangamanga), por lo cual se requiere evaluar nuevos sitios entre ambas localidades para confirmar o no la presencia de *S. tithys*. Hacia el sur de Huabal (localidad 22) el hábitat se continúa con los bosques secos de Huarmaca. Si bien esta zona, que incluye las partes bajas y medias del bosque de Frejolillo, ha sido intensamente evaluada y visitada por grupos de observadores de aves, no cuenta con registros de la especie, aunque las partes altas (700–1.000 msnm) aún deben explorarse en mayor detalle (F. Angulo com. pers.).

Amenazas y conservación

S. tithys es una especie dependiente de sotobosque denso en bosques no alterados perennes y deciduos, aunque ha sido registrada en hábitats secundarios e intervenidos[3,5]. Registramos a la especie en áreas medianamente intervenidas cerca a parajes de ganaderos, matorrales secundarios y bordes de bosque, constatando su tolerancia a la alteración de hábitats y el uso de estos hábitats a lo largo del año.

Las amenazas identificadas para la especie en las distintas localidades son la degradación del sotobosque por el pastoreo de ganado y la expansión agrícola[2]. Adicionalmente en el AICA Suyo-La Tina (localidades 17–19) la minería artesanal de oro, que ha crecido significativamente en los últimos cinco años, está deforestando y afectando la continuidad del hábitat. A la fecha no existen acciones de conservación sobre esta área.

De las 22 localidades reportadas, 15 se encuentran en cuatro áreas naturales protegidas ubicadas sobre la cordillera de los Amotapes: Parque Nacional Cerros de Amotape (seis localidades), Reserva Nacional de Tumbes (dos), Coto de Caza El Angolo (cuatro) y el Área de Conservación Regional Angostura–Faical (tres). Este bloque continuo de áreas bajo protección del Estado peruano (alrededor de 235.827 ha) constituye uno de los principales refugios para esta y otras especies endémicas tumbesinas y amenazadas, por lo que es necesario incrementar sus acciones de conservación. Por otro lado, en los bosques secos de colina en Piura actualmente existen iniciativas de conservación locales sobre la quebrada Tumberos (bosque de Mangamanga) y quebrada La Peña (bosque de Dotor). Allí se han impulsado algunas acciones de protección y manejo (instalación de cercos y propuestas para áreas de conservación) involucrando población organizada, autoridades locales y organizaciones no gubernamentales.

A pesar de que un 64% de las localidades de registro de *S. tithys* en Perú se encuentran en áreas naturales protegidas, se ha constatado que las amenazas sobre la especie y su hábitat persisten por los insuficientes recursos destinados a la conservación, las prácticas tradicionales de uso de estos espacios naturales (conversión de bosques naturales a campos de cultivo y degradación de hábitat por sobrepastoreo de ganado) y la falta de oportunidades alternativas de aprovechamiento para la población local.

Si bien se han incrementado el número de localidades conocidas, *S. tithys* en Perú presenta un hábitat amenazado con tendencia a la fragmentación (sobre todo para las poblaciones en Piura), que hace a la especie particularmente vulnerable a extinciones locales. Un aspecto crítico para su conservación es promover un mejor manejo de la actividad ganadera basado en una zonificación de los sitios importantes para la especie, donde se establezca restricciones de uso del bosque.

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Anexo 1. Colecciones científicas con especímenes de *Synallaxis tithys* provenientes de Perú.

TUMBES: Lechugal: (MHNJP 2847, MHNJP 21088); **Quebrada Faical–El Caucho:** Quebrada Faical, este Puesto Policía (MHNJP 4772, MHNJP 5941, CORBIDI un ejemplar sin código de espécimen, LSUMZ 92160-92172); **El Plátano:** Parque Nacional Cerros de Amotape (LSUMZ 66917, 66920, 66934, 66959, 67129, CORBIDI dos ejemplares sin código); **El Encanto:** Parque Nacional Cerros de Amotape (CORBIDI un ejemplar sin código).

PIURA: Huabal, Canchaque (CORBIDI un ejemplar sin código)

Observations on breeding of two Furnariidae in Patagonia: White-throated Cacholote *Pseudoseisura gutturalis* and Patagonian Canastero *Pseudasthenes patagonica*

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Describimos aspectos básicos de la biología reproductiva de dos especies de Furnariidae endémicas de la Argentina: el Cacholote Pardo *Pseudoseisura gutturalis* y el Canastero Patagónico *Pseudasthenes patagonica*. Además, documentamos el desarrollo de los pichones mediante fotografías y mediciones de peso. Hicimos el seguimiento de un nido de Cacholote Pardo y tres nidos de Canastero Patagónico, todos ubicados sobre arbustos espinosos a baja altura, en cercanía de Puerto Madryn, Chubut, Argentina. Ambas especies nidifican en nidos cerrados construidos con palitos espinosos. La puesta del Cacholote Pardo fue de cuatro huevos que fueron incubados durante 18 días. Los pichones permanecieron en el nido por 21 días antes de abandonar el nido de manera exitosa. Un nido del Canastero Patagónico fue seguido desde el inicio de su construcción, que llevó un mínimo de 20 días. La puesta fue de tres (dos nidos) o cuatro huevos de color blanco depositados en la cámara de incubación forrada con material vegetal blando. Los huevos eclosionaron luego de 15–16 días de incubación. Un nido fue depredado durante incubación, otro 4–5 días luego de la eclosión de los huevos y el tercero probablemente haya sido exitoso, abandonando los pichones el nido alrededor de 15 días luego de la eclosión. La duración de los períodos de incubación y permanencia en el nido de los pichones son similares a los de otras especies de los géneros *Pseudoseisura* y *Asthenes*.

The breeding biology of most species of Furnariidae is still little known and even basic data on nest building, incubation and nestling development are lacking[11]. Furnariidae in Patagonia are no exception and the few detailed studies concern mainly forest-based species[3,6]. Here we provide data on aspects of the breeding biology of two Argentine endemics that inhabit arid Patagonian steppe and shrubland: White-throated Cacholote *Pseudoseisura gutturalis* and Patagonian Canastero *Pseudasthenes patagonica*.

We searched for nests within an area of 1.4 km^2 on the outskirts of Puerto Madryn, Chubut (42°47'S 65°01'W). The study site is covered by shrubland (Monte steppe) and the dominant plant species are *Larrea nitida*, *L. divaricata*, *Condalia microphylla*, *Prosopis flexuosa*, *Prosopidastrum globosum*, *Schinus johnstonii*, *Chuquiraga avellanedae*, *C. hystrix* and *Senecio filaginoides*. Surveys were conducted on a weekly to daily basis (visits to nests being more frequent during the nestling period) in August–December 2007 and during each survey we examined the contents of known nests and searched for new nests. For those nests we suspected were active, we cut a hole into the wall of the nest chamber, which we plugged with an oversized piece of brown styrofoam[1,4,8]. The birds usually covered the foam with sticks outside. Nests were measured with tape to the nearest cm, and eggs with callipers to the nearest 0.1 mm. Due to logistical constraints Pesola spring scales were only available to us on certain dates and some body mass data are therefore lacking.

White-throated Cacholote *Pseudoseisura gutturalis*

Nest.—On 28 August we found a nest under construction. It was a half cup (47 × 42 cm) of thick twigs on a *Prospidastrum globosum* bush. On our next visit, on 15 September, the nest was completed; it was a more or less round chamber of non-thorny (c.6 mm diameter) sticks, with an entrance tube of narrower (c.2 mm) thorny sticks. The chamber was empty and the bottom lined with bark flakes from exotic poplar trees (*Populus* sp., from a nearby rubbish dump, Fig. 1a). Part of the nest material was 'recycled' from an adjacent (1.9 m) nest of the same species. Nest measurements are given in Table 1.

Eggs.—On 22 September we found one cold egg in the chamber. On 28 September the four-egg clutch was complete and the eggs were warm. Eggs white (Fig. 1a) with reddish streaks or blotches, perhaps from blood, as reported for Brown Cacholote *Pseudoseisura lophotes*[8]. Egg measurements (Table 1) slightly smaller than values previously reported[7,9], perhaps because the latter correspond to *P. g. ochroleuca* while our data pertain to *P. g. gutturalis*. On 6 and 12 October an adult was incubating the eggs.

Nestlings.—On 16 October three eggs had hatched and the fourth was hatching. The three nestlings weighed 7.8, 7.8 and 7.4 g. Nestlings had closed eyes, pink skin and were covered dorsally by long, dense, dark grey down, and had a yellow bill and gape (Fig. 1b). Dense and abundant down may permit nestlings to maintain their temperature in

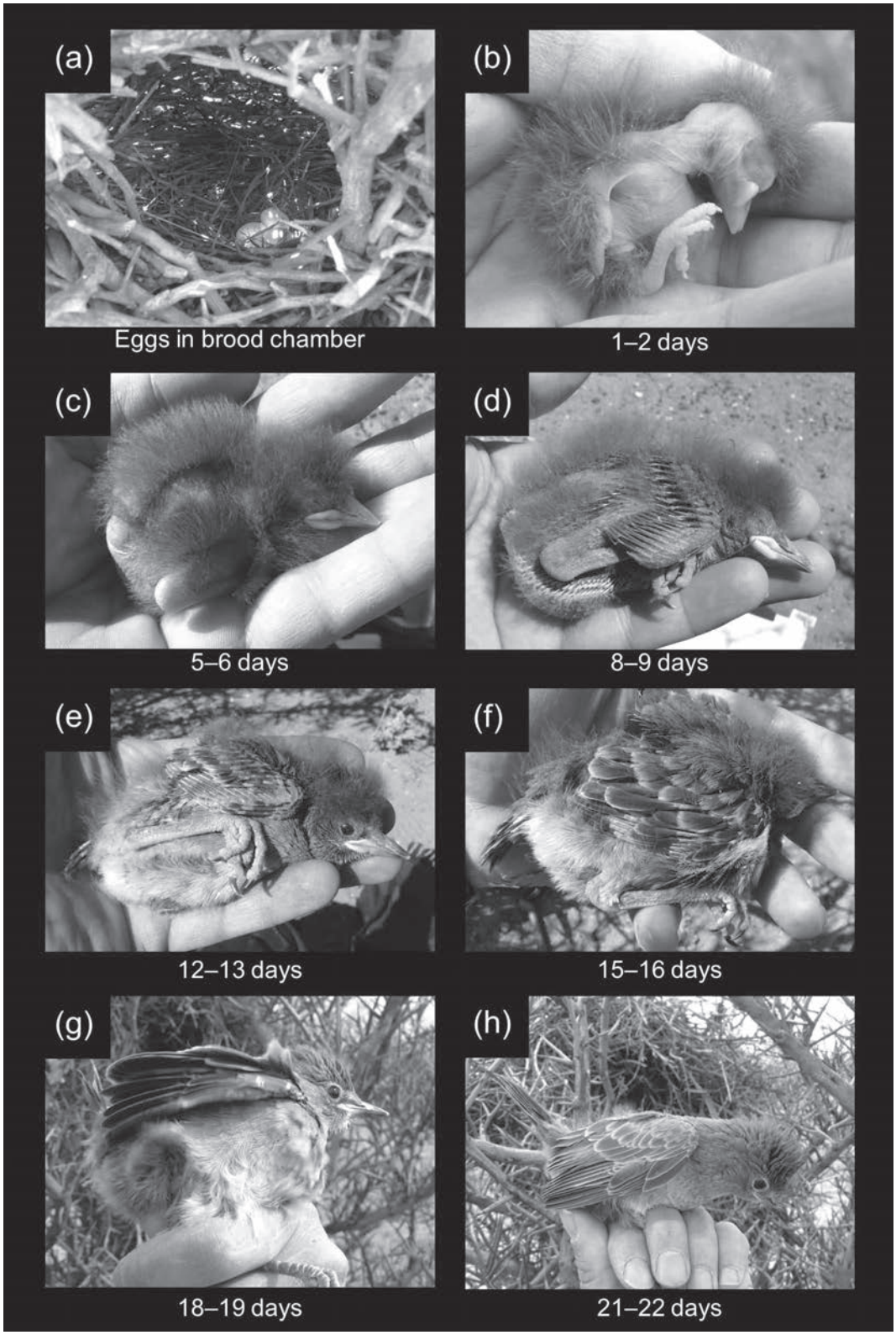

Figure 1 (facing page). White-throated Cacholote *Pseudoseisura gutturalis* eggs in brood chamber (a) as viewed through access hole (eggs numbered by us) and nestlings (b–h). Days refer to estimated nestling ages.

a nest with sparse lining (Fig. 1a). Next day the fourth egg had hatched and this nestling weighed 6.4 g. On 20 October three nestlings weighed 24 g while one was just 15 g (presumably the last to hatch). On 23 October they weighed 46, 46, 45 and 31 g, feather shafts had emerged on the wings and dorsal and ventral tracts; bill grey, eyes still closed (Fig. 1c). Adults were observed bringing a leg and tail of a lizard (*Leiosaurus belli*) to provision the nestlings[10]. On 27 October three nestlings were >50 g (max. of our available spring scales) while the smallest weighed 48 g; eyes open, and all feathers had emerged from their shafts and most of the body had definitive plumage (Fig. 1d). Adults brought a small lizard (*Liolaemus darwinii*) and a 'chinchemolle' (*Agathemera crassa*, Phasmatodea) for the nestlings. On 30 October the four nestlings had covered the inside of the brood chamber with their faeces. On 3 November they were very active and mobile, calling loudly (Fig. 1e) and one produced brown liquid faeces when handled. Two weighed 70 g and the other two 71 g. On 6 November they weighed 67, 69, 70 and 72 g. On 19 November the nest was empty and no birds were seen in the vicinity. On 8 December we observed a pair of cacholotes duetting and four fledglings 50 m from the nest. On our final visit to the territory, on 15 December, no birds were seen.

Based on these data we infer an incubation period of at least 18 days and nestling period of at least 21 days. These values are the first reported for *P. gutturalis* and are similar to those reported (18–20 days and 18–23 days respectively) for *P. lophotes* in Córdoba, Argentina[8].

Patagonian Canastero *Pseudasthenes patagonica*

Nests.—We found three nests on low bushes (Table 1). On discovery Nest 1 (on 6 October) was almost complete (an adult was bringing soft material to line the brood chamber), Nest 2 (6 October) was under construction and Nest 3 (27 October) was complete and held one cold egg. We monitored the construction process of Nest 2, which lasted at least 20 days. The nest started as an open cup of twigs (Fig. 2a) which became the base of the egg chamber. Twigs were then added to the sides to produce the walls of the chamber (Fig. 2b–c) and subsequently the entrance tunnel was built (Fig. 2d). Finally, the brood chamber was lined with soft plant material. All were constructed of thorny twigs, gourd-shaped, with a lower brood chamber connected to an entrance tube (Fig. 2d). The brood chamber was

Table 1. Summary of nest and egg measurements and other data for one White-throated Cacholote *Pseudoseisura gutturalis* and three Patagonian Canastero *Pseudasthenes patagonica* nests, near Puerto Madryn, Chubut, Argentina (2007).

		Pseudoseisura gutturalis	*Pseudasthenes patagonica*		
			Nest 1	Nest 2	Nest 3
Nest	length (cm)	80	50	58	50
	height (cm)	48	30	25	30
	diameter of entrance (cm)	9	5.5	4	5
	distance to ground (cm)	70	115	94	80
	supporting plant	*P. globosum*	*S. johnstonii*	*P. globosum*	*C. microphylla*
Eggs	no. laid	4	3	4	3
	laying date	22 Sep	11–13 Oct	10–15 Nov	26–27 Oct
	length × width (mm)	26.9 × 20.6	20.5 × 15.1	19.9 × 14.7	20.4 × 15.6
		27.7 × 21.0	21.0 × 14.7	19.3 × 14.4	20.4 × 16.0
		27.9 × 20.8	21.1 × 15.4	19.7 × 14.3	20.1 × 15.9
		27.8 × 20.8		19.6 × 14.6	
	incubation start	28 Sep	17 Oct	20 Nov	30 Oct
	hatching date	16 Oct	1–2 Nov	predated	c.15 Nov
	no. hatched	4	3	0	3
Nestlings					
	fledging date	6–19 Nov	predated	-	29 Nov–1 Dec
	number fledged	4	0	-	2 (?)

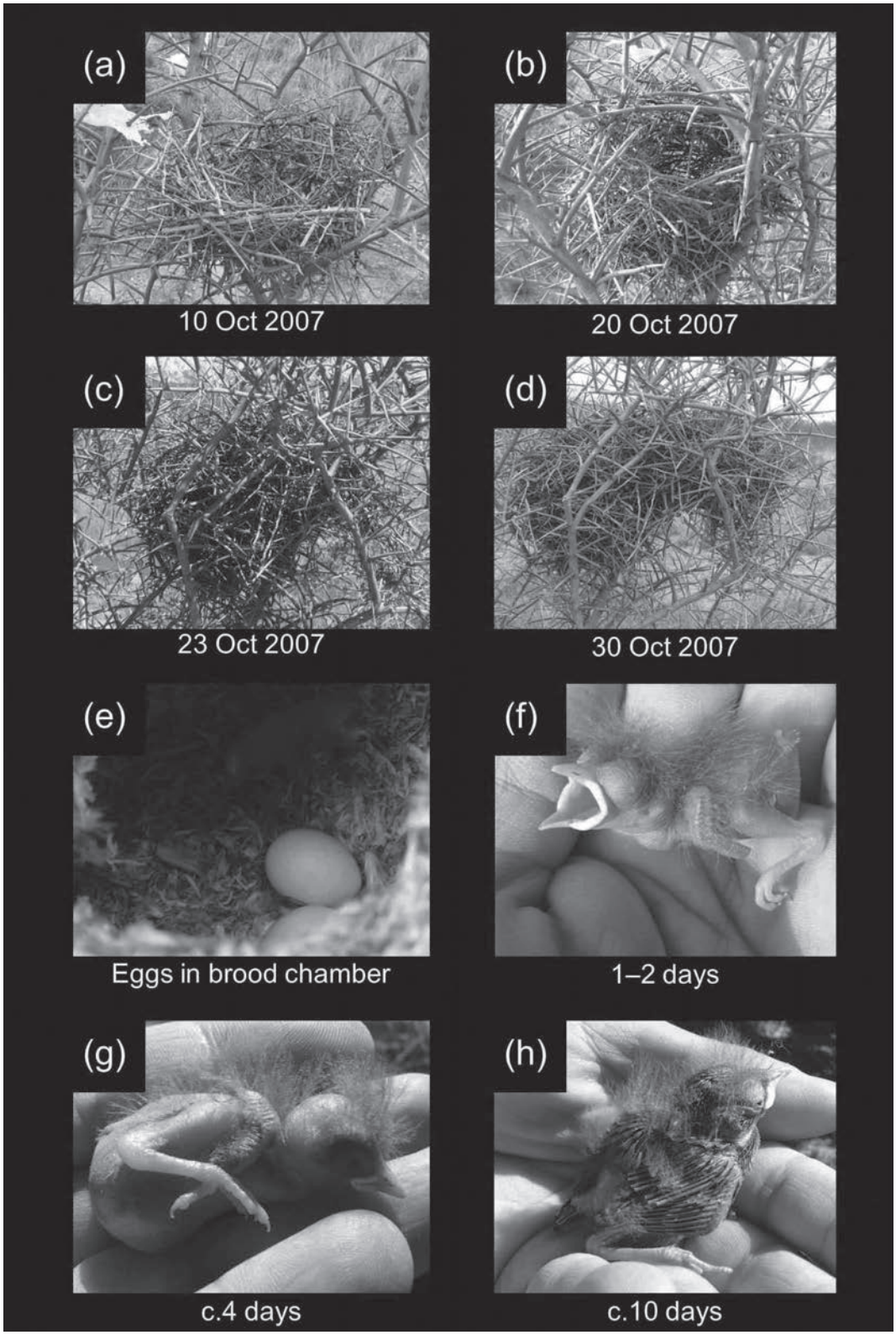

Figure 2 (facing page). Patagonian Canastero *Pseudasthenes patagonica* Nest 2 at different construction phases (a–d), eggs in brood chamber seen through the access hole cut by us (e) and nestlings (f–h). Days refer to estimated nestling ages.

lined mainly with leaves of *S. filaginoides* and pappi of *C. avellanedae* (Fig. 2e). Nest dimensions are in Table 1.

Eggs.—First eggs were laid on 11–13 October (Nest 1, three eggs), 10–15 November (Nest 2, four eggs) and 26–27 October (Nest 3, three eggs). Eggs white (Fig. 2e) although one had brown splotches which could have been blood or faeces. Egg measurements appear in Table 1 and agree with published data[7]. Incubation started on 17 October (Nest 1), 20 November (Nest 2) and 30 October (Nest 3). Nest 2 was predated during incubation (2–4 December).

Nestlings.—Eggs hatched sometime on 1–2 November (Nest 1) and c.15 November (Nest 3). Shortly after hatching, nestlings had sparse greyish dorsal down, closed eyes, yellow flanges, bill and mouth lining (Fig. 2f), and weighed 3.4, 3.6 and 3.8 g (Nest 2). These nestlings were predated sometime on 4–6 November through the styrofoam-covered hole. Older nestlings (c.4 days) in Nest 3 on 19 November had closed eyes and wing feather shafts were emerging from the skin (Fig. 2g). On 25 November nestlings (c.10 days) had started to open their eyes and feathers were emerging from the shafts on wing, tail, back and breast (Fig. 2h). On 28 November only two nestlings (13 days) were present. They were highly mobile, fully feathered and weighed 18 and 19 g. On 1 December, the nest was intact and empty. It is unclear if the nestlings fledged or were predated. Fledging is possible as the nestlings were c.15 days old and the nestling period of the similarly sized, but not especially closely related[2], Short-billed Canastero *Asthenes baeri* is 14 days[9]. Our observations, suggest an incubation period of 15–16 days which also agrees with data for *A. baeri*[5,9]. These are the first data describing nest building, incubation and nestling development for the newly recognised genus *Pseudasthenes*.

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Birds of Sete Cidades National Park, Brazil: ecotonal patterns and habitat use

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O Parque Nacional de Sete Cidades (PNSC) é uma das poucas unidades de conservação no Brasil que possuem dentro de seus limites áreas de transição ecológica envolvendo dois dos principais biomas brasileiros: Cerrado e Caatinga. Portanto é um excelente laboratório natural para estudos que envolvam a dinâmica da biota em áreas ecotonais. Durante o período de agosto de 2002 a julho de 2009 estudamos a avifauna presente nos diversos hábitats existente no PNSC afim de se avaliar a dinâmica das comunidades de aves presentes na área. Como resultados foram registradas 238 espécies de aves, pertencentes a 57 famílias. Apesar do parque apresentar estrutura florística e fisionômica do bioma Cerrado, foram registradas apenas dois espécies endêmicas desse bioma, enquanto outras cinco endêmicas da Caatinga estão presentes no Parque. A maioria das espécies registradas no PNSC é independente de formações florestais. Isso sugere que no geral a avifauna registrada no PNSC, apesar de predomínio de vegetação típica do Bioma Cerrado, reflete uma comunidade típica da Caatinga, mas com a presença de espécies dois biomas. A avifauna presente no parque pode ser classificada em dois grandes grupos ecológicos, um grupo relacionado a formações arbóreas (floresta semidecídua, mata de galeria e cerradão) e outro relacionado a formações herbáceas arbustivas (campo limpo, cerrado típico e cerrado rupestre). De um modo geral o PNSC desempenha um papel importante na manutenção de uma comunidade de aves extremamente peculiar principalmente por representar uma área de transição ecológica entre dois dos maiores biomas brasileiros, o que a torna importante não só do ponto de vista biológico, como também do ponto de vista biogeográfico.

The state of Piauí, in north-east Brazil, lies within a unique ecological transition zone between three principally or uniquely Brazilian biomes, Amazonia, Cerrado and Caatinga[1,26]. This configuration results in a complex mosaic of vegetation types, ranging from xeric Caatinga, through mesic Cerrado to more humid habitats such as babaçu *Orbignya phalerata* forests and semi-deciduous rainforest at the periphery of the Amazonian Hylea[7,22]. This diverse environment supports a variety of plants and animals from all three biomes, with varied interspecific relationships and niche partitioning. For example, in the Caatinga–Cerrado transition zone in the south of the state, Santos[28] found bird species typical of the Cerrado to be restricted to plateaux summits, whereas Caatinga species occurred only in valleys and lowlands. Thus, while the two groups occur in the same zone, they are highly segregated ecologically.

The Cerrado and Caatinga biomes share much of their recent history, having endured major transformations in the Quaternary, reflected in the composition of their respective faunas[2,6,12,41]. Consequently, detailed study of the characteristics of the transition zone between these biomes can provide the key data to understanding ecological relationships between their biotas.

In the Neotropics, however, few data are available on the ecological dynamics of such transition zones, despite that many such ecotones have suffered intense anthropogenic impacts. Degradation of these areas impedes the systematic understanding of ecological and historical processes that have moulded their communities. However, one outstanding example of a transition zone that has been little impacted is northern Piauí's Sete Cidades National Park (SCNP), which encompasses the Caatinga–Cerrado ecotone, and provides an excellent natural laboratory to analyse ecological factors that determine the composition and dynamics of the communities inhabiting these areas. The present study focuses on three main questions: (i) the composition of the avian community of Sete Cidades National Park; (ii) the distribution of these species in an area of ecological transition, and (iii) the dynamics of this avifauna within the mosaic of habitat types inside the park.

Study area and Methods

Sete Cidades National Park (SCNP) is situated in the state of Piauí (Fig. 1), between the municipalities of Piracuruca and Brasileira (04°05'–04°15'S 41°30'–41°45'W). This region coincides with the transition between the Cerrado and Caatinga biomes. Climate is semi-arid equatorial, with a six-month dry season. Mean annual temperatures range from 24°C to 26°C, with mean annual precipitation of 1,000–1,250 mm.

With an area of 6,221 ha and a 40-km perimeter, SCNP encompasses a series of sedimentary basins

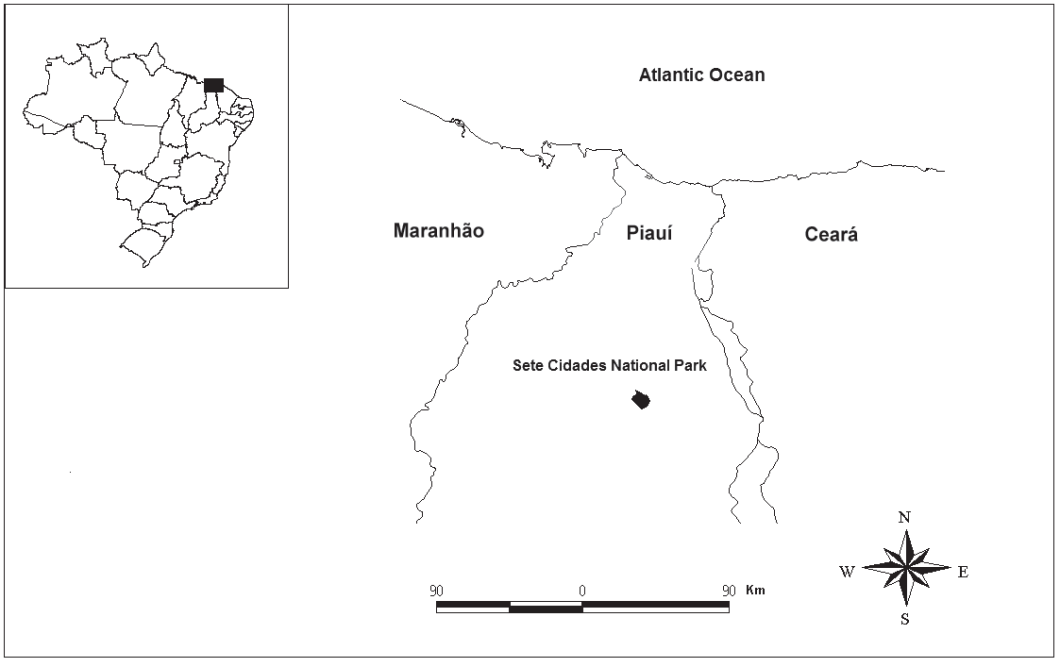

Figure 1. Location of Sete Cidades National Park in the Brazilian state of Piauí.

at altitudes of 100–300 m[16]. Some 22 freshwater springs occur within the park, giving rise to watercourses lined by marshes and gallery forest. Oliveira[22] classified the park's vegetation in three functional categories: forests, savannas and grassland. The same author recognised six distinct habitat types within these three categories: open grassland, savanna, rocky savanna, savanna woodland, gallery forest, and semi-deciduous scrub forest[22].

Open grassland (Og) is a predominantly herbaceous formation, with vegetation up to 1.5 m tall, and a predominance of plants belonging to the Gramineae, Leguminosae, Asteraceae and Amaranthaceae. Savanna (Sv) typically comprises two main strata, a low-lying herbaceous-shrubby layer and a taller arboreal stratum, reaching up to 5 m tall. The latter is composed of small, irregularly shaped trees with misshapen branches and dense, ridged bark, characteristic of the central Brazilian Cerrado. This is the commonest vegetation type in the park. Rocky savanna (Rs) possesses a unique flora, characterised by relatively small plants up to 2 m tall and well adapted to dry conditions. This vegetation occurs among outcrops of sedimentary and ferruginous rocks. Savanna woodland (Sw) is the commonest arboreal habitat within the park, where it is almost always contiguous with semi-deciduous scrub forest. It is similar to Sv, but has a sparser understorey and a better-developed arboreal layer, with straight-trunked trees up to 7 m tall, typically with thin, relatively smooth bark.

Gallery forest (Gf) comprises narrow strips of forest at the margins of rivers and streams. This is the least common forest habitat in the park. The canopy is irregular, varying from 8 m to 12 m, with abundant palms and lianas, a herbaceous understorey and a dense layer of leaf litter. In the wet season, the water table rises above the soil surface, gradually subsiding in the dry season. Leaf litter accumulates from leaf fall within the habitat and horizontal transport from adjacent habitats.

Dry forest ('semi-deciduous scrub forest') (Df) is a relatively dense habitat with trees up to 9 m tall and abundant shrubs in the understorey. There is no herbaceous stratum or epiphytes, but abundant lianas, both in terms of individuals and species. Seasonally flooded pools (Sp) form during the wet season, in January–May.

The present study was conducted between August 2002 and July 2009. Fifteen field excursions were made, each of mean duration four days, with an overall total of 75 days of data collection in SCNP. Survey periods were: 8–15 August 2002, 12–19 September 2003, 9–12 April 2004, 23–26 July 2004, 13–16 May 2005, 7–10 April 2006, 25–28 August 2006, 9–13 May 2007, 11–16 October 2007, 8–11 February 2008, 2–5 May 2008, 24–27 October 2008, 5–9 February 2009, 3–7 April 2009 and 24–28 July 2009. Both visual and aural records of

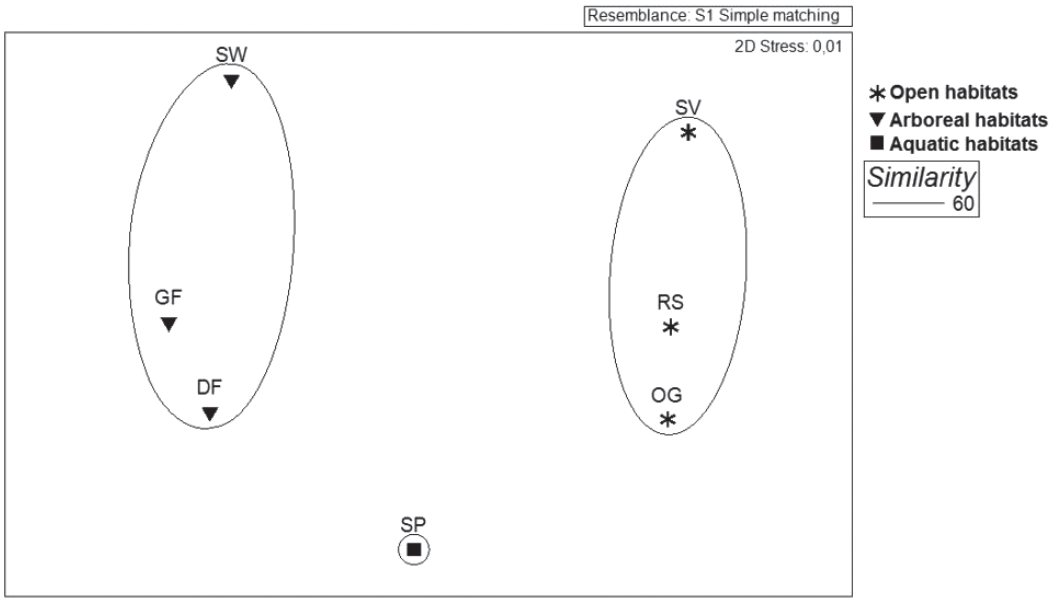

Figure 2. Non-metric multidimensional scaling for bird communities in SCNP, using data in the presence / absence form. Habitat: (Og) open grassland, (Rs) rocky savanna, (Sv) savanna proper, (Sw) Savanna woodland, (Gf) gallery forest, (Df) dry forest and (Sp) seasonal pools.

birds in the study area were also collected during periods other than these surveys, to maximise sampling effort. Data were collected using four complementary approaches.

Visual records: systematic observations preferentially conducted during mornings (05h00–11h00) and afternoons (16h00–18h00) to ensure the recording of both diurnal and nocturnal species. Observers walked pre-existing trails and roads within all six habitats at SCNP.

Aural records: birds were also identified by their vocalisations, which were recorded using a Sony TCM 5000EV tape recorder and a Sennheiser ME-66 shotgun unidirectional microphone; when necessary, playback was used to stimulate additional vocalisations. If identification could not be achieved in the field, recordings were compared with those held privately or in public collections.

Mist-netting; birds were captured using mist-nets (12 m × 2.5 m; 36-mm mesh) set in the undergrowth in a linear sequence, to avoid overlap between them. Two sets of ten nets were employed simultaneously. During each survey, two habitats were sampled using mist-nets, which were set on three consecutive days within each area. This had two principal objectives: (i) to obtain data on species composition and richness in each habitat type, and (ii) to obtain specimens.

Specimens: some 124 individuals, of 40 species, were collected during mist-netting. Most were taxidermized, or fixed in formaldehyde and then conserved in ethanol. The carcasses of all of the taxidermized specimens were fixed and conserved in ethanol. Tissue samples (muscle, liver and blood, when possible) were also collected from all specimens, as well as biometric data (total length and mass). The *in vivo* coloration of the bare parts was also noted on the specimen labels. Specimen collection was authorised by IBAMA through special license DIREC 026/2007 (process no. 02001.006754/06-92) and specimens are deposited at the Museu Paraense Emílio Goeldi, Belém, Pará.

The degree of dependence of species on forested habitats in SCNP was evaluated using three categories: (1) Independent = found only in open habitats (Og, Sv, Rs); (2) Semi-dependent = recorded in at least one open (Og, Sv, Rs) and one forested habitat (Sw, Gf, Df); (3) Dependent = only in forested habitat (Sw, Gf, Sf). In addition to field observations, data on habitat use were obtained from Silva[31,33].

Multidimensional scaling (MDS) was used to visualise the community compositions of the habitats in two-dimensional space[17]. A one-way analysis of similarity (ANOSIM) was used to test for significant differences in community composition between diferent habitats. All multivariate analyses were conducted using PRIMER 6.0 (Plymouth Routines In Multivariate Ecological Research)

Taxonomic classification follows CBRO[8].

Results

Species richness and avian community of Sete Cidades National Park.—Some 238 bird species from 57 families were recorded in SCNP during the study. Just one—Bearded Bellbird *Procnias averano*—is included in the Brazilian list of threatened species. Three others, Buff-browed Chachalaca *Ortalis superciliaris*, Blue-winged Macaw *Primolius maracana* and Caatinga Antwren *Herpsilochmus sellowi*, are listed as Near Threatened. Our records of White-rumped Tanager *Cypsnagra hirundinacea* and Dull-coloured Grassquit *Tiaris fuliginosus* represent the northernmost records in the Cerrado. In Piauí, the previous northernmost record for *C. hirundinacea* involved three specimens taken by Emil Kaempfer in June 1926, in the vicinity of Teresina, c.180 km south of SCNP (AMNH 245580–82). *T. fuliginosus* was known in Piauí from just two records, one collected in 2001 by Silveira *et al*.[35] at Uruçuí-una Ecological Station in the south. In 2003, MPDS collected two at Nazareth Eco in the municipality of José de Freitas, in the north-centre of the state (MPEG 68788–89). The record from SCNP represents a northward extension of c.150 km. We also observed Short-tailed Swift *Chaetura brachyura* in SCNP, for the first time in Piauí: on 11 May 2007 eight were over the park's waterfall, and on 5 April 2009, six were seen over an area of savanna woodland. The species is common in Amazonia, with records from as close as coastal Maranhão, but the species might only be a vagrant to northern Piauí.

Ecotonal patterns.—Almost half (44.5%) of the species were classified as independent of forested habitat, while one-third (33.2%) were semi-dependent and just 22.3% dependent on this type of habitat. The number of species per category was significantly different from expected (χ^2 = 17.706, d.f. = 1, p < 0.001). Among Cerrado endemics, Curl-crested Jay *Cyanocorax cristatellus* is semi-dependent and Black-throated Saltator *Saltatricula atricollis* independent of forest habitat. Among Caatinga endemics Spotted Piculet *Picumnus pygmaeus* is dependent, Caatinga Antwren *Herpsilochmus sellowi* and Caatinga Antshrike *Thamnophilus capistratus* semi-dependent, and White-throated Seedeater *Sporophila albogularis* and Red-cowled Cardinal *Paroaria dominicana* independent of forest habitat.

Habitat use.—Savanna habitat had the highest species richness (n = 138), followed by savanna woodland with 125 species, gallery forest with 88, and rocky savanna with 73. Open grassland (n = 69) and scrub forest (n = 49) were the species-poorest of the main habitats, while seasonal pools supported just 21 species. Gallery and scrub forests were also the most similar in terms of composition of their avifauna, at 70%. Open grassland and rocky savanna were almost as similar (68%), as were savanna and rocky savanna (65%). The species distribution analysis among the different habitats revealed two main groups, one associated with arboreal habitats (Sw, Gf, Sf), the other to open habitats (Og, Sv, Rs). The marked similarity between habitats appears to be related to the fact that few species (32) were associated with a single type. By contrast, 86 species were associated with two habitats and 103 with three, i.e. c.80% of bird species recorded at SCNP were associated with 2–3 different habitats.

MDS supports the two distinct groups representing forested and open areas (Fig. 2), while ANOSIM provides statistical support, confirming that communities in the two habitats are significantly different (global R = 0.911; p = 0.01).

Discussion

Species richness and avian community of Sete Cidades National Park.—The total number of species in SCNP is among the highest in the region, including other sites in Piauí and Ceará which possess between 146 and 254 species. In Ceará, 146 species were recorded by Nascimento[20] in Ubajara National Park, while Farias[13] reported 174 species in Serra das Almas Natural Reserve. Surveys of another area in northern Piauí, Nazareth Eco, produced 230 species (MPDS pers. obs). Further south, several protected areas have been surveyed, including Serra da Capivara National Park, where 208 bird species were recorded by Olmos[23], and Serra das Confusões National Park, where Silveira & Santos[34] found 222 species. Zaher[42] also recorded 235 species in Uruçuí-uma Ecological Station, while Santos[27] listed 254 species for Nascentes do Rio Parnaíba National Park.

The relatively extended sampling period of the present study implies that the inventory was comprehensive, supported by the fact that the number of recorded species was the second highest among all of these studies. However, evidence from field work in the early 20th century suggests that 15 species not recorded during the present study probably occur within SCNP. In the 1920s, the German ornithologist Heinrich Snethlage collected birds at three localities close to the SCNP—Deserto (c.35 km north of the park), Arara (c.118 km south-east) and Ibiapaba, 70 km south-east of the park, and close to the border with Ceará. Fifteen species recorded at these sites[15,36,37], were not found in SCNP.

Vegetation at Deserto is very similar to that in SCNP, whereas Arara and Ibiapaba are typical of the Caatinga proper. Six of the 15 species are considered to be endemic to the Caatinga. Three—Broad-tipped Hermit *Anopetia gounellei*, Red-shouldered Spinetail *Gyalophylax hellmayri*

and Silvery-cheeked Antshrike *Sakesphorus cristatus*—were recorded at Arara, and two (Cactus Parakeet *Aratinga cactorum* and Moustached Woodcreeper *Xiphocolaptes falcirostris*) at Ibiapaba. The sixth, White-browed Guan *Penelope jacucaca*, was registered in ecotonal vegetation at Deserto. Including these species, a total of 11 species endemic to the Caatinga occur in northern Piauí.

Of the other species recorded by Snethlage at the three sites, but not observed in SCNP, Versicoloured Emerald *Amazilia versicolor* was recorded at Deserto and Arara. Pied Lapwing *Vanellus cayanus* was confirmed at Deserto, while three others were found at Arara; Little Wood Rail *Aramides mangle*, Stripe-backed Antbird *Myrmorchilus strigilatus* and Pied Water Tyrant *Fluvicola pica*. The other four species, Bicoloured Hawk *Accipiter bicolor*, Least Sandpiper *Calidris minutilla*, Collared Plover *Charadrius collaris* and Nacunda Nighthawk *Podager nacunda*, were all recorded at Ibiapaba. If most or all of these species are in fact present in SCNP, the species total would reach at least 250, close to the max. recorded in the region[27].

Ecotonal patterns.—While SCNP is dominated by Cerrado habitats, only two of the 30 species considered endemic to this biome by Silva[31] and Silva & Santos[32] were recorded in the present study; *Cyanocorax cristatellus* and *Saltatricula atricollis*. In addition, several other, widely distributed species recorded by us are normally associated with the Cerrado, e.g. Red-legged Seriema *Cariama cristata*, Peach-fronted Parakeet *Aratinga aurea*, Narrow-billed Woodcreeper *Lepidocolaptes angustirostris* and *Cypsnagra hirundinacea*.

Similarly, only five of the 24 species considered endemic to the Caatinga by Stotz[38] and Pacheco[25] were observed in SCNP: *Picumnus pygmaeus*, *Herpsilochmus sellowi*, *Thamnophilus capistratus*, *Sporophila albogularis* and *Paroaria dominicana*. Several other species recorded in the present study are also typically associated with the xeric formations of the Brazilian north-east, including Picui Ground Dove *Columbina picui*, Caatinga Cacholote *Pseudoseisura cristata*, White-naped Jay *Cyanocorax cyanopogon*, Long-billed Wren *Cantorchilus longirostris*, Scarlet-throated Tanager *Compsothraupis loricata*, Pileated Finch *Lanio pileatus* and Campo Troupial *Icterus jamacaii*.

An interesting pattern is observed in the juxtaposition of Caatinga and Cerrado avifaunas in this ecotonal region. The number of Cerrado endemics in bird communities of the central Brazilian plateau is generally 12–14[4,5,21], falling to 6–8 in the north, in northern Tocantins and southern Maranhão and Piauí[14,24,27]. In the northern transition zone, however, which includes SCNP, only four endemics occur[18]. In other words, there is a clear and systematic decline in the number of endemic Cerrado species, from the central nucleus to the periphery.

The pattern appears to be exactly the opposite in the Caatinga. While sites located in the centre of the biome possess c.5 endemics[13,39], this increases to eight in intermediate areas[13,19] and 10–15 in the transition zone with the Cerrado[23,28,34].

Despite the reduced number of endemics from either biome observed in the present study, the same general pattern was observed at SCNP, with more than twice as many Caatinga endemics as Cerrado species being recorded. This appears to reflect a dynamic process of historical fluctuations combined with present-day ecological factors.

The marginal nature of savanna formations in the northernmost Cerrado may explain the reduced number of endemics. This same habitat may not be appropriate for the majority of Caatinga endemics. The scenario recorded in SCNP appears distinct from that of other transitional areas in southern Piauí, where Santos[28] found that endemic Caatinga and Cerrado species segregated by habitat. At SCNP, in contrast, these species used the same habitats. This difference may be related to the greater ecological flexibility of Cerrado species found in northern Piauí, permitting them to exploit a wider variety of habitats in comparison to species observed in the south of the state[28].

An additional factor may be dependence of species on forested habitats. This contrasts with typical Cerrado communities, in which most species are dependent on forested habitat[30–32], and is more similar to the pattern observed in the Caatinga[33]. This suggests that, while Cerrado habitats predominate at SCNP, its avifauna is more typical of the Caatinga, despite the presence of species typical of both biomes. In other words, the avian community of the site is typical of the ecotone between the Caatinga and Cerrado, the two largest open-habitat formations in Brazil.

The relationship between the two communities reflects the complex evolutionary processes that occurred during the Quaternary, and influenced the present-day distribution of species in both biomes[29]. During this period, especially due to glacial events, the distribution and configuration of habitats fluctuated considerably[2,3]. During glacial periods, the climate of South America was colder and drier, favouring the expansion of Caatinga and Chaco scrublands, replacing denser *cerrado* and the Atlantic and Amazon forests, which shrank into isolated refuges either on the central Brazilian plateau (Cerrado) or its periphery, such as the foothills of the Andes and coastal eastern Brazil, in the case of forests. The opposite process occurred during warmer and more humid interglacial periods, with forest ecosystems expanding into areas previously occupied by xeric scrublands. During

these periods, the Caatinga and Chaco retreated into the dry lowlands of north-east and central / south-west South America, respectively[2,6,41].

Overall, Caatinga species are commoner in the transition zone than Cerrado species, which may reflect the relative availability of different habitats in the region, but may also be related to the complex recent history of the two biomes. The current geomorphological scenario is one of progressive erosion of plateaux, which are being substituted by peripheral lowlands. Within this context, the Caatinga is gaining ground over the Cerrado within the transition zone[11], and the diversity of birds within this zone is consistent with this process. As Caatinga species expand into newly formed lowland areas, Cerrado species are restricted to residual plateaux.

Habitat use.—The apparent preference for open habitats is consistent with a predominance of Caatinga species, which are generally less dependent on forest formations. The two Cerrado endemics recorded at SCNP (*Cyanocorax cristatellus* and *Saltatricula atricollis*) occurred in savanna and rocky savanna. Three Caatinga endemics—*Thamnophilus capistratus*, *Sporophila albogularis* and *Paroaria dominicana*—also preferred open habitats, e.g. savanna, open grassland and rocky savanna, whereas *Picumnus pygmaeus* and *Herpsilochmus sellowi* occurred mainly in gallery and scrub forests.

One of the characteristics of the Cerrado is the marked seasonality of precipitation, which provokes considerable variation in the availability of essential food resources, e.g. winged insects and flowers. This cycle is reflected in reproductive patterns and migratory movements between habitats and geographic areas[9,10,21]. Proximity of different *cerrado* habitats also facilitates movements among areas to access seasonally available resources[10,40].

Overall, the avifauna of SCNP is more typical of the Caatinga than the Cerrado, despite that the park's vegetation is dominated by Cerrado formations. From an ecological viewpoint, the avifauna conforms to the characteristic pattern displayed in north-eastern Brazil, indicating that this protected area plays a fundamentally important role in the conservation of the unique avifauna of this complex transition zone, reinforcing its significance from biological and zoogeographic perspectives.

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Appendix 1. List of bird species recorded in Sete Cidades National Park, Piauí. Habitat: (Og) open grassland, (Rs) rocky savanna, (Sv) savanna proper, (Sw) Savanna woodland, (Gf) gallery forest, (Df) dry forest and (Sp) seasonal pools. Habitat use: (1) species independent of forest habitats, (2) species semi-dependent on forest habitats and (3) species dependent on forest habitats. Documentation: (Ob) sight, (Vc) vocalisation heard, (Vr) vocalisation recorded, (Cp) mist-netted and (MPEG) specimen (deposited at Museu Paraense Emílio Goeldi).

Scientific name	English name	Habitat	Habitat use	Documentation
TINAMIDAE (4)				
Crypturellus parvirostris	Small-billed Tinamou	Og, Rs, Sv	1	Ob, Vc, Vr
Crypturellus tataupa	Tataupa Tinamou	Gf, Df	3	Ob, Vc, Vr
Rhynchotus rufescens	Red-winged Tinamou	Og, Rs, Sv	1	Ob, Vc
Nothura boraquira	White-bellied Nothura	Og, Rs, Sv	2	Ob, Vc, Vr
ANATIDAE (4)				
Dendrocygna viduata	White-faced Whistling Duck	Sp	1	Ob, Vc
Dendrocygna autumnalis	Black-bellied Whistling Duck	Sp	1	Ob
Sarkidiornis sylvicola	Comb Duck	Sp	1	Ob
Amazonetta brasiliensis	Brazilian Teal	Sp	1	Ob
CRACIDAE (2)				
Ortalis superciliaris	Buff-browed Chachalaca	Sv, Sw, Gf, Df	2	Ob, Vc, Vr
Penelope superciliaris	Rusty-margined Guan	Sw, Gf, Df	3	Ob, Vc, Vr
PODICIPEDIDAE (1)				
Tachybaptus dominicus	Least Grebe	Sp	1	Ob
ARDEIDAE (5)				
Tigrisoma lineatum	Rufescent Tiger Heron	Sp	1	Ob
Butorides striata	Striated Heron	Sp	1	Ob
Bubulcus ibis	Cattle Egret	Sp	1	Ob
Ardea alba	Great Egret	Sp	1	Ob
Egretta thula	Snowy Egret	Sp	1	Ob
THRESKIORNITHIDAE (1)				
Theristicus caudatus	Buff-necked Ibis	Og, Sp	1	Ob, Vc, Vr
CATHARTIDAE (4)				
Cathartes aura	Turkey Vulture	Sw	1	Ob
Cathartes burrovianus	Lesser Yellow-headed Vulture	Rs, Sv	1	Ob
Coragyps atratus	Black Vulture	Og, Rs, Sv	1	Ob
Sarcoramphus papa	King Vulture	Sw	2	Ob
ACCIPITRIDAE (10)				
Leptodon cayanensis	Grey-headed Kite	Sw, Gf, Df	3	Ob, Vr
Elanoides forficatus	Swallow-tailed Kite	Og, Rs, Sv	1	Ob
Gampsonyx swainsonii	Pearl Kite	Sw	1	Ob, Cp, MPEG
Elanus leucurus	White-tailed Kite	Og, Sv	1	Ob
Ictinia plumbea	Plumbeous Kite	Og, Sv, Df	2	Ob
Rostrhamus sociabilis	Snail Kite	Og, Gf	1	Ob
Geranospiza caerulescens	Crane Hawk	Sv, Sw	2	Ob
Heterospizias meridionalis	Savanna Hawk	Og, Rs, Sv	1	Ob
Rupornis magnirostris	Roadside Hawk	Rs, Sv, Sw	1	Ob, Vc, Vr, Cp
Geranoaetus albicaudatus	White-tailed Hawk	Rs, Sv, Sw	1	Ob

Scientific name	English name	Habitat	Habitat use	Documentation
FALCONIDAE (8)				
Caracara plancus	Southern Caracara	Rs, Og, Sv	1	Ob
Milvago chimachima	Yellow-headed Caracara	Rs, Og, Sv	1	Ob, Vc, Vr
Herpetotheres cachinnans	Laughing Falcon	Sv, Sw, Gf, Df	2	Ob, Vc, Vr
Micrastur ruficollis	Barred Forest Falcon	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
Micrastur semitorquatus	Collared Forest Falcon	Sw, Gf, Df	2	Ob, Vc, Vr
Falco sparverius	American Kestrel	Rs, Og, Sv	1	Ob
Falco rufigularis	Bat Falcon	Sw, Df	3	Ob
Falco femoralis	Aplomado Falcon	Og, Sv, Sw	1	Ob
ARAMIDAE (1)				
Aramus guarauna	Limpkin	Sp	1	Ob
RALLIDAE (3)				
Aramides cajanea	Grey-necked Wood Rail	Gf	2	Ob, Vc, Vr
Gallinula galeata	Common Moorhen	Sp	1	Ob
Porphyrio martinicus	Purple Gallinule	Sp	1	Ob
CARIAMIDAE (1)				
Cariama cristata	Red-legged Seriema	Og, Rs, Sv	1	Ob, Vc, Vr
CHARADRIIDAE (1)				
Vanellus chilensis	Southern Lapwing	Og, Sp	1	Ob, Vc, Vr
SCOLOPACIDAE (3)				
Gallinago paraguaiae	South American Snipe	Sp	1	Ob, Vc, Vr
Actitis macularius	Spotted Sandpiper	Sp	1	Ob
Tringa solitaria	Solitary Sandpiper	Sp	1	Ob
JACANIDAE (1)				
Jacana jacana	Wattled Jacana	Sp	1	Ob
COLUMBIDAE (9)				
Columbina minuta	Plain-breasted Ground Dove	Og, Rs, Sv	1	Ob, Vc, Vr, Cp
Columbina talpacoti	Ruddy Ground Dove	Og, Rs, Sv, Sw	1	Ob, Vc, Vr, Cp, MPEG
Columbina squammata	Scaled Dove	Og, Rs, Sv	1	Ob, Vc, Vr, Cp, MPEG
Columbina picui	Picui Ground Dove	Og, Rs, Sv	1	Ob, Vc, Vr, Cp
Claravis pretiosa	Blue Ground Dove	Og, Rs, Sv, Sw	2	Ob, Vc
Patagioenas picazuro	Picazuro Pigeon	Sv	2	Ob, Vc
Zenaida auriculata	Eared Dove	Og, Rs, Sv	1	Ob
Leptotila verreauxi	White-tipped Dove	Sv, Sw	2	Ob, Vc, Vr, Cp
Leptotila rufaxilla	Grey-fronted Dove	Sw, Gf, Df	3	Ob, Vc, Vr, Cp
PSITTACIDAE (6)				
Primolius maracana	Blue-winged Macaw	Sv, Sw	2	Ob, Vc, Vr
Aratinga leucophthalma	White-eyed Parakeet	Sw, Gf	2	Ob, Vc, Vr
Aratinga aurea	Peach-fronted Parakeet	Rs, Sw, Gf	1	Ob, Vc, Vr
Forpus xanthopterygius	Blue-winged Parrotlet	Og, Sv	1	Ob, Vc, Vr, Cp
Pionus maximiliani	Scaly-headed Parrot	Og, Sv	2	Ob, Vc, Vr
Amazona aestiva	Blue-fronted Parrot	Sw, Gf, Df	3	Ob, Vc, Vr
CUCULIDAE (8)				
Piaya cayana	Squirrel Cuckoo	Sw, Gf	2	Ob, Vc
Coccyzus melacoryphus	Dark-billed Cuckoo	Sv, Sw	2	Ob
Coccyzus euleri	Pearly-breasted Cuckoo	Sv, Sw	2	Cp, MPEG
Crotophaga major	Greater Ani	Sv, Sw	2	Ob, Vc, Vr
Crotophaga ani	Smooth-billed Ani	Og, Rs, Sv	1	Ob, Vc
Guira guira	Guira Cuckoo	Og, Sv	1	Ob, Vc
Tapera naevia	Striped Cuckoo	Og, Rs, Sv	1	Ob, Vc, Vr, Cp
Dromococcyx phasianellus	Pheasant Cuckoo	Sw, Df	3	Ob, Vc, Vr
TYTONIDAE (1)				
Tyto alba	Barn Owl	Sv, Sw	1	Ob, Vc
STRIGIDAE (3)				
Megascops choliba	Tropical Screech Owl	Og, Sv	2	Ob, Vc, Vr
Glaucidium brasilianum	Ferruginous Pygmy Owl	Og, Sv, Sw	2	Ob, Vc, Vr

Scientific name	English name	Habitat	Habitat use	Documentation
Athene cunicularia	Burrowing Owl	Og, Sv, Sw	1	Ob, Vc, Vr
NYCTIBIIDAE (1)				
Nyctibius griseus	Common Potoo	Sw	2	Ob, Vc, Vr
CAPRIMULGIDAE (3)				
Hydropsalis albicollis	Pauraque	Og, Rs, Sv	2	Ob, Vc, Vr
Hydropsalis parvula	Little Nightjar	Og, Rs, Sv	1	Ob, Vc
Hydropsalis torquata	Scissor-tailed Nightjar	Rs, Sv	1	Ob, Vc, Vr, MPEG
APODIDAE (3)				
Cypseloides senex	Great Dusky Swift	Gf	1	Ob, MPEG
Chaetura brachyura	Short-tailed Swift	Sv, Sw	2	Ob
Tachornis squamata	Fork-tailed Palm Swift	Sw, Gf	1	Ob
TROCHILIDAE (10)				
Phaethornis ruber	Cinnamon-throated Hermit	Sv, Sw, Gf, Df	2	Ob, Cp
Phaethornis pretrei	Planalto Hermit	Sv, Sw, Gf	2	Ob, Cp
Eupetomena macroura	Swallow-tailed Hummingbird	Rs, Sv	1	Ob, Cp
Anthracothorax nigricollis	Black-throated Mango	Rs, Sv, Sw	2	Ob
Chrysolampis mosquitus	Ruby-topaz Hummingbird	Rs, Sv, Sw	1	Ob
Chlorostilbon lucidus	Glittering-bellied Emerald	Og, Rs, Sv	2	Ob, Cp, MPEG
Thalurania furcata	Fork-tailed Woodnymph	Sv, Sw, Gf	2	Ob, Cp
Polytmus guainumbi	White-tailed Goldenthroat	Rs, Sv	1	Ob
Amazilia fimbriata	Glittering-throated Emerald	Sv, Sw	2	Ob, Cp
Heliothryx auritus	Black-eared Fairy	Og, Sv, Sw	3	Ob
TROGONIDAE (1)				
Trogon curucui	Blue-crowned Trogon	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
ALCEDINIDAE (2)				
Chloroceryle amazona	Amazon Kingfisher	Og, Gf	2	Ob
Chloroceryle americana	Green Kingfisher	Og, Gf	2	Ob
GALBULIDAE (1)				
Galbula ruficauda	Rufous-tailed Jacamar	Sw, Gf	2	Ob, Vc, Vr, Cp, MPEG
BUCCONIDAE (2)				
Nystalus maculatus	Spot-backed Puffbird	Rs, Sv, Sw, Gf	1	Ob, Vc, Vr, Cp, MPEG
Chelidoptera tenebrosa	Swallow-wing	Sv, Sw, Gf	2	Ob, Vc
RAMPHASTIDAE (2)				
Ramphastos toco	Toco Toucan	Sv, Sw, Df	2	Ob, Vc
Pteroglossus inscriptus	Lettered Aracari	Sw, Gf, Df	3	Ob, Vc
PICIDAE (8)				
Picumnus pygmaeus	Spotted Piculet	Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
Melanerpes candidus	White Woodpecker	Og, Rs, Sv	2	Ob, Vc, Vr
Veniliornis passerinus	Little Woodpecker	Sv, Gf	2	Ob, Vc, Vr, Cp, MPEG
Piculus chrysochloros	Golden-green Woodpecker	Sw, Gf, Df	3	Ob, Vc, Vr
Colaptes melanochloros	Green-barred Woodpecker	Sv, Sw, Gf, Df	2	Ob, Vc
Celeus flavescens	Blond-crested Woodpecker	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
Dryocopus lineatus	Lineated Woodpecker	Sv, Sw, Gf, Df	2	Ob, Vc, Vr
Campephilus melanoleucos	Crimson-crested Woodpecker	Gf, Df	3	Ob, Vc, Vr
THAMNOPHILIDAE (9)				
Formicivora grisea	White-fringed Antwren	Sw	2	Ob, Vc, Vr
Formicivora melanogaster	Black-bellied Antwren	Rs, Sv, Sw	2	Ob, Vc, Vr, Cp, MPEG
Formicivora rufa	Rusty-backed Antwren	Og, Rs	1	Ob, Vc, Vr, Cp, MPEG
Herpsilochmus sellowi	Caatinga Antwren	Sw, Gf, Df	2	Ob, Vc, Vr, Cp, MPEG
Herpsilochmus atricapillus	Black-capped Antwren	Sv, Sw, Gf	3	Ob, Vc, Vr, Cp
Thamnophilus capistratus	Caatinga Antshrike	Rs, Sv, Sw	2	Ob, Vc, Vr, Cp
Thamnophilus torquatus	Rufous-winged Antshrike	Rs, Sw, Gf	1	Ob, Vc, Vr
Thamnophilus pelzelni	Planalto Slaty Antshrike	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
Taraba major	Great Antshrike	Sw, Gf	2	Ob, Vc, Vr, Cp
CONOPOPHAGIDAE (1)				
Conopophaga roberti	Hooded Gnateater	Df	3	Ob, Vc, Vr

Scientific name	English name	Habitat	Habitat use	Documentation
DENDROCOLAPTIDAE (5)				
Sittasomus griseicapillus	Olivaceous Woodcreeper	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Campylorhamphus trochilirostris	Red-billed Scythebill	Sw, Gf, Df	3	Ob, Vc, Vr
Dendroplex picus	Straight-billed Woodcreeper	Sv, Sw, Gf	2	Ob, Vc, Vr, Cp, MPEG
Lepidocolaptes angustirostris	Narrow-billed Woodcreeper	Og, Rs, Sv, Sw	1	Ob, Vc, Vr, Cp, MPEG
Dendrocolaptes platyrostris	Planalto Woodcreeper	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
FURNARIIDAE (10)				
Xenops rutilans	Streaked Xenops	Sw, Gf, Df	3	Ob, Vc
Furnarius figulus	Wing-banded Hornero	Rs, Sv	1	Ob, Vc, Vr
Furnarius leucopus	Pale-legged Hornero	Sw, Gf	2	Ob, Vc, Vr
Pseudoseisura cristata	Caatinga Cacholote	Sv, Sw	2	Ob, Vc, Vr
Phacellodomus rufifrons	Rufous-fronted Thornbird	Rs, Sv	2	Ob, Vc, Vr
Certhiaxis cinnamomeus	Yellow-chinned Spinetail	Sv, Sw	1	Ob, Vc
Synallaxis frontalis	Sooty-fronted Spinetail	Gf, Df	3	Ob, Vc, Cp, MPEG
Synallaxis albescens	Pale-breasted Spinetail	Rs, Sv	1	Ob, Vc, Vr
Synallaxis scutata	Ochre-cheeked Spinetail	Sw, Gf	2	Ob, Vc, Cp, MPEG
Cranioleuca vulpina	Rusty-backed Spinetail	Sv, Sw, Gf	1	Ob, Vc
PIPRIDAE (2)				
Neopelma pallescens	Pale-bellied Tyrant-Manakin	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Chiroxiphia pareola	Blue-backed Manakin	Gf, Df	3	Ob, Vc, Vr
TITYRIDAE (6)				
Myiobius atricaudus	Black-tailed Flycatcher	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Tityra inquisitor	Black-crowned Tityra	Gf, Df	3	Ob, Vc
Tityra cayana	Black-tailed Tityra	Sv, Sw, Gf, Df	3	Ob, Vc, Vr
Pachyramphus viridis	Green-backed Becard	Sv, Sw	2	Ob, Vc, Cp, MPEG
Pachyramphus polychopterus	White-winged Becard	Sv, Sw	2	Ob, Vc, Vr
Pachyramphus validus	Crested Becard	Sv, Sw, Df	3	Ob, Vc
COTINGIDAE (1)				
Procnias averano	Bearded Bellbird	Gf, Df	3	Vc
INCERTAE SEDIS (1)				
Platyrinchus mystaceus	White-throated Spadebill	Sw, Df	3	Ob, Vc
RHYNCHOCYCLIDAE (5)				
Leptopogon amaurocephalus	Sepia-capped Flycatcher	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Tolmomyias flaviventris	Yellow-breasted Flycatcher	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Todirostrum cinereum	Common Tody-Flycatcher	Og, Rs, Sv	2	Ob, Vc, Vr
Hemitriccus striaticollis	Stripe-necked Tody-Tyrant	Sv, Sw	2	Ob, Vc, Vr
Hemitriccus margaritaceiventer	Pearly-vented Tody-Tyrant	Og, Sv, Sw, Gf, Df	2	Ob, Vc, Cp, MPEG
TYRANNIDAE (31)				
Hirundinea ferruginea	Cliff Flycatcher	Og, Rs, Sv	2	Ob, Vc
Euscarthmus meloryphus	Tawny-crowned Pygmy Tyrant	Sv, Sw	2	Ob, Vc
Camptostoma obsoletum	Southern Beardless Tyrannulet	Rs, Sv, Sw	1	Ob, Vc, Vr
Elaenia flavogaster	Yellow-bellied Elaenia	Og, Rs, Sv	2	Ob, Vc, Cp, MPEG
Elaenia parvirostris	Small-billed Elaenia	Og, Rs, Sv	1	Ob, Vc, Cp, MPEG
Elaenia cristata	Plain-crested Elaenia	Og, Rs, Sv	1	Ob, Vc, Cp, MPEG
Elaenia chiriquensis	Lesser Elaenia	Og, Rs, Sv	1	Ob, Vc, Cp, MPEG
Suiriri suiriri	Suiriri Flycatcher	Og, Rs, Sv	1	Ob, Vc
Myiopagis viridicata	Greenish Elaenia	Sw, Gf, Df	3	Ob, Vc
Phaeomyias murina	Mouse-coloured Tyrannulet	Sv, Sw	1	Ob, Vc, Cp, MPEG
Myiarchus swainsoni	Swainson's Flycatcher	Og, Rs, Sv	1	Ob, Vc, Cp, MPEG
Myiarchus ferox	Short-crested Flycatcher	Sw	2	Ob, Vc
Myiarchus tyrannulus	Brown-crested Flycatcher	Og, Rs, Sv	2	Ob, Vc, Cp, MPEG
Casiornis fuscus	Ash-throated Casiornis	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Pitangus sulphuratus	Great Kiskadee	Og, Sv, Sw	1	Ob, Vc, Vr
Machetornis rixosa	Cattle Tyrant	Og, Sv	1	Ob, Vc
Myiodynastes maculatus	Streaked Flycatcher	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Megarynchus pitangua	Boat-billed Flycatcher	Sw, Gf	2	Ob, Vc, Vr
Myiozetetes cayanensis	Rusty-margined Flycatcher	Sw, Gf, Df	3	Ob, Vc, Vr

Scientific name	English name	Habitat	Habitat use	Documentation
Myiozetetes similis	Social Flycatcher	Sv, Sw	2	Ob, Vc, Vr
Tyrannus melancholicus	Tropical Kingbird	Og, Sv, Sw	1	Ob, Vc
Tyrannus savana	Fork-tailed Flycatcher	Og, Rs, Sv	1	Ob, Vc
Griseotyrannus aurantioatrocristatus	Crowned Slaty Flycatcher	Sv, Sw	2	Ob, Vc
Empidonomus varius	Variegated Flycatcher	Og, Rs, Sv, Sw	2	Ob, Vc, Cp, MPEG
Myiophobus fasciatus	Bran-coloured Flycatcher	Sw, Gf	1	Ob, Vc
Sublegatus modestus	Southern Scrub Flycatcher	Sv, Sw	2	Ob, Vc
Fluvicola albiventer	Black-backed Water Tyrant	Gf	1	Ob, Vc
Fluvicola nengeta	Masked Water Tyrant	Sp, Gf	1	Ob, Vc
Cnemotriccus fuscatus	Fuscous Flycatcher	Sw, Gf, Df	3	Ob, Vc, Cp, MPEG
Xolmis cinereus	Grey Monjita	Og, Rs, Sv	1	Ob, Vc
Xolmis irupero	White Monjita	Og, Sv	1	Ob, Vc
VIREONIDAE (3)				
Cyclarhis gujanensis	Rufous-browed Peppershrike	Rs, Sv, Sw	2	Ob, Vc, Vr
Vireo olivaceus	Red-eyed Vireo	Sv, Sw, Gf, Df	3	Ob, Vc, Vr
Hylophilus poicilotis	Rufous-crowned Greenlet	Gf, Df	3	Ob, Vc, Vr
CORVIDAE (2)				
Cyanocorax cristatellus	Curl-crested Jay	Rs, Sv	1	Ob, Vc, Vr
Cyanocorax cyanopogon	White-naped Jay	Sv, Sw, Gf, Df	2	Ob, Vc, Vr
HIRUNDINIDAE (2)				
Stelgidopteryx ruficollis	Southern Rough-winged Swallow	Rs, Sv	1	Ob, Vc
Progne chalybea	Grey-breasted Martin	Og, Sv	1	Ob, Vc
TROGLODYTIDAE (3)				
Troglodytes musculus	Southern House Wren	Sv, Sw	1	Ob, Vc, Vr
Pheugopedius genibarbis	Moustached Wren	Gf, Df	3	Ob, Vc, Vr
Cantorchilus longirostris	Long-billed Wren	Sv, Sw, Gf	3	Ob, Vc, Vr
DONACOBIIDAE (1)				
Donacobius atricapilla	Black-capped Donacobius	Sp	1	Ob, Vc
POLIOPTILIDAE (1)				
Polioptila plumbea	Tropical Gnatcatcher	Sv, Sw	2	Ob, Vc, Vr
TURDIDAE (3)				
Turdus rufiventris	Rufous-bellied Thrush	Sw, Gf	1	Ob, Vc, Vr
Turdus leucomelas	Pale-breasted Thrush	Sw, Gf	2	Ob, Vc, Vr, Cp, MPEG
Turdus amaurochalinus	Creamy-bellied Thrush	Sv, Sw	2	Ob, Vc, Vr
MIMIDAE (1)				
Mimus saturninus	Chalk-browed Mockingbird	Og, Rs, Sv	1	Ob, Vc, Vr
MOTACILLIDAE (1)				
Anthus lutescens	Yellowish Pipit	Og, Rs	1	Ob, Vc
COEREBIDAE (1)				
Coereba flaveola	Bananaquit	Rs, Sv, Sw	2	Ob, Vc, Vr, Cp, MPEG
THRAUPIDAE (15)				
Saltatricula atricollis	Black-throated Saltator	Sv, Sw	1	Ob, Vc, Vr
Compsothraupis loricata	Scarlet-throated Tanager	Sv, Sw	2	Ob, Vc, Vr, Cp, MPEG
Nemosia pileata	Hooded Tanager	Sv, Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
Thlypopsis sordida	Orange-headed Tanager	Sv, Sw	2	Ob, Vc
Cypsnagra hirundinacea	White-rumped Tanager	Rs, Sv	1	Ob, Vc, Vr
Tachyphonus rufus	White-lined Tanager	Sv, Sw, Gf	3	Ob, Vc, Vr, Cp, MPEG
Ramphocelus carbo	Silver-beaked Tanager	Sv, Sw	2	Ob, Vc
Lanio pileatus	Pileated Finch	Og, Rs, Sv	2	Ob, Vc, Vr, Cp, MPEG
Tangara sayaca	Sayaca Tanager	Sw, Gf	2	Ob, Vc
Tangara palmarum	Palm Tanager	Sw, Gf	2	Ob, Vc
Tangara cayana	Burnished-buff Tanager	Sv, Sw	1	Ob, Vc
Schistochlamys ruficapillus	Cinnamon Tanager	Og, Rs, Sv	1	Ob, Vc, Vr
Paroaria dominicana	Red-cowled Cardinal	Og, Rs, Sv	1	Ob, Vc, Vr
Dacnis cayana	Blue Dacnis	Sw, Gf	2	Ob, Vc
Hemithraupis guira	Guira Tanager	Sv, Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
Conirostrum speciosum	Chestnut-vented Conebill	Sw, Gf, Df	3	Ob, Vc

Scientific name	English name	Habitat	Habitat use	Documentation
EMBERIZIDAE (10)				
Zonotrichia capensis	Rufous-collared Sparrow	Og, Rs, Sv	1	Ob, Vc, Vr
Ammodramus humeralis	Grassland Sparrow	Og, Rs, Sv	1	Ob, Vc, Vr
Sicalis flaveola	Saffron Finch	Og, Rs, Sv	1	Ob, Vc, Vr
Emberizoides herbicola	Wedge-tailed Grass Finch	Og	1	Ob, Vc, Vr
Volatinia jacarina	Blue-black Grassquit	Og, Rs, Sv	1	Ob, Vc
Sporophila plumbea	Plumbeous Seedeater	Og, Rs, Sv	1	Ob, Vc
Sporophila albogularis	White-throated Seedeater	Og, Rs, Sv	1	Ob, Vc, Vr
Sporophila angolensis	Chestnut-bellied Seed Finch	Og, Rs, Sv	1	Ob, Vc, Vr
Tiaris fuliginosus	Sooty Grassquit	Df	3	Ob, MPEG
Arremon taciturnus	Pectoral Sparrow	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
CARDINALIDAE (2)				
Piranga flava	Hepatic Tanager	Sv, Rs, Sw	1	Ob, Vc, Vr
Cyanoloxia brissonii	Ultramarine Grosbeak	Gf, Df	3	Ob, Vc, Vr
PARULIDAE (2)				
Basileuterus culicivorus	Golden-crowned Warbler	Sw, Gf	3	Ob, Vc, Vr
Basileuterus flaveolus	Flavescent Warbler	Sw, Gf, Df	3	Ob, Vc, Vr, Cp, MPEG
ICTERIDAE (8)				
Psarocolius decumanus	Crested Oropendola	Sw, Gf, Df	3	Ob, Vc, Vr
Cacicus cela	Yellow-rumped Cacique	Sw, Gf, Df	3	Ob, Vc, Vr, MPEG
Icterus cayanensis	Epaulet Oriole	Sv, Sw, Gf	2	Ob, Vc, Vr
Icterus jamacaii	Campo Troupial	Sv, Sw, Gf	2	Ob, Vc, Vr
Gnorimopsar chopi	Chopi Blackbird	Sw	1	Ob, Vc, Vr
Chrysomus ruficapillus	Chestnut-capped Blackbird	Og, Sv	1	Ob, Vc
Agelaioides badius	Bay-winged Cowbird	Rs, Sv	1	Ob, Vc
Molothrus bonariensis	Shiny Cowbird	Og, Rs, Sv, Sw	1	Ob, Vc
FRINGILLIDAE (1)				
Euphonia chlorotica	Purple-throated Euphonia	Sw, Gf	2	Ob, Vc, Vr, Cp, MPEG
PASSERIDAE (1)				
Passer domesticus	House Sparrow	Sv	1	Ob, Vc

Observations on White-browed Guan *Penelope jacucaca* in north-east Brazil

Hermann Redies

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Jacus-verdadeiros *Penelope jacucaca* foram estudados na reserva particular RPPN Mãe-da-lua no interior semi-árido do Estado do Ceará no nordeste do Brasil. Durante vários meses da estação seca de 2007, 2008 e 2010, numerosos jacus visitaram regularmente um olho d'água e um comedor adjacente na reserva. Em outros estações e / ou anos, os jacus quase não freqüentavam o olho d'água e o comedor, e parece que uma grande parte da população permaneceu em lugares distantes, dentro ou fora da RPPN. Estes achados confirmam que *P. jacucaca* faz migrações locais, e são relevantes para a conservação desta espécie, em particular para o planejamento e manejo de reservas. Outras pesquisas seriam necessárias para mostrar os motivos e o alcance dos deslocamentos. Observei os jacus durante muitas sessões no campo, frequentemente usando um esconderijo ('blind') que as aves aproximavam a uma distância de poucos metros. Nesta publicação, presento informações sobre: vocalizações; comportamento no comedor; aparência dos jovens; hábitos de empoleirar, e frequentes mudanças dos locais para passar a noite. No início da estação chuvosa, aves 'rufando as asas' foram gravadas em duas ocasiões. Jacus-verdadeiros foram também registrados em outras localidades do Ceará, fora de unidades de conservação, em mata úmida (Maranguape) e em uma fazenda na caatinga (Pentecoste). O registro da fazenda sugere que pelo menos no norte do Ceará, a vegetação secundária madura nas regiões agricultores da caatinga pode ser suficiente para a especie sobreviver e reproduzir.

White-browed Guan *Penelope jacucaca* is endemic to north-east Brazil, from Maranhão and Ceará to Minas Gerais[11,14,17–19]. It was formerly common in parts of the north-east[13], but is now considered Vulnerable[2]. The sparse literature concerning its behaviour and vocalisations is summarised below. Information concerning the species' morphology and taxonomy appears elsewhere[5,8].

O. Reiser participated in an Austrian expedition to north-east Brazil in 1903 and encountered White-browed Guans in Piauí and Bahia[13]. According to his observations, guans usually occurred in small groups (e.g. 3–7 individuals), sometimes feeding in crowns of trees, and were most easily found near water and in dry riverbeds, where the birds dustbathed. When humans approached, the birds often did not fly, but hid. During the breeding season the mating call of females could be heard at long distance.

In 1923–26, H. Snethlage traveled through Piauí, Maranhão and Ceará[7,16]. He found *P. jacucaca* in humid primary forest, in dry forest, dry palm forest and temporarily flooded forests[17]. He also remarked that it and other cracids in the region undertake local migrations to areas with temporary food resources. For example, when a certain ripe fruit ('araça') was available in the dry forest of northern Piauí, then '...one can be certain to encounter there, at dawn and dusk, large flocks of the shy *Penelope jacucaca*... During this period, they can also frequently be flushed in the forest… Later, one hardly encounters them any more.'[17] (all translations mine). Snethlage considered *P. jacucaca* a territorial bird that temporarily departs its territory for other areas with better food availability[17]. Despite the paucity of information concerning the species, his findings (published in German) appear to have been ignored by subsequent authors. That *P. jacucaca* undertakes short-range movements in search of food has not been mentioned in other publications, although it has important implications for conservation (see Results and Discussion).

Olmos[12] found a 'good population' of guans in Serra da Capivara National Park, Piauí, and was first to confirm that *P. jacucaca* wing-whirrs, like other guans[5]. He wrote: 'This species...is easily detected by the characteristic sound it makes with the wings during the rainy season, apparently as a courtship display.' Preferred habitats are taller dry forest, but also second-growth *caatinga* near human dwellings. The fruits of the juazeiro tree *Ziziphus joazeiro* form part of its diet.

I discovered the species in Mãe-da-lua reserve in 2007, close to a spring, where I have a blind (Fig. 1). In 2007–08, I occasionally observed birds from the blind, and photographed and sound-recorded them. However, my field notes from this time are rather incomplete. Several birdwatchers visited during this period, and their images from the reserve appear on various websites (www.wikiaves.com.br, www.arthurgrosset.com, www.worldwildlifeimages.com, www.ibc.lynxeds.com). In 2010, I collected behavioural and vocalisation

Figure 1. Blind (B) at Gameleiras in hills of Mãe-da-lua reserve, Ceará, 21 February 2010; part of the feeding area (F) is visible in the foreground, but the spring is located behind the blind and cannot be seen in the photograph (Hermann Redies)

data for the species in the reserve, presented here, sometimes complemented by observations from other years.

Main study site and Methods

Mãe-da-lua private reserve (03°48'41"S 39°28'25"W), Itapajé municipality, Ceará, in the semi-arid *caatinga* of north-east Brazil, encompasses 769 ha, c.50% lowland secondary arboreal *caatinga* at various stages of regrowth, mostly 15–30 years old. The other 50% covers low hills (max. altitude 700 m), with similar *caatinga* lower down, and secondary dry and subhumid forest above c.500 m. More information can be found at www.mae-da-lua.org. The wet season normally starts around January and lasts until May–July. The dry season, nearly or entirely without rainfall, occupies the rest of the year[1,9].

There are several water sources in the reserve, including a permanent spring (Gameleiras) in a valley in the mountains, where I have a blind (Fig. 1). Nearby, I cleared an irregularly shaped area of 150 m^2 of vegetation, as a feeding site (Fig. 1, foreground). At intervals, usually of 2–3 days, in August–December 2007 and 2008, and June–October 2010, I scattered a few kg of coarse-ground corn on the ground, to attract guans. Since the reserve was created in 2006, I have regularly visited Gameleiras and, to my knowledge, hunters have mostly avoided this area. Observations from the blind were conducted irregularly, often in early mornings, from c.04h30 (before dawn) until c.07h00 or later. Occasionally, I remained a few hundred metres distant, to observe the guans approach.

Equipment and software.—Sound-recordings were made using a Marantz PMD671 or PMD661 digital recorder and Sennheiser ME-67 or ME-66 directional microphones. Photographs were made using a Canon 20D camera and 200-mm or 300-mm lenses; despite the poor light, flash was not used, except occasionally in 2007. Most computer work was done on a Linux platform (OpenSuse 11.4), with Wavesurfer 1.8.5 and Praat 5.2 for sound-editing, and Gimp 2.6 for image processing.

Supplementary material.—All sound-recordings mentioned herein, and additional photographs, can be accessed via www.mae-da-lua.org/supplement_wbg.html. In the text, references in the form 'jpg Pnn' or 'mp3 Rnn' can be found on this webpage.

Results and Discussion

Occurrence of P. jacucaca in Mãe-da-lua reserve

In July or August 2007, 2008 and 2010 (i.e. 1–2 months after the last rains), guans began visiting the spring and feeding site at Gameleiras. During the following months, guans were present there nearly daily, usually early in the morning, sometimes also late in the afternoon. In 2007 up to

Figure 2. White-browed Guans *Penelope jacucaca*, Gameleiras, Mae-da-lua reserve, showing c.20 of the 34 guans present, 18 August 2010 (Hermann Redies)

16 birds were present and in 2008 up to 14. In 2009, following above-average rains, very few guans visited the waterhole. In 2010, I counted a max. 38 birds (Fig. 2). In 2011, following another season of relatively heavy rains, the situation was as in 2009, with almost no guans present.

Local movements.—Snethlage stated that *P. jacucaca* undertakes local movements to areas with better food availability[17]. Temporary concentrations of guans at Gameleiras during the dry season of some years confirms this. Short-range movements are also reported for Sickle-winged Guan *Chamaepetes goudotii* and Black-fronted Piping Guan *Pipile jacutinga*[6,10,15]. Because of the availability of food and water at Gameleiras, one might expect that in those years in which guans were present, they would remain until the onset of the rains (January), but this was not so. Instead, in 2007 and 2008, most birds appeared to have left by the year-end, several weeks prior to the rains. (In 2010, I discontinued early-morning observations in late October, when guans were still present.)

When guans did not visit Gameleiras, they were far more difficult to locate. In the reserve, I occasionally saw two or more individuals, which fled as soon as they realised my presence. At times, vocalisations indicated the presence of guans in the dense vegetation. During the early wet season, wing-whirring was heard rarely (see below). I

Figure 3. Adult White-browed Guan *Penelope jacucaca*, Gameleiras, Mãe-da-lua reserve, in alert position, with its head elevated and the bird attentive, 10 July 2010 (Hermann Redies)

Figure 4. Juvenile White-browed Guan *Penelope jacucaca*, in company of adult, Gameleiras, Mãe-da-lua reserve, 18 August 2010 (Hermann Redies)

had no reliable means to determine how many birds remained year-round, or in which areas they were present. Presumably, the guans that left Gameleiras in late 2007 and 2008, moved to another location within or outside the reserve, for the remainder of the dry season. It is probable that in the wet season, pairs are spread out across the reserve and its environs.

The issue of local movements is relevant because the species' conservation is potentially undermined if the birds periodically leave the protected area[6,12]. Guans are not strong fliers[5], and it is therefore unlikely that they migrate far, but even movements of just a few km would reach unprotected areas worked by hunters. Further research is needed to clarify how far guans move, what precisely attracts them to a given area, and those characteristics a reserve should possess to adequately protect the birds year-round.

Morphology

Size of guans seen at Gameleiras varied considerably, from half grown to full grown, but except two juveniles (see below) all had adult-like plumage (Fig. 3), matching descriptions and illustrations in the literature[3,5].

Juveniles.—On 18 August 2010, two juveniles (probably siblings) were seen (Fig. 4, cf. jpg P04–06). The peri-orbital skin of one was yellowish, slightly darker in the other. Foreneck yellowish without the characteristic red dewlap, and whitish stripes on wings, breast, flanks etc., less pronounced. These were the youngest individuals I saw, probably <2 months old. They must have hatched around June, suggesting that some birds breed either very late in the wet season, or more than once p.a.

Iris colour.—Sick[15] noted that males possess red irides and females brown, but Blake[3] stated that they are brown in both sexes. Delacour & Amadon[5] did not mention sex-related differences for *P. jacucaca*, but described such differences for *P. pileata* and *P. ochrogaster*, which are closely related to *P. jacucaca*. Vaurie[20] suggested for the genus *Penelope* in general that '...a sexual difference probably exists, because brown, rather than red, was usually mentioned in the case of females. The iris probably becomes red in males during the breeding season.' I did not pay direct attention to iris colour during my field work, but I photographed numerous individuals, presumably of both sexes, and verified that some had a pale brown or red-brown iris (jpg P02) and others a dark brown iris (jpg P01), compatible with the assumption of sexual differences in iris colour (males reddish-brown or pale brown, females dark brown), but I have no other evidence to support this, and fluctuations in ambient light might have contributed to the apparent variation (cf. jpg P03).

The issue of sex-related differences in iris colour in *P. jacucaca* remains to be resolved.

General behaviour

I spent 16 morning sessions in the blind (Fig. 1) at Gameleiras between 25 June and 27 October 2010, normally 04h30–07h00 / 08h00. During June–July, guans did not regularly visit the feeding area. On 25 June, several were heard but not seen. On 10 July, several birds that roosted at Gameleiras the previous night were at the feeding site (Fig. 3). On 18 July, none was noted. On 23 July, guans were again heard, but not seen. In August–October, 10–38 individuals were seen during each of 12 sessions. In this section, I describe their behaviour, as observed at close range from the blind. My view was often restricted by the vegetation, by poor light at dawn and by shade, and by the small windows in the blind. To follow the events, I relied partially on the sounds produced by the birds.

Response to the blind.—Guans often approached to 2–3 m and were surprisingly indifferent to noise or movements within the blind (Fig. 1). Usually, a reasonably discrete observer did not appear to disturb the birds, which are otherwise described as shy[17], and which immediately flee on realising human presence (pers. obs.).

Arrival at feeding area.—The birds arrived to feed at dawn, after leaving their roosts. They usually perched >2 m above ground in nearby vegetation for the first few minutes, often >10 m from the feeding site. Gradually they moved closer, cautiously checking before jumping to the ground, which they did one by one or in small groups. While perched many vocalisations were heard: *ga-ga* and *ga-o* calls, and series of *ga-ga-ga-*... or *ga-o-o-o-*... (Fig. 5) were commonest. Whistles (Fig. 6) were also heard, and, typically, one or more particularly loud *sh-sh-..-ga-ga-*.. calls (Fig. 7) were given. Some sounds are audible over several hundred metres, and could indicate the position of the calling bird not only to other guans, but to predators. As Reiser[13] wrote, 'The expert hunter notes a group of these guans already from far away, …by a particular cawing (Gekrakel)'.

Behaviour on ground.—If undisturbed, the guans initially fed for 20–40 minutes. Largest numbers were regularly present just after dawn, until c.06h00. Usually, a variable number remained at least one hour longer, often feeding for a second time, augmented by late-arriving visitors. During feeding, many whistles of several different types were heard (Fig. 6).

Diurnal roosting.—After feeding some birds departed, while others moved to nearby trees to rest. I repeatedly observed a group of c.10 move to a large tree opposite my blind. They jumped, climbed and flew from branch to branch, before selecting a suitable position. Some soon returned to the ground to drink at the spring and / or to feed again. Roosting birds on the tree often uttered whistles similar to those heard while feeding (Fig. 6).

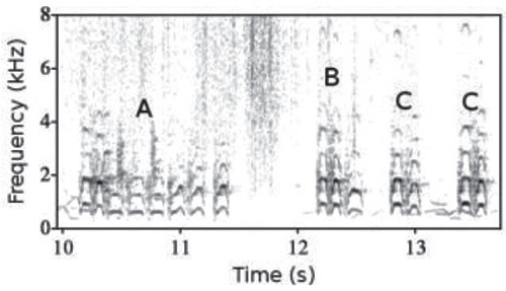

Figure 5. Sonogram of *ga-ga* calls and variants, given by birds in vegetation around feeding site, 10 September 2010 (download: mp3 R30). The sonogram illustrates the variability of these sounds: initially, there is a series of eight notes *ga-ga-o-o-o-o-o-o* (A), then a *ga-ga-o* sequence (B), followed by two pairs of *ga-ga* notes (C). In the few minutes between arrival in the trees and jumping to the ground, the guans produce hundreds of these and similar sounds. In background, some whistles (cf. Fig. 6).

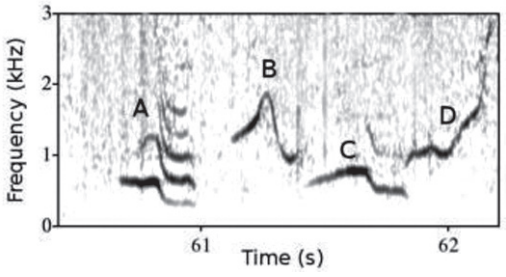

Figure 6. Examples of frequency modulated whistles, from birds at feeding site, 5 September 2010 (download: mp3 R50). A: frequently heard sound, with strong harmonics. B: another commonly heard, quite variable note, with a relatively high frequency range. C: similar to A, but fewer harmonics; D: less common upslurred whistle. Several other types of whistles were recorded, but are not depicted here. Sonogram manually edited, to reduce noise.

Social behaviour and aggression.—Guans arrived to feed in groups, but on the ground they mostly foraged together. However, one or two groups often kept separate from the rest. Occasionally, a guan aggressively pecked at another, and one or more loud, sharp notes (mp3 R60) were then given, probably by the victim of the aggression. I also observed birds jumping high into the air and several times one bird with an erect crest chased another around the feeding site, similar to the video recording by J. del Hoyo at Rio de Janeiro zoo (ibc.lynxeds.com).

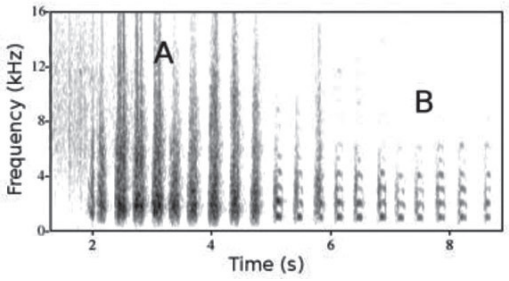

Figure 7. Sonogram of recording from bird shortly after arriving around feeding site, 10 September 2010 (download: mp3 R40). Initial series of raucous *sh* notes (A) grades into evenly spaced *ga* notes (B).

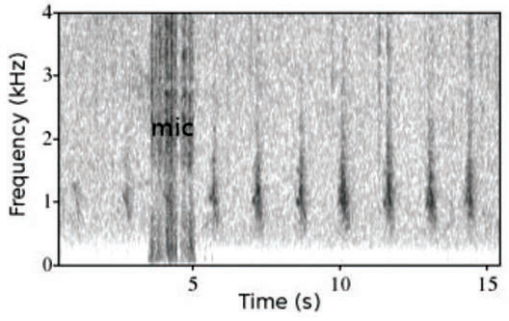

Figure 8. Series of raucous calls given by single guan during pause en route to Gameleiras, 14 September 2010 (download: mp3 R110). The vocalisation is markedly different from the *sh-sh-...* calls in Figs. 7: notes have narrower frequency range (mostly 0.5–2.0 kHz), and pauses between notes much longer; 'mic' = microphone handling noise.

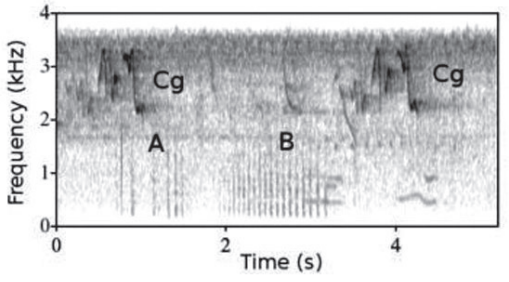

Figure 9. Wing-whirr of White-browed Guan *Penelope jacucaca*, 19 January 2011, with a few initial wingbeats (A) followed by a break and then, at two-second mark, a longer series of wingbeats (B). In background, Rufous-browed Peppershrike *Cyclarhis gujanensis* (Cg) (download: mp3 R160).

Response to danger.—Feeding sessions were often interrupted by loud alarm-calls and sudden flights from the ground to the surrounding trees (mp3 R70, R80). In most cases, the birds returned to feed after 1–2 minutes, presumably because the alarm was 'false' or the danger passed. A common cause of alarm was the arrival of Brown Capuchins *Cebus apella* or warning calls of White-naped Jays *Cyanocorax cyanopogon*. Details of alarm and escape behaviour will be presented elsewhere.

Approach to Gameleiras

In September–October 2010, I spent five dawn sessions outside the blind, overlooking the surroundings of Gameleiras. The directions from which guans approached Gameleiras varied, presumably due to changes in their roost sites. Furthermore, the birds generally arrived from several directions, suggesting separate roosts. Guans were seen alone, in pairs or in groups. 'Lone' birds often (nearly always?) were part of a pair or group whose members moved independently of each other, and reassembled at intermediate stops or at the destination. For vocalisations given on the move, see Figs. 5, 7–8 and mp3 R120.

Roosting

P. jacucaca roosts in trees, at least a few metres above ground. On several occasions in Mãe-da-lua reserve and at Maranguape (see below), I observed that smaller groups form loose nocturnal roosts. For example, in the late afternoon of 20 July 2010, I observed two groups at Gameleiras, settling themselves in two different trees, c.30 m apart. Vocalisations recorded at the time (mp3 R130, mp3 R140) were reminiscent of those at dawn, when arriving to feed. Communal roosts of cracids were mentioned by Delacour & Amadon[5] who cautiously stated that 'some ... [species] may tend to roost socially'. While guans may use the same roost for days or weeks, sites are not permanent. Rather, they change at irregular intervals, perhaps due to disturbance (pers. obs.). This agrees with my observation that directions from which guans approached the feeding site at dawn changed frequently.

Wing-whirring

According to Delacour & Amadon[5], all *Penelope* species make wing-whirring displays in the breeding season, and Olmos[12] briefly mentioned such behaviour for *P. jacucaca*. I heard wing-whirrs in the reserve in January 2011 at the onset of the wet season, firstly on c.15 January, at dawn, when I heard guan vocalisations, followed by a series of unusually loud wingbeats, as the birds flew off. The second record was on 19 January 2011, a few hundred metres from the previous location. One wing-whirr was sound-recorded at 05h39 (mp3 R150) and another at 05h41 (Fig. 9). I could not reliably determine how far the birds were away (200 m?), but the sounds were rather faint

To my knowledge, these are the first sound-recordings of wing-whirring by *P. jacucaca*.

Comparison of Fig. 9 with a sonogram of wing-whirring by Crested Guan *P. purpurascens* recorded by P. Schwartz[5] suggests that the sound is similar in both species.

I cannot confirm the remark that *P. jacucaca* is 'easily detected' by wing-whirring in the wet season[12]. In my experience, wing-whirring is difficult to hear and easily missed. Delacour & Amadon[5] suggested that wing-whirring may substitute primary song in some guans. More field work is needed to validate this, and to clarify the significance of wing-whirring in *P. jacucaca*.

New records

Fazenda Canaã, municipality of Pentecoste, Ceará.—On numerous occasions in 2003–06, I saw guans at Fazenda Canaã (03°43'00"S 39°11'00"W), but could not determine the species (*P. jacucaca* or Rusty-margined Guan *P. superciliaris*). On 3 February 2009, I finally observed two at close range, in riverine gallery vegetation, and identified them as *P. jacucaca*, based on their morphology and vocalisations. Local people were aware of the species' presence and I saw a trap (to be baited with corn) in the neighbourhood. Vegetation at Fazenda Canaã, and surrounding rural areas in a radius of 20+ km, comprises secondary arboreal *caatinga*, farmland and secondary gallery forest. Some of the vegetation is relatively mature regrowth, >20–30 years old, but there is no pristine *caatinga* or gallery forest (pers. obs.). The presence of guans here indicates that, at least in northern Ceará, secondary vegetation can support the species, confirming that *P. jacucaca* can adapt to a range of habitats[12,13,17]. However, there are several different types of *caatinga* in north-east Brazil[1] and not all *caatinga* regrowth may be equally suitable.

Municipality of Maranguape, Ceará.—In a privately owned fragment of preserved humid forest (precise coordinates unknown; Maranguape 03°53'24"S 38°41'09"W), 15–20 guans were seen in the late afternoon of 21 December 2009. They arrived in distinct groups, and roosted in at least two places c.50 m apart. On other days, groups of 3+ individuals were seen nearby in early morning. In conversations with residents, I learned that local hunters were scared by superstitions associated with this area, and therefore avoided it, to the obvious benefit of the guans.

Conservation

At present, the most serious threat to the species' survival is probably hunting[4,12] (pers. obs.). It is important for conservationists to realise that in north-east Brazil comprehensive government assistance is offered to poor rural populations and hunting no longer qualifies as 'subsistence hunting', but instead has become a popular pastime, mainly for fun and often bordering on vandalism (pers. obs.). The prospects for White-browed Guan would be much brighter if government environmental agencies were more active in enforcing legislation that forbids hunting.

Acknowledgements

Dan Brooks refereed the manuscript and made several valuable suggestions. The blind at Gameleiras was constructed by Neto e Raimundo Lino da Silva Filho. The assistance of Manuel Paula and Raimundo Mendes in maintaining Mãe-da-lua reserve and its population of guans was invaluable.

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Estado del Hormiguero Alifranjeado *Myrmornis torquata* en Nicaragua

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In January 2011, while conducting a survey in the Cerro Musún Natural Reserve in east-central Nicaragua, we captured a male Wing-banded Antbird *Myrmornis torquata*. Given that records of the taxon in Nicaragua are few, we returned in March 2011 and trapped a second male and a female. In addition to using mist-nets, we conducted a point-count survey and playback of vocalisations, which resulted in the finding of seven additional individuals. This indicates that *M. torquata* is locally common at Cerro Musún. Elsewhere in Nicaragua, the species is rare and very local. Historically, it has been reported from three further localities, but the persistence of those populations is unknown.

El Hormiguero Alifranjeado *Myrmornis torquata* es un ave insectívora terrestre que habita el sotobosque de bosques continuos tropicales húmedos de tierras bajas, encontrándose frecuentemente en pendientes[4,13,15,16]. Es un ave difícil de detectar como se demuestra por los registros reportados en eBird[2] donde hasta la fecha se pueden ver sólo ocho puntos de reportes. La distribución de la especie es discontinua, con poblaciones en Honduras[17], Nicaragua, Panamá, Colombia, Ecuador, Perú, Guayana Francesa, Guyana, Surinam, Venezuela y Brasil[7]. En la Lista Roja de UICN está actualmente catalogada como una especie de Preocupación Menor[8].

En Centroamérica la especie puede considerarse como rara y localizada. Los dos reportes de *M. torquata* en la cabecera del río Plátano, en Honduras, en el año 2010, amplió el rango de distribución conocido de la especie 200 km al norte desde El Edén[17], en la Región Autónoma del Atlántico Norte de Nicaragua. Un posible reporte en Fila Carbón, al sureste de Costa Rica, nos indica que la especie es también esperada en ese país[14]. En Panamá se encuentra en el sotobosque de las tierras bajas de la vertiente del Caribe, en la zona del Canal, en el Pacífico al este de la provincia de Panamá y en las tierras bajas y estribaciones de la provincia del Darién[12].

En Nicaragua se conoce la existencia de *M. torquata* por 16 especímenes colectados por W. B. Richardson entre 1904 y 1909 y uno por W. A. Huber en 1922[6]. Catorce de los especímenes colectados por Richardson se encuentran depositados en el American Museum of Natural History, New York, y dos en el Museum of Comparative Zoology en Cambridge, MA. Todos los individuos fueron obtenidos en la vertiente del Caribe de la zona nor-central de Nicaragua así como en las tierras bajas de la zona caribeña en el norte (El Edén) y en el sur (Chontales) (Tabla 1). La inclusión por Zimmer & Isler[18] del dpto. Rivas en la vertiente del Pacífico como parte del rango de distribución de la especie es el resultado de un error en la ubicación de la localidad Peñas Blancas; la localidad en el dpto. Jinotega fue confundida con otra con el mismo nombre en el dpto. Rivas.

La única observación reciente publicada fue reportada en el Refugio Bartola, dpto. Río San Juan en 1994[4]. El propósito del presente reporte es documentar el descubrimiento de una población aislada de la especie en la Reserva Natural Cerro Musún.

Tabla 1. Especímenes de *Myrmornis torquata* colectados en Nicaragua depositados en el American Museum of Natural History, New York, Museum of Comparative Zoology, Cambridge, MA, y Academy of Natural Sciences Philadelphia.

Colector	Fecha	Localidad	Departamento	Altitud (m)	Cantidad
Richardson	18 al 20 mayo 1909	Peñas Blancas	Jinotega	850–1.200	5
Richardson	¿?	Peñas Blancas	Jinotega	850–1.200	1
Richardson	2 abril 1909	Río Tuma	Jinotega	500–600	1
Richardson	Entre el 9 de octubre 1904 y 7 de abril 1908	Río Grande	Matagalpa	200–300	5
Richardson	9 octubre 1904 y 12 octubre 1908	?	Matagalpa	<300	2
Richardson	25 febrero 1908 y fecha desconocida	?	Chontales	200–400	2
Huber	3 abril 1922	El Edén	RAAN	200–300	1
Especímenes totales					17

Área de estudio y Metodología

El cerro Musún es un macizo montañoso ubicado en la Región Central de Nicaragua, en el este del dpto. Matagalpa, y abarca parte de los municipios de Río Blanco, Matiguás y Matagalpa. El área protegida comprende un aproximado de 41 km^2 (4.142 ha). El macizo del cerro Musún forma parte del conjunto de colinas y montañas que se elevan sobre la llanura del Caribe constituyendo uno de los centros de aporte hidrográfico para los ecosistemas de pluvioselva de esa llanura. La cumbre más alta del macizo alcanza los 1.436 m, pero hay otros cerros con altitudes que oscilan entre los 1.019 m y los 1.400 m.

La cobertura vegetal es bosque latifoliado muy húmedo entre los 1.000 y 1.200 m, bosque nuboso entre los 1.200 y 1.400 m y bosque enano en las cumbres arriba de los 1.400 m. Debajo de los 900 m hay áreas intervenidas con parches de regeneración secundaria, cultivos, frutales, pastizales y cercas vivas[5].

La precipitación anual oscila entre los 2.368 mm y los 3.040 mm. El clima es típico de zonas con influencia de la zona Atlántica y está clasificado como 'clima tropical de selva' y 'clima tropical monzónico de selva' en donde hay una época seca en los meses de marzo y abril. Las temperaturas varían dependiendo de la altitud. La estación meteorológica más cercana está ubicada en Aulo Río Blanco a 295 m por lo que las temperaturas reportadas para el área protegida[5] no son representativas del área de estudio.

La parcela de investigación cubrió un área aproximada de 100 ha con un rango altitudinal de 990–1.250 m y una pendiente >30º con dirección sur y oeste. La parcela se ubicó a una distancia de 500 m del borde de bosque en el costado sur, y estaba rodeada de bosques en los otros tres costados formando parte de un bosque maduro y continuo con una altura promedio del dosel de 25 m. El sotobosque era medianamente denso con arbustos, lianas, palmeras y con gran cobertura de hojarasca en el suelo. Los troncos de los árboles estaban cubiertos de musgos y había gran cantidad de epifitas en las ramas.

Estaciones de capturas.—**MUS1**: 12º58.124'N 85º13.990'O, altitud 1.071 m. Estación establecida el 3 de enero de 2011 y utilizada nuevamente el 25 y 27 de marzo de 2011. Hábitat: bosque primario alto perennifolio. **MUS2**: 12º58.442'N 85º14.008'O, altitud 1.208 m. Estación establecida el 3 de enero de 2011 y utilizada nuevamente el 25 y 27 de marzo de 2011. Características de bosque nuboso. Ubicación del campamento. **MUS3**: 12º58.080'N 85º14.299'O, altitud 995 m. Estación establecida el 25 de marzo 2011, ubicada en un bosque de galería a la orilla de un riachuelo que es uno de los afluentes del río Blanco, en un área de bosque húmedo o lluvioso.

Los nombres científicos utilizados en este documento se basan en la lista patrón de la AOU[1] y suplementos y los nombres en español en la lista patrón de las aves de Nicaragua[9].

Entre el 25 y 28 de marzo de 2011 se establecieron tres estaciones para capturas con redes con el propósito de capturar a la especie meta. Se utilizaron redes de niebla de 12,0 m × 2,5 m con luz de malla de 30 mm. El nivel de esfuerzo con redes variaba según la estación. Los datos morfométricos fueron tomados con calibrador, pesolas y regla de tope de acuerdo a Pyle[11]. El músculo pectoral se midió con una graduación de 0 a 3, siendo 0 cuando el esternón está definido y el músculo pectoral está deprimido y 3 cuando el esternón es difícil de distinguir y el músculo pectoral está totalmente redondeado. El ancho y profundidad del pico se midieron con calibrador a la altura de la parte anterior de la narina, y el largo desde la parte anterior de la narina hasta la punta. A las aves capturadas se les cortó un centímetro de la rectriz 5 derecha para distinguir las nuevas capturas de las recapturas. El sexo de los individuos capturados fue determinado por el babero que es negro en los machos y de color rufo en las hembras[12,13].

Siguiendo el sendero de acceso al campamento se establecieron cuatro puntos de conteo con distancias de 200 m entre puntos, con excepción del primer punto que tenía una distancia de 400 m hasta el punto 2. El primer punto se estableció entre las estaciones de redes MUS2 y MUS1 a 200 m de MUS2. Partiendo de MUS1 en dirección sureste se establecieron otros tres puntos de conteo separados por 200 m entre sí. En los puntos de conteo se emitían vocalizaciones de *M. torquata* hasta un total de 15 minutos de forma intermitente para llamar a la especie. Se utilizaron vocalizaciones previamente grabadas en Venezuela[3]. También se utilizó una grabación hecha *in situ* del canto de una de las aves del área.

Resultados

Con un esfuerzo total de 104,5 horas red se capturaron dos machos y una hembra de *M. torquata* en las estaciones MUS1 y MUS3. En la estación MUS2, ubicada a mayor altitud que las otras en hábitat de bosque nuboso, no hubo ninguna captura de la especie meta. La edad del macho 1 y de la única hembra capturada se determinó como segundo año (SY). Este código de edad corresponde a un individuo inmaduro nacido el año calendario anterior. Ambas aves presentaban un límite entre coberteras, siendo las coberteras secundarias formativas y las coberteras primarias juveniles; las coberteras primarias y las primarias correspondientes eran opacas, angostas, y transparentes y el raquis pálido (Figs. 1–2).

Figura 1. Macho 1 (SY) de *Myrmornis torquata* capturado en estación MUS1, cerro Musún, Nicaragua, el 3 de enero de 2011 (Georges Duriaux)

Figura 2. Hembra (SY) de *Myrmornis torquata* capturado en estación MUS1, cerro Musún, Nicaragua, el 25 de marzo de 2011 (Georges Duriaux)

Figura 3. Macho 2 (ASY) de *Myrmornis torquata* capturado en estación MUS3, cerro Musún, Nicaragua, el 27 de marzo de 2011 (Georges Duriaux)

La edad de macho 2 se determinó como después del segundo año (ASY), que corresponde a un ave adulta que eclosionó antes del año calendario anterior al que fue capturada, por presentar todo el plumaje básico de buena calidad, uniforme con coberteras primarias y primarias anchas, brillantes y con raquis negros y brillantes (Fig. 3). Tomando en cuenta que el macho 1 capturado el 3 de enero 2011 presentaba un plumaje preformativo, se determinó su edad como inmaduro; el macho 2 tenía plumaje adulto y fue capturado 83 días después, por lo que podría tratarse del mismo individuo que durante ese tiempo habría mudado las coberteras y plumas de vuelo, incluyendo la rectriz marcada. Sin embargo, el macho 2 presentó un desgaste moderado con graduación 2 en un rango de 0 a 5 en las dos primarias más externas; en un ave con un plumaje recién cambiado el desgaste tendría que haber sido 0 ó 1. Las longitudes del pico de los machos eran distintas siendo el pico del macho 2 menor en 1,5 mm que el del macho 1. Finalmente, la mayoría de las especies neotropicales mudan las plumas de vuelo después de la época reproducción. En Costa Rica la época principal de anidación comienza en marzo o abril al iniciar el periodo de lluvias[14]. Igualmente sucede en Nicaragua ya que las hembras de los Passeriformes capturadas por los autores en la Reserva El Jaguar, en la zona nor-central de Nicaragua, presentan parche de incubación vascularizado desde finales de marzo hasta finales de julio y presentan muda de las plumas de vuelo a partir de agosto. Estos criterios indican que se trataba de dos individuos distintos.

Todos los individuos capturados presentaron una cuerda alar uniforme de 90 mm no habiendo diferencia entre la hembra y ambos machos; la medida de la cola era menor en la hembra que en los machos; el tarso de la hembra era mayor que el de los machos. Las otras medidas eran similares para machos y hembra (Tabla 2).

Cinco machos, un individuo de sexo indeterminado y una hembra fueron vistas y

Tabla 2. Datos morfométricos de *Myrmornis torquata* en la Reserva Natural Cerro Musún.

Fecha de captura	**3 de enero de 2011**	**25 de marzo de 2011**	**27 de marzo de 2011**
Sexo	Macho 1	Hembra	Macho 2
Edad	SY	SY	ASY
Cuerda alar (mm)	90	90	90
Masa (g)	45	48	48
Músculo	2	3	2
Tarso (mm)	23,3	26,5	23,8
Nares a punta del pico (mm)	16,2	15,7	14,7
Profundidad del pico (mm)	5,2	5,4	5,1
Ancho del pico (mm)	4,3	4,5	4,5
Longitud de la cola (mm)	34,1	32,6	35,2

Figura 4. Macho de *Myrmornis torquata* capturado en estación MUS1, cerro Musún, Nicaragua, el 3 de enero de 2011 (Georges Duriaux)

Figura 5. Hembra de *Myrmornis torquata* capturada en estación MUS1, cerro Musún, Nicaragua, el 25 de marzo de 2011 (Georges Duriaux)

escuchadas el 28 de marzo de 2011 en los cuatro puntos, totalizando siete detecciones. En reacción a las grabaciones se movían en las ramas más bajas del sotobosque y no excedían en sus movimientos

Figura 6. Macho 2 de *Myrmornis torquata* capturado en estación MUS3, cerro Musún, Nicaragua, el 27 de marzo de 2011 (Georges Duriaux)

los 2 m de altura. Esta conducta difiere de observaciones hechas en enero sin emisión de vocalizaciones en donde las aves fueron detectadas en el suelo levantando las hojas con el pico.

Conclusiones

En nuestro estudio se capturaron tres individuos y se hicieron siete detecciones en los puntos de conteo, totalizando diez reportes en altitudes que oscilan entre los 990 m y los 1.172 m. No podemos asegurar que las detecciones en los puntos de conteo fueran diferentes individuos que los capturados aunque se establecieron los puntos de conteo a una distancia de al menos 200 m para disminuir la probabilidad de detecciones repetidas.

Tomando en cuenta que la especie es sensible a la fragmentación y que necesita un hábitat de bosque primario continuo[4,15], es de suponer que la población del cerro Musún sea una población aislada porque el bosque del área protegida no presenta continuidad ni conectividad con las grandes áreas boscosas más cercanas como la Reserva de la Biosfera Bosawás en el norte o la Reserva Biológica Indio Maíz en el sur. Hace 50 años había conectividad entre esas áreas (LC & GD obs. pers.).

De los 16 especímenes colectados por W. B. Richardson seis fueron colectados en Peñas Blancas, dpto. Jinotega, cinco de ellos entre el 18 y 20 de mayo de 1909 (Tabla 1). Este dato nos da indicios de que la densidad de población era alta en esa localidad. La parte baja o pie del macizo

de Peñas Blancas está a 850 m y la elevación más alta es >1.400 m. Es probable que a la fecha se haya extinguido de esa localidad debido a la fragmentación existente y a que los remanentes de bosque no forman bosques continuos necesarios para el hábitat de la especie. A pesar de eso, la información de que existía esa población en Peñas Blancas es relevante porque tanto Peñas Blancas como cerro Musún son macizos que se elevan sobre una base más o menos plana, ambos tienen una gradiente que sube hasta cerca de los 1.500 m y es de suponer que tenían una vegetación parecida. Peñas Blancas dista solamente 50 km del cerro Musún.

El individuo colectado por Huber en 1922 en El Edén, en la zona caribeña de Nicaragua, a un probable rango de altitud de entre 200 y 300 m de acuerdo a las coordenadas que él señala[6], junto con la afirmación de Salvin en 1893 de que en Santo Domingo, Chontales (400 m) existía la subespecie *M. t. stictoptera*[10] y finalmente el reporte de Cody[4] de 1994 en el Refugio Bartola a 100 m, confirman la distribución de la especie en las tierras bajas con bosque húmedo. Por otro lado, basándonos en los especímenes colectados por Richardson en 1909 y sabiendo que la altitud de la base de Peñas Blancas oscila entre los 800 y los 1.050 m y en nuestros reportes del cerro Musún, podemos concluir que *M. torquata* se distribuye en Nicaragua en bosques húmedos de tierras bajas y estribaciones de la vertiente del Caribe hasta los 1.200 m. Esto coincide con la distribución reportada en Panamá[12].

Concluimos que en el cerro Musún, en hábitat de bosque maduro continuo, existe una población reproductiva de *M. torquata* que se podría describir como común y local. Recomendamos hacer otras expediciones en áreas con bosques maduros y continuos como la Reserva de la Biosfera Bosawás y la Reserva Biológica Indio Maíz para determinar la distribución completa de la especie en Nicaragua.

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Noteworthy nesting record and unusual bill coloration of Resplendent Quetzal *Pharomachrus mocinno*

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En la Reserva Chelemhá, Alta Verapaz, Guatemala, se observó un nido de Quetzal Centroamericano *Pharomachrus mocinno* de mayo a agosto 2011. Los dos juveniles se desarrollaron desigualmente, el primero salió del nido el 28 de julio a la edad de 30 ó 31 días, y el segundo el 1 de agosto a la edad de 28–35 días. La hembra tenía un pico casi completamente amarillo. Solamente el área alrededor de los orificios nasales fue oscura, así como dos líneas finas en la mandíbula inferior. Este es el primer reporte de una hembra con pico amarillo de la subespecie *P. m. mocinno*. Esta anormalidad de coloración podría ser causada por alteraciones genéticas o alteraciones en el balance de hormonas sexuales. La hembra se observó desde mayo a julio atendiendo un nido junto con un macho que estaba por lo menos en su tercer año de edad. La hembra estaba en su segundo año de edad, determinado por la forma de sus rectrices exteriores, cuyo ancho disminuyó gradualmente hacia la punta, a diferencia de las rectrices truncadas de hembras en por lo menos su tercer año. Este es el primer reporte de anidación de *P. mocinno* en el segundo año de vida.

The range of Resplendent Quetzal *Pharomachrus mocinno* extends from southern Mexico to western Panama, with two recognised subspecies: *P. m. mocinno* in southern Mexico to Nicaragua, and *P. m. costaricensis* in Costa Rica and Panama[12]. Nesting has been described in detail only a few times. Clutches usually comprise two eggs[12]. Unger[25] reported a nest with two nestlings and an egg from Guatemala, probably indicating a three-egg clutch, but it cannot be eliminated that the egg remained from an earlier clutch (D. Unger pers. comm.). Whether adults start incubation after the first, second or third egg is laid is unknown, as well as the interval between eggs. In Golden-headed Quetzal *P. auriceps*, the interval was suggested to be one day inferred from the hatching interval in captivity[12]. In other Neotropical trogons, a gap of 1–3 days between eggs was reported or can be inferred from hatching intervals (Baird's *Trogon bairdii*, Black-headed *T. melanocephalus*[21] and Masked Trogons *T. personatus*[9]). Incubation of 17–19 days is known for Resplendent Quetzal from three nests of the southern subspecies[27]. Broods fledge in 23–31 days, based on three nests of *costaricensis* in Costa Rica and one of *mocinno* in Mexico[1,20]. Eggs and nestlings of *mocinno* were described by LaBastille *et al.*[15].

The exuberant ornamental plumes of the male Resplendent Quetzal have encouraged numerous publications on its plumages, moult and subspecific differences[3,4,8,10,12,18,23], while female morphology has received less attention. Immature females of nominate *mocinno* are apparently undescribed. The bill of adult females is usually dark. In *mocinno* it has been described as 'blackish'[2,10,18], 'dull black'[5] and 'darkish grey'[15]. In *costaricensis* female bill colour has been described as 'black'[20], 'upper mandible black' with yellow mandible[23], 'maxilla black; mandible dull yellow, tinged with dull green toward base'[26], 'slate to yellow'[27], 'maxilla blackish, streaked with yellow, sometimes entirely yellow, mandible dull yellow, tinged with green toward base'[12]. Here I document a breeding female Resplendent Quetzal of the subspecies *mocinno* with a yellow bill in the second year of life.

Study site and methods

Chelemhá Reserve (15º23'N 90º04'W), Alta Verapaz, Guatemala, is part of the Yalijux Important Bird Area[6], and protects c.2,500 ha of pristine cloud forest at 1,800–2,500 m combined with adjacent private nature reserves. I observed a Resplendent Quetzal nest from 11 May to 2 August 2011, for a total of 147 observation hours. Observations were made with binoculars and a telescope from a hide at distances of 20–50 m from the nest. Plumage terminology follows Pyle[17].

Results

The nest cavity of Resplendent Quetzal was located in an 8 m-tall, half-rotten oak stump (*Quercus* sp.), with a diameter at breast height of 90 cm and diameter at nest height 70 cm. Nest entrance was 4.8 m above ground, facing north-east. The stump was within 30 m-tall, oak-dominated cloud forest at 2,500 m.

Noteworthy nesting data.—I observed the female Resplendent Quetzal inside the nest cavity for >1 hour on 11 May 2011. Given the time between this observation and the first confirmation of nestlings, the bird may have been excavating or resting in the cavity, or there may have been an earlier clutch that was lost. Both adults were still incubating on 14 and 26 June. During brief observation on 27 June, the male and female were in the nest at unusual times compared to the

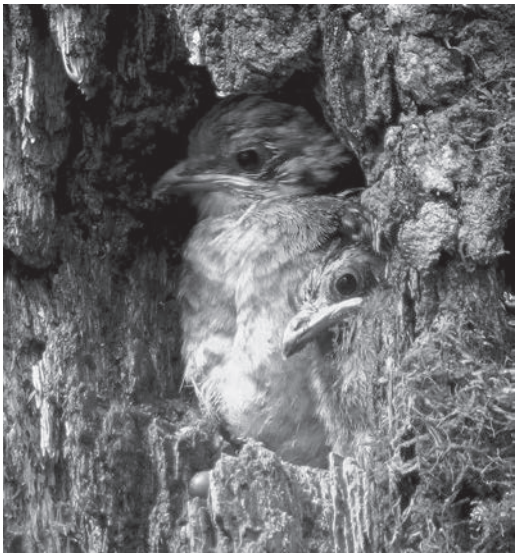

Figure 1. Unequally developed siblings of Resplendent Quetzal *Pharomachrus mocinno* perched at nest entrance, at age 29–30 days (large young) and 23–30 days (small young), Chelemhá Reserve, Alta Verapaz, Guatemala, 27 July 2011 (Knut Eisermann)

Figure 2. Female Resplendent Quetzal *Pharomachrus mocinno* with unusual yellow bill at nest entrance, Chelemhá Reserve, Alta Verapaz, Guatemala, 16 July 2011 (Knut Eisermann)

day before. On 28 June both adults were seen for the first time bringing food to the nest. Based on the adults' behaviour, the first young presumably hatched on 27 or 28 June. Food provided to the nestlings by both adults consisted mainly of fruit (different species of Lauracae, *Parathesis* sp. [Myrsinaceae], *Rubus* sp. [Rosaceae]). Occasionally lizards (including *Abronia* sp.), golden beetles (*Chrysina* sp., Scarabeidae), crickets (Ensifera) and landsnails (Gastropoda) were also brought. Once the female was observed feeding a small snake to one of the fledglings. Details of food and parental care will be presented elsewhere.

Juveniles were seen perched at the nest entrance for the first time on 18 July at the age of c.3 weeks. On 22 July, when the oldest young was 24 or 25 days old, I noticed that the nestlings were unequally developed, which became more obvious thereafter (Fig. 1). Both siblings fledged, the larger bird on 28 July and the smaller one on 1 August. Assuming that the large nestling was older, it fledged when aged 30 or 31 days. If the smaller young hatched on the same day as its sibling, fledging occurred at age 34 or 35 days. If the small young hatched 1–6 days after its sibling, which appears possible based on the interval between eggs of 1–3 days in other Trogonidae[9,21], it fledged at age 28–34 days.

Description of the female.—Observed for the first time on 11 May, perched in the nest entrance, the yellow bill was noticeable. The female was paired with an adult after-second-year male, aged by the fully developed uppertail-coverts. Based on careful observation and photographs made in the following weeks, the female had distal sections of the maxilla (including all of the exposed culmen) and mandible bright yellow, the area around the nostrils blackish, and the bill base dull yellow. The distal mandible had two fine blackish lines opposite the blackish mark on the maxilla (Fig. 2). No change in bill coloration was noticed from May until the last sighting on 28 July 2011. The bare skin of the narrow eye-ring was grey, the iris dark brown and feet pale grey. The head was brownish-green, breast grey and lower belly red. Back, rump and wing-coverts were green, remiges blackish, the outer vanes of the primaries fringed buff. Inner rectrices were blackish, the outer three rectrices (rr4–6) on both sides basally blackish. The distal parts of these rectrices were white, irregularly barred blackish (more extensive on the inner vanes), in r4 the distal c.40% was white, in r5 c.50%, and in r6 c.80% (Fig. 3). Outer rectrices were tapered (Fig. 4).

Discussion

The nesting described here was noteworthy because it differed in time of nesting, duration of brooding, nestling development and age of the female from previously reported nests. Nesting of the northern subspecies of Resplendent Quetzal ranges from the end of the dry season well into the wet season, in January–June[1,5,15,19,22,24]. Observation of a fledgling in August supports earlier suggestions[13] that the

Figure 3. Female Resplendent Quetzal *Pharomachrus mocinno* feeding *Abronia* sp. lizard to nestlings; note pattern of outer three rectrices and that the plumage is wet, making rectrices appear very pointed; Chelemhá Reserve, Alta Verapaz, Guatemala, 18 July 2011 (Knut Eisermann)

Figure 4: View of tapered outer rectrices of same female Resplendent Quetzal *Pharomachrus mocinno* as in Figs. 2–3, Chelemhá Reserve, Alta Verapaz, Guatemala, 14 July 2011 (Knut Eisermann)

breeding season in Guatemala could extend to this month. At Finca Santa Luisa in the western Sierra de las Minas, El Progreso, Guatemala, in the latest nest observed in 2007 young fledged in mid August (F. Mejilla pers. comm.). Nesting by *P. m. mocinno* therefore ranges from January to August. The observed nestling period of 30–35 days is longer than the previously recorded 27 days for *P. m. mocinno*[1], indicating some variability. For *costaricensis*, a nestling period of 23–31 days was reported[20], but the fledging was probably premature and provoked by disturbance at the nest[20]. Food quality may have impacted nestling development. Nestling period at the observed nest could have been slightly prolonged because it fell entirely within the wet season, with much rain and mist, probably inhibiting the adults ability to find sufficient energy-rich animal food, e.g. lizards.

Yellow bills in female quetzals of nominate *mocinno* have, to my knowledge, not been reported previously, nor did I note other individuals with extensive yellow bills during my observations in 1997–2011. Some birds, however, show a small extent of dull yellow on the mandible (Fig. 5), similar to some *costaricensis*[12,23,26]. Extensive yellow bills are rare in both subspecies; in *costaricensis* it has been reported in just a single female[27]. Other juvenile females, such as two from Finca Santa Luisa[16] and a specimen in the American Museum of Natural History, New York (AMNH 143912), have primarily dark bills. The coloration abnormality could be caused by an imbalance of sexual hormones—bright yellow bills are normal in males—or a genetic alteration.

The tapered outer rectrices indicate that the yellow-billed female had fledged in 2010. For *costaricensis*, Johnsgard[12] described the outer three rectrices of young females as more pointed than in adults. In other trogons (Elegant Trogon *Trogon elegans*, Eared Quetzal *Euptilotis neoxenus*) young

Figure 5. Adult female (after-second year) Resplendent Quetzal *Pharomachrus mocinno mocinno*; note truncated tips to outer rectrices; Refugio del Quetzal, San Rafael Pie de la Cuesta, San Marcos, Guatemala, 17 March 2011 (Knut Eisermann)

in the hatch year and second year have tapered outer rectrices unlike the truncated rectrices of adults[17]. Resplendent Quetzals retain the juvenile remiges and rectrices until aged c.1 year[4]. Johnsgard[12] indicated that the coloration of the outer rectrices is similar in young and adult females. Photographs of three juvenile females[11,16], and the female in Chelemhá, however, had irregularly barred outer rectrices with the distal end predominantly white, distinctive from adult females (Figs. 3–5). The female specimen AMNH 143912 with tapered outer rectrices also has irregular barring. Irregular barring in young females (hatch year and second year) is apparently age-related and distinguishes immatures from after-second-year adults. Adult females usually show coarse, regular barring and truncated outer rectrices (Fig. 5).

Demography of Resplendent Quetzal populations is unknown[8,12]. To my knowledge this is the first report of breeding in the second year, which seems exceptional. I reviewed published[3,7,11,13,14,16,25,28] and unpublished photographs (KE & E. Col unpubl.), as well as field notes on nine females and 18 males attending nests, of which all were adults at least in their third year of life—females aged by their truncated outer rectrices and males by fully developed uppertail-coverts.

Although Resplendent Quetzal is one of the most emblematic Neotropical birds, the number of described nests is rather small. Several details of nesting ecology remain unknown or unclear given the small number of observed nests, e.g. interval between eggs, onset of incubation, frequency of three-egg clutches, nesting success and duration of pair-bonds. More detailed observations on the quetzal's natural history will help to understand demographic patterns and population changes.

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Birds of the Cerro El Amay Important Bird Area, Quiché, Guatemala

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El Área Importante para la Conservación de Aves Cerro El Amay (IBA GT006) en el departamento de Quiché, Guatemala, incluye más de 250 km^2 de bosque húmedo latifoliado, lo que representa el segundo bosque nuboso más extenso en Guatemala. La avifauna del bosque nuboso en la altitud de 1.000–2.600 m, así como de áreas agrícolas en esta elevación y de bosque de pino, fue investigada usando búsquedas intensivas diurnas y nocturnas a lo largo de transectos con estimación de distancia perpendicular, de octubre 2010 a abril 2011. Durante los conteos y observaciones casuales se registraron 265 especies de aves, representando un 89% de las especies esperadas según patrones generales de distribución de aves en Guatemala. La riqueza de especies de aves residentes y de aves migratorias neotropicales fue mayor en bosque nuboso de 1.000–1.800 m de altitud comparado con bosque nuboso de 1.800–2.600 m. De acuerdo a la tasa de detección a lo largo de los transectos con una truncación de datos en la distancia perpendicular de 40 m, las especies más abundantes en bosque nuboso de 1.000–1.800 m fueron *Cardellina pusilla*, *Henicorhina leucosticta*, *Chlorospingus ophthalmicus*, *Basileuterus culicivorus* y *Myadestes unicolor*, y en bosque nuboso de 1.800–2.600 m fueron *C. ophthalmicus*, *C. pusilla*, *H. leucophrys*, *Zimmerius villisimus* y *Turdus infuscatus*. Para las especies comunes se calculó la preferencia de hábitat según el promedio de la tasa de detección en los transectos. Para las cinco especies más abundantes, se calculó la densidad de población y abundancia absoluta. La densidad de la migratoria *C. pusilla* fue 3,7 individuos / ha (95% intervalo de confianza: 2,2–6,2) en bosque nuboso de 1.800–2.600 m, y de 4,4 individuos / ha (2,9–6,7) en bosque nuboso de 1.000–1.800 m. Según la extensión de ambos tipos de bosque, se estimó la población total de esta especie con 68.330 individuos (43.580–107.500). Considerando los individuos adicionales en áreas abiertas, áreas <1.000 m, y el recambio de individuos durante la migración, se asume que el IBA Cerro El Amay apoya >1% de la población global de *C. pusilla*. Los búhos (Strigiformes) más comunes de 1.000–1.800 m fueron *Ciccaba virgata* y *Megascops guatemalae*, y de 1.800–2.600 m fueron *Strix fulvescens* y *Megascops barbarus*. En el siglo XIX, *Oreophasis derbianus* fue registrado como poco común en el Cerro El Amay. En un esfuerzo de búsqueda de 18 días en hábitat apropiado de 2008–11 la especie no pudo ser reconfirmada para este IBA. La especie seguramente ya no es poco común en el área, pero es posible que todavía exista en secciones del bosque nuboso aún no investigadas. Este estudio identifica el Cerro El Amay como uno de los IBAs más importantes en Guatemala por el número de especies claves que alberga.

Ornithologically, dpto. Quiché is one of the most poorly known areas in Guatemala[10]. Cerro El Amay, in northern Quiché, which forms part of the Sierra de Chamá, supports the second-largest montane humid broadleaf forest in Guatemala at c.250 km^2 [23]. Few bird records are available from the area. Salvin[26] collected several Horned Guans *Oreophasis derbianus* and Griscom[17] reported several species collected and observed by Alfred Webster Anthony at El Soch. At the same site a short recent survey[28] provided sufficient evidence to designate an Important Bird Area (IBA GT006[12]). Especially highland species reported by Griscom for Uspantán might relate to Cerro El Amay, e.g. Bearded Screech Owl *Megascops barbarus* and Pink-headed Warbler *Cardellina versicolor*. Here we report on the first avifaunal survey to cover all habitat types on the upper Cerro El Amay, including efforts to rediscover Horned Guan, and provide the first compilation of all species recorded in this IBA.

Study area and Methods

Study area.—The Cerro El Amay IBA (centred on 15º31ºN 90º45'W) is located in the municipalities of Uspantán and Chicamán, dpto. Quiché, and is bordered by the río Chixoy to the east, the río Putul to the west, Quebrada Saquixpec in the north and Quebrada El Rosario in the south (Fig. 1). The IBA ranges in elevation from 300 to 2,600 m. Unbroken forest is limited to areas above 1,000 m, on which our surveys focused. Humid broadleaf forest covers c.10,400 ha at 1,000–1,800 m and 6,100 ha at 1,800–2,600 m (Fig. 1). We sampled the avifauna in five habitat types. Upper cloud forest (1,800–2,600 m) comprised c.35 m-tall humid broadleaf forest dominated by oak (*Quercus* spp.) along ridges, with a more diverse tree community including

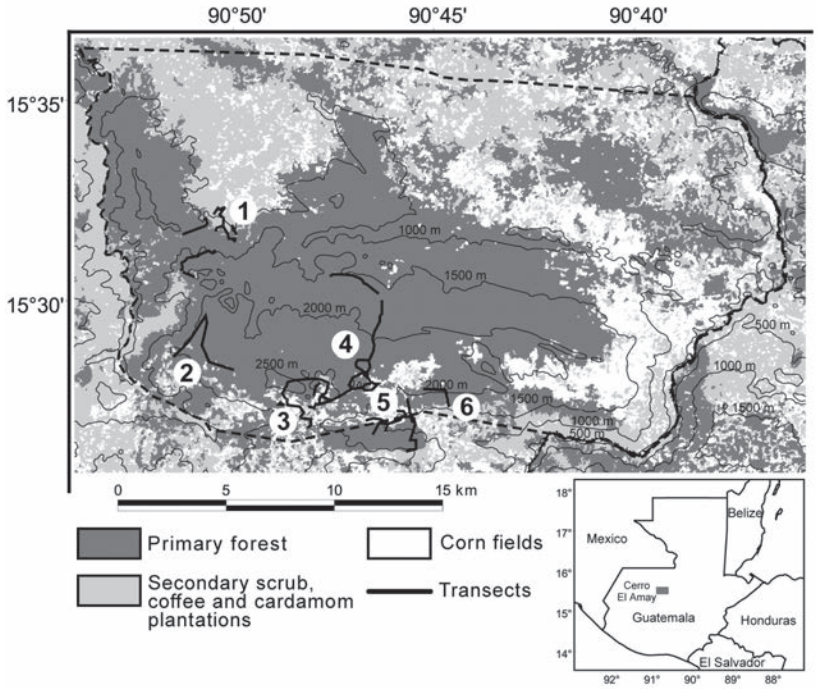

Figure 1. Vegetation cover and altitudinal zones in Cerro El Amay Important Bird Area (IBA GT006, dashed polygon) according to MAGA[23] and our field observations. Study sites: 1—La Gloria, 2—San Pedro La Esperanza, 3—Laj Chimel, 4—Chimel, 5—Reserva El Recuerdo, 6–El Soch, and transects used for intensive searches for Horned Guan *Oreophasis derbianus*. The inset shows the location of Cerro El Amay (grey rectangle) in Guatemala.

several Lauraceae on slopes. Lower cloud forest (1,000–1,800 m) was also c.35 m tall, locally with 50–65 m-tall trees (Mexican elm *Ulmus mexicanus* at La Gloria, cedar *Cedrela salvadorensis* at El Recuerdo). Pine forest (*Pinus* sp.) with a shrubby understorey was restricted to a hillside at El Recuerdo at 1,800–2,200 m. Natural habitat has been altered by agriculture around the main forest. We also sampled the bird community in upper open habitat (1,800–2,600 m) and lower open habitat (1,000–1,800 m), including forest edges, small plantations of coffee (*Coffea arabica*), cardamom (*Elettaria cardamomum*), sugarcane (*Saccharum officinarum*) and corn (*Zea mays*), with cattle pasture and second-growth scrub.

Bird surveys.—We surveyed lower cloud forest and lower open habitat in Reserva El Recuerdo (15º27'16"N 90º45'33"W) and La Gloria (15º32'04"N 90º49'57"W), upper cloud forest and upper open habitat in Chimel (15º28'12"N 90º47'00"W), Laj Chimel (15º27'30"N 90º48'45"W), El Soch (15º27'20"N 90º44'42"W) and San Pedro La Esperanza (15º28'40"N 90º50'56"W), and pine forest in El Recuerdo (Fig. 1).

KE & CA sampled the avifauna using audio-visual counts (diurnal and nocturnal intensive searches) along transects[3,24]. Census workers were familiar with bird vocalisations from previous studies[9,10,14]. Diurnal counts were conducted at 05h00–10h00 h, although on days with exceptionally high bird activity this was extended until 11h50, and on nocturnal counts, 17h45–23h00 and 04h30–6h00, under optimal weather conditions (no rain, wind speed <4 Beaufort scale). For each bird or flock detected, we recorded the number of individuals and their perpendicular distance from the transect line, measured with a laser field ranger or estimated. Pre-existing trails were used as transects, in length 260–2,740 m (diurnal, n = 34 transects) or 100–2,560 m (nocturnal, n = 21 transects). Total sampling effort was 37.8 km of diurnal transects and 21.4 km of nocturnal transects. Counts were made on 16–20 October 2010, 2–12 February and 10–26 April 2011. In addition to standardised counts, casual observations were recorded over 153 hours. Ten days were spent in upper cloud forest >2,000 m, which is considered appropriate Horned Guan habitat[11].

Additional effort was made to detect Horned Guans during surveys in 2008–11. PT spent a total of eight days surveying cloud forest habitat at 2,000–2,600 m in February 2008, January 2010 and March 2011 in lands managed by the villages of La Gloria, Laj Chimel, San Pedro La Esperanza

and by the Chimel Community Association. While some pre-existing trails were used, the majority of areas surveyed were accessed by freshly cut trails, created to access remote parts of Cerro El Amay (Fig. 1). Intensive searches were conducted along c.32 km of trails, with at least 45 hours of observations.

Data analyses.—To compare species richness between habitats, we produced individual-based rarefaction curves using Biodiversity Professional[22] and estimated species richness via a non-parametric first-order Jackknife estimator using EstimateS[7]. To calculate relative abundance, each transect was considered a sampling unit. To reduce the effect of different detectability among species, we truncated data at the perpendicular distance of 40 m (for nocturnal birds data were truncated at 100 m). Because transect length was variable, we calculated the encounter rate in number of individuals / 100 m transect. To determine habitat preferences, we compared encounter rate between the four main habitat types (upper cloud forest, lower cloud forest, upper open habitat, lower open habitat) with the parameter-free Kruskal-Wallis test with $\alpha = 0.05$, using PAST 2.08[18]. When significant differences were detected, we subsequently applied a pairwise Mann-Whitney U-Test with $\alpha = 0.05$, and a Bonferroni correction according to the number of pairs tested.

For the most abundant species the number of records was sufficient (c.80[5]) to calculate detection probability and population densities using Distance 6.0[29]. Each transect was considered a replicate unit. Data were, when necessary, truncated during model selection. The best model was selected based on Akaike's Information Criterion (AIC) and chi-square goodness-of-fit-test for each interval[5].

To classify all species according to their relative abundance in Cerro El Amay IBA, we established five categories: abundant (mean >0.25 birds / 100 m transect), common (0.10–0.25 individuals / 100 m transect or >20 casual observations), fairly common (0.02–0.09 individuals / 100 m transect or >10 casual observations), uncommon (<0.02 individuals / 100 m transect or 3–10 records during transect counts and casual observations), and rare (1–2 records during transect counts and casual observations). Nomenclature follows the AOU[1] and supplements[6].

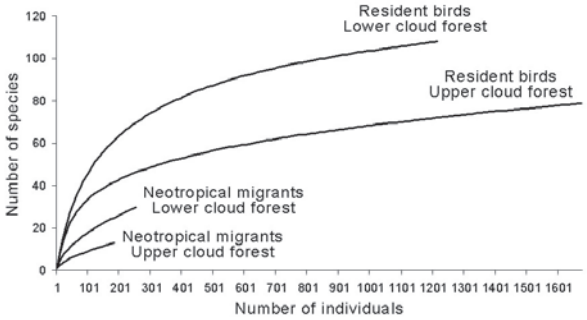

Figure 2. Rarefaction curves (based on the number of detected individuals) comparing species richness of resident and migratory birds in upper and lower cloud forest in Cerro El Amay IBA.

Results

Species richness.—Between October 2010 and April 2011, 265 species were recorded in Cerro El Amay IBA during standardised bird counts and casual observations. Of these, 214 are considered breeding residents and 47 are Nearctic-Neotropical migrants (39 winter residents and eight transients). Four species are considered summer residents.

Some 5,667 birds were recorded during standardised intensive searches. An individual-based rarefaction analysis comparing both principal primary forest habitats revealed higher species richness in lower cloud forest compared to upper cloud forest, in both resident and migratory species (Fig. 2). The species richness calculated with a first-order Jackknife estimator based on transect counts was as follows (Jackknife estimation is indicated with SD): lower cloud forest: resident birds observed: 108 species, estimated: 137 ± 4; migratory birds observed: 30 species, estimated 45 ± 5; upper cloud forest: resident birds observed: 79 species, estimated: 102 ± 7; migratory birds observed: 13 species, estimated 19 ± 3.

Relative abundance and habitat preferences.—Table 1 lists the most abundant species in each habitat type. Among common species with at least ten records during transects, we tested for differences in the mean encounter rate between upper and lower cloud forest, and upper and lower open habitat (Table 2). Upper cloud forest specialists, exclusively recorded there or with a significantly greater encounter rate were Band-tailed Pigeon *Patagioenas fasciata*, Amethyst-throated Hummingbird *Lampornis amethystinus*, Garnet-throated Hummingbird *Lamprolaima rhami*, Hairy Woodpecker *Picoides villosus*, Spot-crowned Woodcreeper *Lepidocolaptes affinis*, Paltry Tyrannulet *Zimmerius vilissimus*, Hutton's Vireo *Vireo huttoni*, Rufous-browed Wren *Troglodytes rufociliatus*, Ruddy-capped Nightingale-Thrush *Catharus frantzii*, Black Thrush *Turdus infuscatus*, Mountain Thrush *T. plebejus*, Crescent-chested Warbler *Parula superciliosa*, Golden-browed Warbler *Basileuterus belli* and Common Bush Tanager *Chlorospingus ophthalmicus*. Species with a significantly greater encounter rate in lower cloud forest were: Green-throated Mountain-gem *Lampornis viridipallens*,

Table 1. Most abundant bird species in Cerro El Amay IBA, with a mean encounter rate >0.25 birds / 100 m of transect and strip width 80 m across all months from October 2010 to April 2011. Species are listed in descending order of abundance, for scientific names see Table 2.

Lower cloud forest		Upper cloud forest		Lower open habitat		Upper open habitat		Pine forest	
Species	Encounter rate	Species	Encounter rate	Species	Encounter rate	Species	Encounter rate	Species	Encounter rate
Wilson's Warbler	1.10	Common Bush Tanager	1.42	Wilson's Warbler	1.09	Amethyst-throated Hummingbird	0.61	White-eared Hummingbird	0.50
White-breasted Wood Wren	0.61	Wilson's Warbler	1.28	Swainson's Thrush	0.74	Wilson's Warbler	0.52	Grey-breasted Wood Wren	0.34
Common Bush Tanager	0.58	Grey-breasted Wood Wren	0.92	Azure-crowned Hummingbird	0.61	Brown-backed Solitaire	0.28	Wilson's Warbler	0.25
Golden-crowned Warbler	0.50	Paltry Tyrannulet	0.78	White-eared Hummingbird	0.61	Plain Wren	0.28	Ruddy Foliage-gleaner	0.25
Slate-coloured Solitaire	0.44	Black Thrush	0.68	Black-throated Green Warbler	0.50				
Swainson's Thrush	0.43	Yellowish Flycatcher	0.57	Plain Wren	0.49				
Grey-breasted Wood Wren	0.37	Amethyst-throated Hummingbird	0.57	Tennessee Warbler	0.36				
Green-throated Mountain-gem	0.35	Mountain Thrush	0.51	Slate-throated Redstart	0.34				
Slate-throated Redstart	0.34	Brown-backed Solitaire	0.43	Brown-capped Vireo	0.29				
Spot-breasted Wren	0.31	Ruddy-capped Nightingale-Thrush	0.40	Green Violetear	0.28				
Scaly-throated Foliage-gleaner	0.29	Golden-browed Warbler	0.40						
Black-throated Green Warbler	0.28	Rufous-browed Wren	0.37						
Yellowish Flycatcher	0.27	Chestnut-capped Brush Finch	0.37						
Eye-ringed Flatbill	0.27	Garnet-throated Hummingbird	0.33						
		Crescent-chested Warbler	0.29						
		Slate-throated Redstart	0.28						

Tawny-throated Leaftosser *Sclerurus mexicanus*, Scaly-throated Foliage-gleaner *Anabacerthia variegaticeps*, Eye-ringed Flatbill *Rhynchocyclus brevirostris*, White-breasted Wood Wren *Henicorhina leucosticta*, Black-headed Nightingale-Thrush *Catharus mexicanus*, Golden-crowned Warbler *Basileuterus culicivorus* and Red-crowned Ant Tanager *Habia rubica*.

Absolute abundance.—For the five most abundant species, density estimates were calculated from distance sampling data in April 2011. Common Bush Tanager was the most abundant bird in upper cloud forest with a density of 6.5 birds / ha (95% confidence interval: 4.1–10.3; n = 134 birds). In lower cloud forest it was recorded at a density of 4.3 birds / ha (95%: 2.8–6.5 birds / ha; n = 70 birds). Assuming a homogeneous population density throughout the upper cloud forest (6,100 ha) and lower cloud forest (10,400 ha), the total population in primary forest above 1,000 m in the IBA is estimated to be 84,400 birds (95%: 54,100–130,400 birds). The second most abundant bird was the migratory Wilson's Warbler *Cardellina pusilla* with a population density of 3.7 birds / ha (95%: 2.2–6.2 birds / ha; n = 138 birds) in upper cloud forest, and 4.4 birds / ha (95%: 2.9–6.7; n = 92 birds) in lower cloud forest. Consequently, total population in primary forest above 1,000 m was 68,330 birds (95% confidence interval: 43,580–107,500). The next most abundant birds in upper cloud forest were: Grey-breasted Wood Wren *Henicorhina leucophyrs* (2.0 birds / ha; 95% confidence interval 1.3–3.0; n = 136 birds), Paltry Tyrannulet (1.6 birds / ha; 95% confidence interval 1.1–2.4; n = 91 birds), and Black Thrush (1.3 birds / ha; confidence interval 0.7–2.5; n = 87 birds).

Nocturnal birds.—Seven species of owls and three nighthawks were recorded in the IBA (Table 2). The commonest owls in lower cloud forest and open habitat were Mottled Owl *Ciccaba virgata* and

Table 2. Bird species recorded in the Cerro El Amay Important Bird Area.

IBA trigger species (marked in species column): [1] = Globally threatened species (Vulnerable, Engangered, or Critically Endangered); [2] = restricted to EBA 18 (North Central American highland); [3] = restricted to Madrean Highlands; [4] = restricted to Gulf Caribbean Slope; [5] = >1% of global population within IBA.

Evidence: P = photograph, R = voice recording, S = sight, V = voice.

Status: R = resident, nesting assumed; R* = resident, nesting observed (nest, fledged juveniles or nest-building adults); RV = summer resident; T = transient; V = visitor; ? = uncertain

Abundance: a = abundant (>0.25 individuals / 100 m transect); c = common (0.10–0.25 individuals / 100 m transect or >20 casual observations); f = fairly common (0.02–0.09 individuals / 100 m transect or >10 casual observations); u = uncommon (<0.02 individuals / 100 m transect or 3–10 records during transect counts and casual observations); r = rare (1–2 records during transect counts and casual observations), X = no data.

Habitat: A = upper cloud forest (1,800–2,600 m); B = lower cloud forest (1,000–1,800 m); C = upper open habitat (1,800–2,600 m); D = lower open habitat (1,000–1,800 m); E = open habitat <1,000 m; F = pine forest (1,800–2,200 m); G = small lagoon, + = historical record (Salvin 1874), * = open-habitat species recorded by Tenez [28]. Habitat with highest detection rate underlined. If habitat preference was statistically significant (pairwise comparison with Mann-Whitney U-test with $\alpha = 0.05$, Bonferroni-corrected according to the number of pairs), p is indicated in parentheses.

Family and species	English name	Evidence	Residency status	Abundance	Habitat
TINAMIDAE					
Tinamus major	Great Tinamou	V	R	u	B
Crypturellus soui	Little Tinamou	V	R	u	D
Crypturellus boucardi	Slaty-breasted Tinamou	R	R	u	B
CRACIDAE					
Ortalis vetula [4]	Plain Chachalaca	V	R	c	D
Penelope purpurascens	Crested Guan	R,P	R	f	A,B
Penelopina nigra [1,2,3]	Highland Guan	R,P	R*	c	A,B
Oreophasis derbianus [1,2,3]	Horned Guan	-	?	X	+
ODONTOPHORIDAE					
Dendrortyx leucophrys	Buffy-crowned Wood Partridge	V,S	R	c	A,C,D,F
Odontophorus guttatus	Spotted Wood Quail	V	R	f	B
ARDEIDAE					
Ardea alba	Great Egret	S	V	u	D
CATHARTIDAE					
Coragyps atratus	Black Vulture	S	V	u	D
Cathartes aura	Turkey Vulture	S	V	u	C,D
ACCIPITRIDAE					
Chondrohierax uncinatus	Hook-billed Kite	R,P	R	u	B
Elanoides forficatus	Swallow-tailed Kite	S	RV	X	E
Accipiter striatus	Sharp-shinned Hawk	S	V	r	D
Accipiter striatus chionogaster	White-breasted Hawk	P	R	f	A,B,D,F
Buteogallus anthracinus	Common Black Hawk	P	R	u	B,D
Buteogallus urubitinga	Great Black Hawk	S	R	r	B
Leucopternis albicollis	White Hawk	P	R	u	B
Buteo magnirostris	Roadside Hawk	S	R	r	D
Buteo platypterus	Broad-winged Hawk	P	T	f	A,B,C,D
Buteo plagiatus	Grey Hawk	P	R	u	D
Buteo brachyurus	Short-tailed Hawk	S	R	u	A,E
Buteo jamaicensis	Red-tailed Hawk	P	R	f	A,B,C,D
Spizaetus ornatus	Ornate Hawk-Eagle	P	R	r	B
SCOLOPACIDAE					
Phalaropus tricolor	Wilson's Phalarope	S	V	r	G
COLUMBIDAE					
Patagioenas flavirostris	Red-billed Pigeon	S	R	r	D
Patagioenas fasciata	Band-tailed Pigeon	P	R	c	A,B,C,D ($p = 0.002$)
Columbina inca	Inca Dove	-	R	X	*
Columbina passerina	Common Ground Dove	-	R	X	*
Columbina talpacoti	Ruddy Ground Dove	S	R	X	E
Claravis pretiosa	Blue Ground Dove	S	R	X	E

Leptotila verreauxi	White-tipped Dove	P	R*	f	B,C,D
Geotrygon albifacies [3]	White-faced Quail-Dove	R	R	f	A,B
CUCULIDAE					
Piaya cayana	Squirrel Cuckoo	S,V	R	f	B,C,D
Tapera naevia	Striped Cuckoo	V	R	u	C,E
Dromococcyx phasianellus	Pheasant Cuckoo	R	R	r	B
Geococcyx velox	Lesser Roadrunner	-	R	X	*
Crotophaga sulcirostris	Groove-billed Ani	S	R	u	D
STRIGIDAE					
Megascops barbarus [1,2,3]	Bearded Screech Owl	R,P	R	c	A,C,F
Megascops guatemalae	Vermiculated Screech Owl	R,P	R	c	B,D
Glaucidium gnoma	Northern Pygmy Owl	R,P	R	f	A,B,C,D
Glaucidium griseiceps	Central American Pygmy Owl	R	R	r	B
Ciccaba virgata	Mottled Owl	R	R	c	B,D
Strix fulvescens [2,3]	Fulvous Owl	R	R	c	A,C
Aegolius ridgwayi	Unspotted Saw-whet Owl	R	R	r	A
CAPRIMULGIDAE					
Nyctidromus albicollis	Common Pauraque	P	R*	c	B,C,D (p = 0.02)
Antrostomus carolinensis	Chuck-will's-widow	R	T	r	D
Antrostomus arizonae	Mexican Whip-poor-will	R	R	f	A,B,C,D,F
APODIDAE					
Streptoprocne rutila	Chestnut-collared Swift	V,S	R	u	A,B,C,D
Streptoprocne zonaris	White-collared Swift	P	R	f	A,B,C,D
Chaetura vauxi	Vaux's Swift	V,S	R	f	A,B,C,D
TROCHILIDAE					
Phaethornis longirostris	Long-billed Hermit	V,S	R	f	B,D
Phaethornis striigularis	Stripe-throated Hermit	R	R	c	B,D
Colibri thalassinus	Green Violetear	V,S	R	a	B,C,D (p = 0.03)
Anthracothorax prevostii	Green-breasted Mango	S	R	X	E
Eugenes fulgens	Magnificent Hummingbird	S,V	R	c	A,B,C,D
Lampornis viridipallens [2,3]	Green-throated Mountain-gem	P	R	a	A,B,C,D,F (p = 0.006)
Lampornis amethystinus [3]	Amethyst-throated Hummingbird	S,V	R	a	A,B,C,D,F (p = 0.01)
Lamprolaima rhami [3]	Garnet-throated Hummingbird	S,V	R	a	A,C (p = 0.04)
Doricha enicura [2,3]	Slender Sheartail	S	R	r	D
Tilmatura dupontii [3]	Sparkling-tailed Hummingbird	S	R	r	D
Archilochus colubris	Ruby-throated Hummingbird	S	V	r	D
Atthis ellioti [2,3]	Wine-throated Hummingbird	R,P	R	c	A,B,C,D
Abeillia abeillei [3]	Emerald-chinned Hummingbird	P	R*	f	B,D
Campylopterus hemileucurus	Violet Sabrewing	R	R	a	A,B,D (p = 0.04)
Eupherusa eximia	Stripe-tailed Hummingbird	S	R	f	B
Amazilia cyanocephala	Azure-crowned Hummingbird	S	R*	a	B,D (p = 0.002)
Amazilia beryllina	Berylline Hummingbird	S	R	u	B,D
Amazilia tzacatl	Rufous-tailed Hummingbird	S	R	u	D
Hylocharis leucotis [3]	White-eared Hummingbird	P	R	a	A,M,C,D,F (p = 0.01)
TROGONIDAE					
Trogon mexicanus [3]	Mountain Trogon	S,V	R	c	A,C,D (p = 0.02)
Trogon collaris	Collared Trogon	S,V	R	c	B,C,D,F
Pharomachrus mocinno	Resplendent Quetzal	R,P	R	c	A,B,C
MOMOTIDAE					
Aspatha gularis [2,3]	Blue-throated Motmot	V	R	f	A,B,C,D
Momotus momota	Blue-crowned Motmot	S,V	R	a	B,D
RAMPHASTIDAE					
Aulacorhynchus prasinus	Emerald Toucanet	P	R*	a	A,B,C,D

PICIDAE					
Melanerpes aurifrons	Golden-fronted Woodpecker	S,V	R	c	D
Sphyrapicus varius	Yellow-bellied Sapsucker	S	V	r	C,D
Picoides fumigatus	Smoky-brown Woodpecker	V	R	r	B
Picoides villosus	Hairy Woodpecker	R	R	c	A,B,C,D (p = 0.007)
Colaptes rubiginosus	Golden-olive Woodpecker	S,V	R	c	A,B,C,D
Colaptes auratus	Northern Flicker	S,V	R	f	A,B,C,D
Dryocopus lineatus	Lineated Woodpecker	S,V	R	r	C,D
Campephilus guatemalensis	Pale-billed Woodpecker	S,V	R	r	D
FALCONIDAE					
Micrastur ruficollis	Barred Forest Falcon	R	R	f	A,B
PSITTACIDAE					
Bolborhynchus lineola	Barred Parakeet	S,V	R	f	A,B,C,D
Pyrilia haematotis	Brown-hooded Parrot	V	R	r	B
Pionus senilis	White-crowned Parrot	V,S	R	u	B,D
THAMNOPHILIDAE					
Taraba major	Great Antshrike	V	R	X	E
Thamnophilus doliatus	Barred Antshrike	S,V	R	c	B,D
Myrmotherula schisticolor	Slaty Antwren	S,V	R	u	B
Cercomacra tyrannina	Dusky Antbird	S,V	R	f	B,D
GRALLARIIDAE					
Grallaria guatimalensis	Scaled Antpitta	S	R	u	B
FORMICARIIDAE					
Formicarius analis	Black-faced Antthrush	V	R	c	B,D
FURNARIIDAE					
Sclerurus mexicanus	Tawny-throated Leaftosser	S,V	R	a	A,B,D (p = 0.003)
Dendrocincla anabatina [4]	Tawny-winged Woodcreeper	S,V	R	r	B
Glyphorynchus spirurus	Wedge-billed Woodcreeper	S,V	R*	f	B,D
Xiphocolaptes promeropirhynchus	Strong-billed Woodcreeper	V	R	r	F
Xiphorhynchus flavigaster	Ivory-billed Woodcreeper	S,V	R	f	B
Xiphorhynchus erythropygius	Spotted Woodcreeper	S,V	R	c	A,B,D,F
Lepidocolaptes affinis	Spot-crowned Woodcreeper	S,V	R	c	A,B,C,D,F (p = 0.03)
Anabacerthia variegaticeps	Scaly-throated Foliage-gleaner	S,V	R	a	A,B,D (p = 0.009)
Automolus ochrolaemus	Buff-throated Foliage-gleaner	V	R	f	B
Automolus rubiginosus	Ruddy Foliage-gleaner	S,V	R*	c	A,B,C,D,E,F
Synallaxis erythrothorax	Rufous-breasted Spinetail	V	R	u	D
Tyrannidae					
Elaenia flavogaster	Yellow-bellied Elaenia	S,V	R	f	D,E
Elaenia frantzii	Mountain Elaenia	S,V	R	f	A,C
Mionectes oleagineus	Ochre-bellied Flycatcher	S,V	R	c	B,D
Zimmerius vilissimus	Paltry Tyrannulet	P	R	a	A,B,C,D,F (p = 0.004)
Oncostoma cinereigulare	Northern Bentbill	S,V	R	f	B,D
Todirostrum cinereum	Common Tody-Flycatcher	S,V	R	f	D,E
Rhynchocyclus brevirostris	Eye-ringed Flatbill	R	R	a	A,B (p =0.003)
Tolmomyias sulphurescens	Yellow-olive Flycatcher	V	R	f	A,B,D,E
Platyrinchus cancrominus	Stub-tailed Spadebill	V	R	c	B
Mitrephanes phaeocercus	Tufted Flycatcher	S,V	R	c	A,B,C,D (p = 0.03)
Contopus cooperi	Olive-sided Flycatcher	P	T	u	A,B,C,D
Contopus pertinax [3]	Greater Pewee	S,V	R	f	B,F
Contopus sordidulus	Western Wood Pewee	P,R	T	f	A,B,C,D,E
Contopus virens	Eastern Wood Pewee	V,S	T	f	A,B,C,D
Contopus cinereus	Tropical Pewee	P	R	f	D
Empidonax flaviventris	Yellow-bellied Flycatcher	V,S	V	f	B,D

Empidonax albigularis	White-throated Flycatcher	P	R	u	D
Empidonax minimus	Least Flycatcher	P	V	c	A,B,C,D,E
Empidonax hammondii	Hammond's Flycatcher	V,S	V	u	A,C
Empidonax flavescens	Yellowish Flycatcher	S,V	R	a	A,B,C,D,F
Empidonax fulvifrons [3]	Buff-breasted Flycatcher	S,V	R	r	C
Attila spadiceus	Bright-rumped Attila	S,V	R	f	B
Rhytipterna holerythra	Rufous Mourner	V	R	r	B
Myiarchus tuberculifer	Dusky-capped Flycatcher	S,V	R	c	B,C,D,E
Myiarchus crinitus	Great Crested Flycatcher	V	V	r	D
Myiarchus tyrannulus	Brown-crested Flycatcher	S,V	RV	r	B,D
Pitangus sulphuratus	Great Kiskadee	-	R	X	*
Megarynchus pitangua	Boat-billed Flycatcher	-	R	X	*
Myiozetetes similis	Social Flycatcher	S,V	R	c	C
Myiodynastes luteiventris	Sulphur-bellied Flycatcher	V	RV	c	B,D,E
Tyrannus melancholicus	Tropical Kingbird	V,S	R	u	C
Tyrannus couchii [4]	Couch's Kingbird	V,S	R*	u	D
TITYRIDAE					
Tityra semifasciata	Masked Tityra	V,S	R	r	D
Pachyramphus major	Grey-collared Becard	V,S	R	u	B
Pachyramphus aglaiae	Rose-throated Becard	V,S	R	c	A,B,C,D,E
VIREONIDAE					
Vireo plumbeus	Plumbeous Vireo	S	R	r	A,D
Vireo solitarius	Blue-headed Vireo	S	V	c	A,B,C,D
Vireo huttoni	Hutton's Vireo	V,S	R	f	A (p = 0.02)
Vireo gilvus	Warbling Vireo	S	V	r	D
Vireo leucophrys	Brown-capped Vireo	V,S	R	a	A,B,C,D
Vireo olivaceus	Red-eyed Vireo	S	T	r	D
Vireo flavoviridis	Yellow-green Vireo	V,S	RV	X	E
Hylophilus decurtatus	Lesser Greenlet	V,S	R	c	B,D
Vireolanius melitophrys [3]	Chestnut-sided Shrike-Vireo	V	R	f	A,F
Vireolanius pulchellus	Green Shrike-Vireo	V	R	f	B
Cyclarhis gujanensis	Rufous-browed Peppershrike	V,S	R	f	A,C,D
CORVIDAE					
Cyanolyca pumilo	Black-throated Jay	R	R	f	A,B
Cyanolyca cucullata	Azure-hooded Jay	R,P	R	c	A,B,D
Psilorhinus morio	Brown Jay	V,S	R	X	E
Cyanocorax yncas	Green Jay	V	R	r	B
Cyanocorax melanocyaneus [2,3]	Bushy-crested Jay	V,S	R	c	B,C,D
Cyanocitta stelleri	Steller's Jay	V	R	r	A
Aphelocoma unicolor [3]	Unicoloured Jay	R,P	R	f	A,B,C
HIRUNDINIDAE					
Progne chalybea	Grey-breasted Martin	S	R	X	E
Notiochelidon pileata [2,3]	Black-capped Swallow	V,S	R	u	C
Stelgidopteryx serripennis	Northern Rough-winged Swallow	S	R	r	D,E
Hirundo rustica	Barn Swallow	S	V	u	C,E
AEGITHALIDAE					
Psaltriparus minimus	Bushtit	S	R	r	C
CERTHIIDAE					
Certhia americana	Brown Creeper	V,S	R	c	F

TROGLODYTIDAE					
Microcerculus philomela [4]	Nightingale Wren	V	R	f	B,D
Troglodytes aedon	House Wren	V,S	R	c	C,D,F
Troglodytes rufociliatus [2,3]	Rufous-browed Wren	V,S	R	a	A,B,C (p = 0.0003)
Campylorhynchus zonatus	Band-backed Wren	V,S	R	r	F
Pheugopedius maculipectus	Spot-breasted Wren	V,S	R	a	B,D,E
Cantorchilus modestus	Plain Wren	V,S	R	a	C,D
Henicorhina leucosticta	White-breasted Wood Wren	V,S	R	a	B,D (p = 0.02)
Henicorhina leucophrys	Grey-breasted Wood Wren	V,S	R	a	A,B,C,F
POLIOPTILIDAE					
Ramphocaenus melanurus	Long-billed Gnatwren	V	R	r	B,D
TURDIDAE					
Sialia sialis	Eastern Bluebird	V,S	R	u	C
Myadestes occidentalis [3]	Brown-backed Solitaire	V,S	R	a	A,B,C,D,F (p = 0.03)
Myadestes unicolor [3]	Slate-coloured Solitaire	R	R*	a	A,B,C,E
Catharus aurantiirostris	Orange-billed Nightingale-Thrush	V,S	R	c	C,D
Catharus frantzii	Ruddy-capped Nightingale-Thrush	V,S	R	a	A,B,C,D,F (p = 0.003)
Catharus mexicanus	Black-headed Nightingale-Thrush	R	R	c	B (p = 0.04)
Catharus dryas	Spotted Nightingale-Thrush	V,S	R	c	A,B,D
Catharus ustulatus	Swainson's Thrush	V,S	V	a	A,B,C,D
Hylocichla mustelina	Wood Thrush	P	V	c	B,D
Turdus infuscatus [3]	Black Thrush	R	R	a	A,B,C,D (p = 0.006)
Turdus plebejus	Mountain Thrush	R	R	a	A (p = 0.0001)
Turdus grayi	Clay-coloured Thrush	V,S	R	c	B,C,D
Turdus assimilis	White-throated Thrush	V,S	R	f	B,D
Turdus rufitorques [2,3]	Rufous-collared Robin	V,S	R	a	A,C
MIMIDAE					
Dumetella carolinensis	Grey Catbird	V,S	V	a	C,D
Melanotis hypoleucus [2,3]	Blue-and-white Mockingbird	V,S	R	a	A,C,D
PTILOGONATIDAE					
Ptilogonys cinereus [3]	Grey Silky-flycatcher	V,S	R	f	C
PEUCEDRAMIDAE					
Peucedramus taeniatus	Olive Warbler	V,S	R	u	B,F
PARULIDAE					
Helmitheros vermivorum	Worm-eating Warbler	S	V	r	B
Parkesia motacilla	Louisiana Waterthrush	V,S	V	u	B,D
Parkesia noveboracensis	Northern Waterthrush	V,S	V	u	B,D
Vermivora chrysoptera	Golden-winged Warbler	S	V	f	B,D
Mniotilta varia	Black-and-white Warbler	S	V	c	B,D
Oreothlypis superciliosa [3]	Crescent-chested Warbler	V,S	R	a	A,B,C,F (p = 0.01)
Oreothlypis peregrina	Tennessee Warbler	S	V	a	A,B,C,D
Oreothlypis ruficapilla	Nashville Warbler	P	V	u	C
Geothlypis poliocephala	Grey-crowned Yellowthroat	-	R	X	*
Geothlypis tolmiei	MacGillivray's Warbler	V,S	V	c	C,D
Geothlypis formosa	Kentucky Warbler	V,S	V	r	B
Setophaga fusca	Blackburnian Warbler	P	T	c	A,B,C,D
Setophaga petechia	Yellow Warbler	S	V	r	C
Setophaga pensylvanica	Chestnut-sided Warbler	V,S	V	r	B,D
Setophaga coronata	Yellow-rumped Warbler	S	V	r	C
Setophaga graciae	Grace's Warbler	V	R	f	F

Setophaga townsendi	Townsend's Warbler	V,S	V	c	A,B,C,D
Setophaga chrysoparia [1]	Golden-cheeked Warbler	S	V	r	B
Setophaga virens	Black-throated Green Warbler	R,P	V	a	A,B,C,D
Basileuterus rufifrons	Rufous-capped Warbler	V,S	R	c	B,D,F (p = 0.01)
Basileuterus belli [3]	Golden-browed Warbler	V,S	R	a	A,B,F (p = 0.001)
Basileuterus culicivorus	Golden-crowned Warbler	V,S	R	a	B,D (p = 0.02)
Cardellina canadensis	Canada Warbler	S	T	c	A,B,D
Cardellina pusilla [5]	Wilson's Warbler	P	V	a	A,B,C,D,F
Cardellina versicolor [1,2,3]	Pink-headed Warbler	R, P	R	c	A,C
Myioborus miniatus	Slate-throated Redstart	P	R*	a	A,B,C,D,E,F
INCERTAE SEDIS					
Coereba flaveola	Bananaquit	V,S	R	f	D,E
THRAUPIDAE					
Ramphocelus sanguinolentus [4]	Crimson-collared Tanager	S	R	f	D,E
Ramphocelus passerinii [4]	Passerini's Tanager	S	R	u	D,E
Thraupis episcopus	Blue-grey Tanager	V,S	R	f	D
Thraupis abbas	Yellow-winged Tanager	V,S	R	f	A,D
Tangara larvata	Golden-hooded Tanager	V,S	R	r	D
Chlorophanes spiza	Green Honeycreeper	P	R	u	B
Cyanerpes cyaneus	Red-legged Honeycreeper	V,S	R	r	D
INCERTAE SEDIS					
Saltator coerulescens	Greyish Saltator	V,S	R	c	D
Saltator maximus	Buff-throated Saltator	V,S	R	c	D
Saltator atriceps	Black-headed Saltator	V,S	R	c	A,B,C,D
EMBERIZIDAE					
Volatinia jacarina	Blue-black Grassquit	V,S	R	c	D
Sporophila americana	Variable Seedeater	V,S	R	f	D
Sporophila torqueola	White-collared Seedeater	V,S	R	c	C,D
Tiaris olivaceus	Yellow-faced Grassquit	P	R*	a	C,D,E
Diglossa baritula [3]	Cinnamon-bellied Flowerpiercer	V,S	R	c	A,B,C,D (p = 0.007)
Arremon aurantiirostris	Orange-billed Sparrow	V,S	R	f	B,D
Arremon brunneinucha	Chestnut-capped Brush Finch	R	R	a	A,B,C,D
Arremonops chloronotus [4]	Green-backed Sparrow	V	R	r	D,E
Atlapetes albinucha [3]	White-naped Brush Finch	V,S	R	a	A,C,D
Pipilo maculatus	Spotted Towhee	R	R	r	C
Aimophila rufescens	Rusty Sparrow	V,S	R	c	C,D
Melozone biarcuata	Prevost's Ground Sparrow	V,S	R	c	D (p = 0.03)
Melospiza lincolnii	Lincoln's Sparrow	P	V	c	C,D
Zonotrichia capensis	Rufous-collared Sparrow	V,S	R	c	C,D
Junco phaeonotus	Yellow-eyed Junco	V,S	R	r	C
Chlorospingus ophthalmicus	Common Bush Tanager	V,S	R	a	A (p = 0.02)
CARDINALIDAE					
Piranga rubra	Summer Tanager	V,S	V	c	A,B,C,D
Piranga ludoviciana	Western Tanager	V,S	V	u	A,B,C,D
Piranga bidentata	Flame-coloured Tanager	V,S	R	c	A,B,C,D
Piranga leucoptera	White-winged Tanager	V,S	R	f	B
Habia rubica	Red-crowned Ant Tanager	V,S	R	c	B,D (p = 0.001)
Pheucticus ludovicianus	Rose-breasted Grosbeak	V,S	V	c	A,B,C,D
Cyanocompsa cyanoides	Blue-black Grosbeak	V,S	R	r	B
Passerina cyanea	Indigo Bunting	V,S	V	f	B,C,D,E

ICTERIDAE					
Dives dives	Melodious Blackbird	V,S	R	c	C,D,E
Quiscalus mexicanus	Great-tailed Grackle	V,S	R	c	C,D
Molothrus aeneus	Bronzed Cowbird	V,S	R	f	C,D,E
Icterus wagleri [3]	Black-vented Oriole	V,S	R	f	B,D
Icterus prosthemelas [4]	Black-cowled Oriole	V,S	R	u	D
Icterus chrysater	Yellow-backed Oriole	V,S	R	c	B,D
Icterus pectoralis	Spot-breasted Oriole	V,S	R	u	D
Icterus galbula	Baltimore Oriole	V,S	V	c	B,D
Amblycercus holosericeus	Yellow-billed Cacique	V,S	R	c	D
Psarocolius wagleri	Chestnut-headed Oropendola	V,S	R*	f	B,D,E
FRINGILLIDAE					
Euphonia affinis	Scrub Euphonia	V,S	R	r	D
Euphonia hirundinacea	Yellow-throated Euphonia	V,S	R	r	D,E
Euphonia elegantissima	Elegant Euphonia	V,S	R	f	A,B,C,D
Euphonia gouldi [4]	Olive-backed Euphonia	V	R	f	B
Chlorophonia occipitalis [3]	Blue-crowned Chlorophonia	P	R	f	A,B,D
Spinus atriceps [2,3]	Black-capped Siskin	P	R	f	A,D
Spinus notatus	Black-headed Siskin	P	R	f	A,C,D
Spinus psaltria	Lesser Goldfinch	P	R	f	A,B,C,D,F
Coccothraustes abeillei [3]	Hooded Grosbeak	V,S	R	f	A,B

Vermiculated Screech Owl *Megascops guatemalae*. In upper cloud forest and adjacent open habitat commonest were Fulvous Owl *Strix fulvescens* and Bearded Screech Owl *Megascops barbarus*.

Horned Guan.—The species was not observed during a total of 18 days in cloud forest at 2,000–2,600 on Cerro El Amay. Crested Guan *Penelope purpurascens* and Highland Guan *Penelopina nigra* were the only cracids found in upper cloud forest; the latter was common with a mean encounter rate of 0.18 birds / 100 m of transect (Table 2).

Discussion

Based on general patterns of bird distribution in Guatemala[11,19], the 259 species recorded above 1,000 in 2010–11 represent 87% of those potentially occurring in the area >1,000 m, and 52% of the species potentially occurring in the IBA including lowland species and waterbirds. Many of the potentially occurring lowland species and species restricted to wetland habitats are yet to be recorded, because our surveys were focused above 1,000 m. Species expected to be common in lowlands, such as Rufous-tailed Hummingbird *Amazilia tzacatl*, Tawny-winged Woodcreeper *Dendrocincla anabatina*, Northern Rough-winged Swallow *Steligopteryx serripennis*, and Yellow-throated *Euphonia hirundinacea* and Olive-backed Euphonias *E. gouldi*, were uncommon or rare in areas >1,000 m (Table 2). In addition to those species recorded in October 2010–April 2011, eight others were recorded previously, bringing to 273 species recorded in the IBA. Among these is Horned Guan, of which several specimens were collected in the 19th century[26]. Tenez[28] recorded six species associated with open habitat. Griscom[17] mentioned Dusky Flycatcher *Empidonax oberholseri* (then *E. wrightii*) collected at El Soch near Reserva El Recuerdo. However, the specimens were subsequently identified as Hammond's Flycatcher *E. hammondii* by R. Phillips (A. Vallely & D. Dyer pers. comm.). PT recorded Hermit Warbler *Setophaga occidentalis* near the southern limit of the IBA.

Cerro El Amay was designated an IBA based on the presence of 19 trigger species[13]. This study increases the number of trigger species to 48 (Table 2), reconfirming IBA status under criteria A1 (presence of globally threatened species[21]), A2 (presence of at least 33% of species restricted to the North Central American Highlands Endemic Bird Area [EBA], Table 2), A3 (presence of at least 33% of species restricted to the Madrean Highlands biome) and A4 (site supports 1% of the global population of a migratory bird) (see Devenish *et al*.[8] for details of categories). Four globally threatened species were recorded by our study: Highland Guan, Bearded Screech Owl, Golden-cheeked Warbler *Setophaga chrysoparia* and Pink-headed Warbler. Sixteen species are restricted to the North Central American Highlands, representing 70% of all Guatemalan species found in that EBA. Thirty-eight species recorded by us are restricted

to the Madrean Highlands, or 75% of Guatemalan bird species confined to that biome. Furthermore, nine species restricted to the Gulf Caribbean Slope represent 32% of the Guatemalan species restricted to this biome. Because lowland habitats were not the focus of our study, additional species restricted to that biome can be expected. Thus, Cerro El Amay could apply in the A3 category for two biomes. Based on an estimate of the global population size for Wilson's Warbler of 36 million[25], primary forest above 1,000 m at Cerro El Amay supported 0.1–0.3% of the world population in April 2011. Considering additional birds below 1,000 m and turnover of individuals during migration, we assume that the IBA supports >1% of the global population of Wilson's Warbler (IBA category A4iv).

Horned Guan is Endangered due to habitat loss, hunting and illegal trade[4,16]. The first and only record of Horned Guan at Cerro El Amay dates from the 19th century[26], when it was considered fairly common[27]. Since then, c.17 km^2 of primary forest above 1,800 m (19% of 90 km^2) have been lost to agriculture (Fig. 1), and we assume that the species was heavily hunted. Despite a field effort of 18 days in appropriate habitat in 2008–11, the species' continued presence could not be confirmed. Thus, Horned Guan is certainly not a fairly common bird at Cerro El Amay now, if it occurs at all. Although much of the forest above 2,000 m is intact, suitable habitat with a high diversity of fruiting trees similar to other locations where the species occurs (Sierra de las Minas, south-west Guatemala, and El Triunfo, Chiapas, Mexico[2,11,15]) appears to be limited to a few valleys at Cerro El Amay. Forests in the highest parts are oak-dominated and not optimal habitat for Horned Guan because of a lack of food. It might still occur as a rare bird restricted to sections of upper cloud forest not yet surveyed, especially at 2,000–2,500 m in the south-west of the IBA (Fig 1). We recommend further field effort in these areas.

The area of >250 km^2 of pristine cloud forest in Cerro El Amay IBA is severely threatened by an advancing agricultural frontier, which in the south has already reached 2,100 m elevation, and in the north 1,000 m (Fig. 1). Some areas within the IBA have recently been declared privately protected areas, but there is no strictly protected reserve according to IUCN categories I and II[20]. Although many of the private reserves are currently among the best-protected sites in Guatemala, driven by the strong personal interest of their owners, the National Law of Protected Areas (Decreto 4–89, Congreso de la República de Guatemala) and its regulations (Acuerdo Gubernativo 759–90) do not require the long-term commitment of owners to conservation, nor do they require continued conservation from future landowners. Conservation effort is urgently needed among the forest-owning communities in order to maintain Cerro El Amay as the second-largest cloud forest in Guatemala.

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Descripción del nido, huevos y polluelos del Colibrí de Buffon *Chalybura buffonii* y notas sobre su biología reproductiva en Colombia

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We describe the nest, eggs and chicks, and present other observations on the breeding biology of White-vented Plumeteer *Chalybura buffonii* based on a nest in Ibagué, Colombia. The nest was a small compact cup of plant fibres, down, cobwebs, small twigs and dried leaves, externally decorated with green moss and some lichen. It contained two elliptical-ovoid white eggs, one of them infertile. The recently hatched nestling was blind and nearly unfeathered with just dorsal rows of neosoptiles. Fledging period occupied 21 days. Our findings are similar to previous descriptions of *C. buffonii* and *C. urochysia*, but exhibited some differences from other hummingbird genera. More study is required to infer patterns in the nesting habits of Trochilidae.

El conocimiento de la biología reproductiva y los hábitos de anidación son componentes básicos para comprender la historia natural de las aves, permitiendo inferir qué factores bióticos y abióticos moldean su ciclo reproductivo[7]. Esta información es útil no solo para entender las relaciones ecológicas y evolutivas entre las especies, sino para diseñar políticas de manejo eficientes que faciliten la conservación de sus hábitats y recursos[3,7].

Con casi 350 especies, los colibríes (Trochilidae) son una de las familias más diversas entre las aves del Nuevo Mundo, pero poco más de la mitad de sus especies carece de información básica sobre sus hábitos de anidación[13]. Este desconocimiento se extiende incluso a géneros cuyas especies suelen ser relativamente comunes y de amplia distribución, como *Amazilia* y *Chalybura*[13].

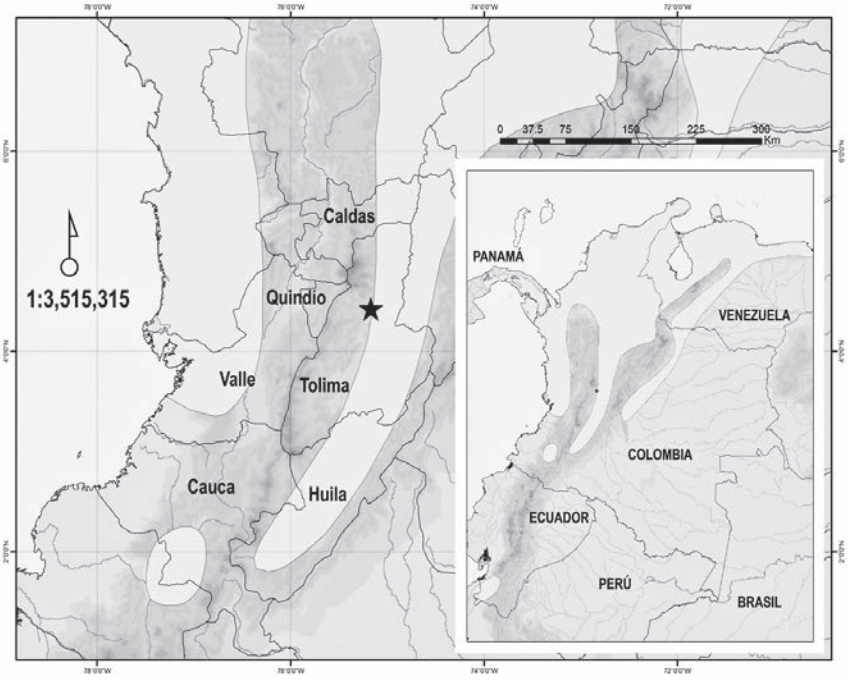

Figura 1. Ubicación del área donde fue encontrado el nido del Colibrí de Buffon *Chalybura buffonii* (estrella) y su posición relativa a la distribución propuesta por Ridgely *et al.*[11]. La zona se detalla con un punto en el recuadro pequeño.

El género *Chalybura* está compuesto por dos especies, el Colibrí Colibronceado *C. urochrysia* y el Colibrí de Buffon *C. buffonii*[13]. Este último tiene un rango geográfico relativamente amplio, con cuatro subespecies distribuidas desde el centro de Panamá, pasando por el centro y occidente de Colombia y el suroccidente de Venezuela, hasta el occidente de Ecuador y el nor-occidente del Perú, entre 0–2.000 m de altitud[6,10,11,13,14] (Fig. 1). El Colibrí de Buffon es una especie relativamente común en bosques secos, húmedos y muy húmedos, bordes de bosque y áreas semiabiertas[6]; en zonas de simpatría con *C. urochrysia* parece ocupar con mayor frecuencia en áreas abiertas o cubiertas de vegetación arvense[13].

Si bien se trata de una especie común y ampliamente distribuida, no se cuenta con información detallada sobre su biología reproductiva y tan solo existe una descripción breve de un nido de *C. b. buffonii* y una anotación poco detallada de una zona de anidación de *C. b. coerulogaster*[13]. En este trabajo describimos el nido, huevos y polluelos de *C. buffonii,* y agregamos anotaciones sobre su biología reproductiva y hábitat de anidación en Colombia.

Ubicación y descripción del nido

Nuestras observaciones tuvieron lugar el 16 de febrero 2011 en la quebrada Cerro Azul (04°27'04,9"N 75°11'33,3"O; 1.098 m), ubicada en el borde del perímetro urbano de la cuidad de Ibagué, dpto. Tolima, Colombia. Ibagué se ubica en el piedemonte de la vertiente oriental de la cordillera Central de los Andes, entre 900–1.400 m de elevación, y hace parte del valle medio del Magdalena, donde se distribuye la subespecie *C. b. buffonii* (Fig. 1).

La zona de anidación se caracterizó por la presencia de bosques rivereños a lo largo de la quebrada, con un sotobosque denso y un dosel dominado por árboles de *Anacardium*

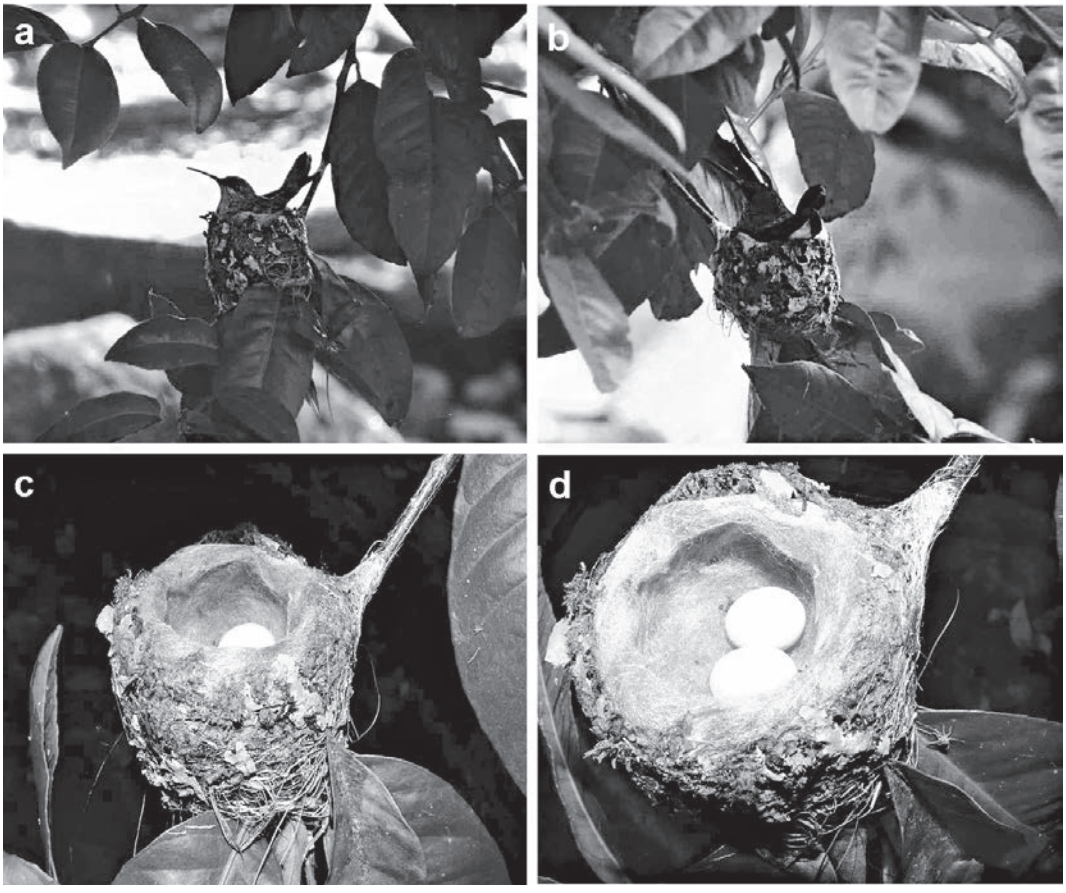

Figura 2. Nido y huevos del Colibrí de Buffon *Chalybura buffonii* en Ibagué, Colombia. Posición del nido en la rama y cobertura del follaje (a y b); forma y estructura del nido (c); detalle del nido y los huevos (d).

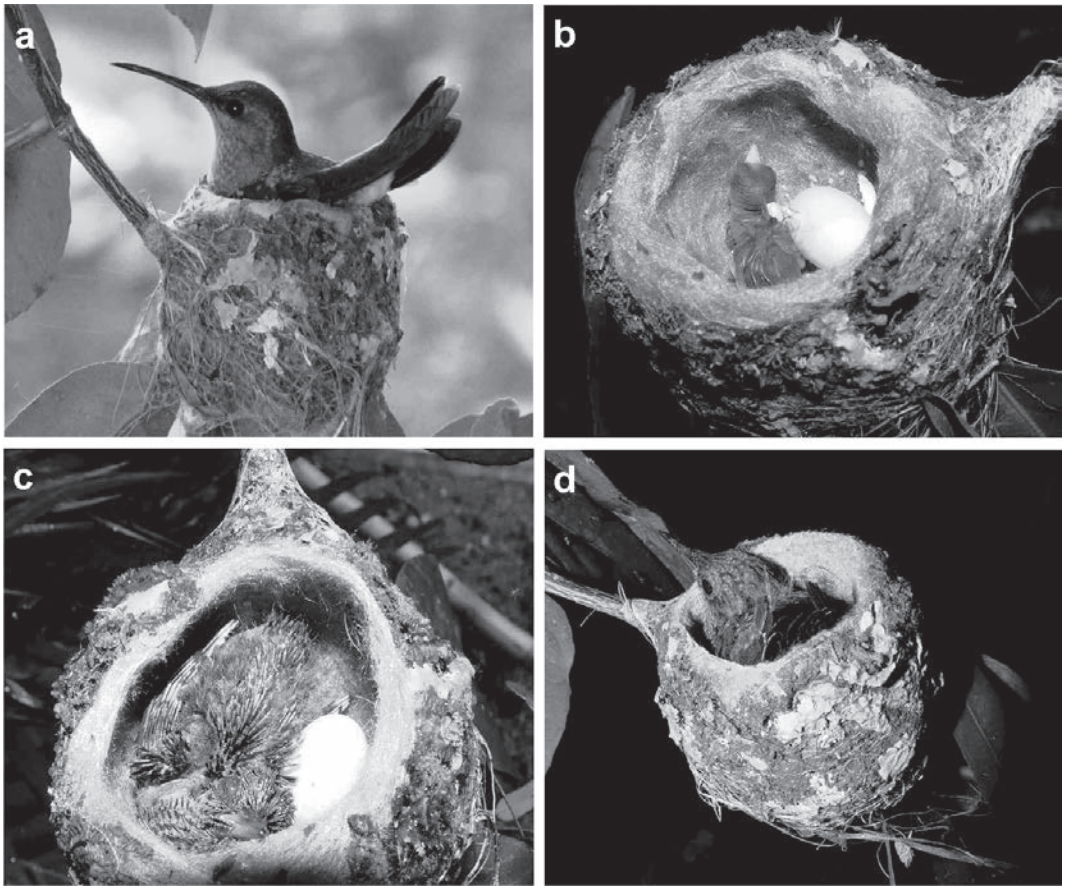

Figura 3. Incubación por una hembra del Colibrí de Buffon *Chalybura buffonii* y polluelo, Ibagué, Colombia. Hembra incubando durante el hallazgo del nido (a); cría recién eclosionada con ojos cerrados y neosoptilo (b); polluelo a 13 días de la eclosión, mostrando abundante desarrollo del plumaje (c); polluelo de unos 18 días de desarrollo, con plumaje de juvenil completo (d).

excelsum (Anacardiaceae), *Erythrina fusca* y *E. poeppigiana* (Fabaceae) de más de 20 m. El nido se encontró a 1,5 m sobre el suelo, a menos de 30 cm del ápice de una rama de *Citrus limon* (Rutaceae) levemente inclinada hacia abajo (Fig. 2a). El nido estaba cubierto por arriba con las ramas más altas del mismo árbol (Fig. 2b).

El nido fue recolectado el 17 de marzo, ya finalizada toda actividad reproductiva. El nido era una taza pequeña y compacta de 40 × 52 mm de diámetro externo, 37 mm de alto, 26 × 33 mm de diámetro interno y 18 mm de profundidad. Se encontraba adherido a la rama por medio de telaraña y fibras vegetales (Fig. 2c). La capa externa de la taza incluyó principalmente delgadas fibras y pequeños trozos de ramitas y hojas secas, estando densamente decorada por musgo y algunos trozos de líquen (*Parmotrema* sp.); estos materiales estaban adheridos con telaraña (Figs. 2c–d). La capa interna era mucho más gruesa y compacta, y estaba conformada por fibras muy finas y 'lana' de origen vegetal (i.e. papus de frutos de Asteraceae), además de pocos pelos (Figs. 2c–d); no se encontró evidencia de la presencia de masa miceliar entre las fibras.

Huevos, cría y polluelo

Encontramos dos huevos elíptico-ovoides, con uno de los extremos ligeramente más agudo, que medían 15 × 10 y 15 × 9 mm, respectivamente (Fig. 2d). El cascarón era completamente liso, de color blanco opaco (Figs. 2c–d). El huevo de menor tamaño no eclosionó. La cría recién emergida se encontraba con los ojos cerrados y carecía de plumaje corporal (Fig. 3a), con la excepción de dos franjas dorsales de neosoptilo de unos 6 mm. Durante las siguientes dos semanas observamos un desarrollo prominente de las plumas en el ala, espalada y rectrices del polluelo (Fig. 3b). El polluelo (más de 15 días de eclosión) exhibió

su plumaje juvenil completamente emergido (Fig. 3c), con una coloración grisácea opaca en el vientre. El pico de la cría mostró un tono ocráceo pálido, oscureciéndose durante su crecimiento hasta presentar la coloración gris cuerno típica del adulto (Figs. 3b,d). La piel de la cría era de tono rosa envejecido (Fig. 3b).

Biología reproductiva y comportamiento

La hembra se encontraba incubando cuando el nido fue descubierto (Fig. 3d). La eclosión del único huevo exitoso ocurrió cuatro días después (22 de febrero). La etapa de máximo desarrollo del plumaje duró diez días más. El 7 de marzo (13 días desde la eclosión), el polluelo aún se encontraba cubierto por abundantes cañones, y cinco días más tarde el plumaje juvenil estaba completo (Fig. 3c). El nido fue abandonado por la madre y el volantón el 15 de marzo (27 días después). El desarrollo completo del plumaje juvenil tomó cerca de 18 días, y el abandono del nido ocurrió en 21 días.

Durante los cuatro días previos a la eclosión, la hembra fue observada con frecuencia en el nido mientras incubaba, aunque en algunas ocasiones no se encontró, principalmente entre 07h00–09h00. En la medida en que avanzaba el desarrollo del volantón, la madre invertía menor tiempo en visitar el nido. La ausencia fue más notoria hacia el mediodía. No observamos eventos de alimentación del polluelo.

Discusión

El hábitat, la ubicación y las dimensiones del nido de *C. buffonii* concuerdan con lo documentado para la mayoría de miembros de Trochilidae[2,4,5,8,9,12,15,17,18], y en especial, a lo descrito previamente sobre esta especie y *C. urochrysia*[13]. Los datos presentados aquí son un complemento al conocimiento de su biología.

Considerando que el nido fue encontrado días antes de la eclosión, nuestras observaciones extenderían el periodo reproductivo propuesto para *C. b. buffonii* entre marzo–octubre[6,13]. De acuerdo a nuestros datos y a la información existente[13], es posible que el periodo de reproducción también abarque los meses de enero y febrero. Esto, sumado a los registros de reproducción de junio a noviembre de *C. b. coeruleogaster*, sugiere que la especie se reproduciría todo el año, como ha sido propuesto para colibríes de zonas tropicales y premontanas[13]. Se requiere más información para confirmar si las cuatro subespecies se reproducen en distintos periodos debido a variaciones ambientales locales a lo largo de su distribución geográfica.

Aunque el nido se ubicó en una zona perturbada, se encontraba cercano a una quebrada y cubierto por sotobosque denso, potencialmente protegido de cambios drásticos en la temperatura. Si bien la variación en los sitios de anidación en colibríes es alta y la cercanía a zonas alteradas puede significar un menor éxito reproductivo[1], un microclima equilibrado asociado a estabilidad en los cambios repentinos de temperatura parecen ser los factores determinantes en la elección de la zona de anidación[13,16]. La cercanía del nido a una quebrada también fue reportada en *C. urochrysia*[13].

La forma y los materiales del nido de *C. buffonii* resultaron semejantes a lo reportado previamente para la especie, aunque observamos bastante musgo y pocos trozos de líquenes en la cubierta externa, más similar al nido descrito para *C. urochrysia*[13]. Algunas especies de *Amazilia* parecen emplear principalmente líquenes en el exterior de la taza[5,9], mientras que algunos miembros de *Chlorostilbon* utilizan trozos de cortezas y no parecen emplear decorado alguno[6,13,17].

La altura del nido estuvo dentro del rango reportado para el género *Chalybura*, entre 0,5–2,5 m. Comparativamente, el nido de *C. buffonii* es de mayor tamaño que el de colibríes de menor talla, como algunos *Chlorostilbon*[8,12,17], pero de dimensiones similares al nido de especies de *Amazilia*[9,15,18]. Los huevos también exhibieron una talla ligeramente mayor a los de *Chlorostilbon*[8,12,17] e incluso *Amazilia*[9,15,18], aunque la diferencia con éste último grupo es pequeña (p.e. 14,2 × 9,0 mm y 14,2 × 9,2 mm en *A. cyanocephala*).

El tiempo de desarrollo de los polluelos se encontró dentro del rango de duración descrito para otras especies de tamaño similar como *Lampornis* spp., e incluso de menor talla, como *Adelomyia melanogenys*[13]. Aunque las determinantes ambientales del tiempo de desarrollo son desconocidas para los colibríes que cuentan con esta información, se ha sugerido que el periodo de desarrollo en especies que habitan entre 0–1.500 m de altitud es de 20–26 días, extendiéndose a 30–40 días en especies de alta montaña[13].

Desconocemos la razón de la inviabilidad del huevo de menor tamaño, lo cual pudo obedecer a múltiples causas. No realizamos un seguimiento sistemático de la duración y periodicidad de las visitas de la madre al nido, por lo que recomendamos más estudio para relacionar los patrones de atención al nido y la variación de factores ambientales como la temperatura y la abundancia de alimento durante la crianza[1].

Pese a que nuestras observaciones se ajustan a los patrones observados en los hábitos de anidación de otros Trochilidae, es evidente la necesidad de más estudios para inferir los patrones propios de cada género y poder comparar la relación entre su historia natural, su historia evolutiva y su distribución ecológica y geográfica. Para ello, primero será necesario seguir compilando información básica sobre muchas especies, incluyendo las comunes y de amplia distribución.

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Noteworthy bird records from the Santa Elena Peninsula and coastal south-west Ecuador

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Realizamos registros en diversas localidades del suroccidente de Ecuador durante censos mensuales en las piscinas artificiales de Ecuasal, en las costas de la provincia de Santa Elena y en el archipiélago de Jambelí, provincia de El Oro. Este estudio presenta nuevos registros geográficos de especies raras en el suroccidente de Ecuador y contribuye al conocimiento de la distribución de las aves en Ecuador continental. Se presenta el primer registro fotográfico de la Aguja Canela *Limosa fedoa*, se evidencia la presencia de la Agachona Chica *Thinocorus rumicivorus* (un vagrante raro en Ecuador) y se presenta el registro más al sur que existe en Sudamérica del Gaviotín Piquirrojo *Hydroprogne caspia*.

In August 2008 and June 2010–February 2012, we surveyed the aquatic avifauna of various localities in south-west Ecuador, including the artificial salt lakes belonging to the Ecuasal Company, the beaches and fishing ports of prov. Santa Elena, and the Jambelí archipelago, prov. El Oro. Here we present noteworthy bird records from this work. Species classification follows Remsen *et al*.[11].

Northern Shoveler *Anas clypeata*
An adult male in breeding plumage was photographed with White-cheeked Pintails *A. bahamensis* at Ecuasal salt lakes, north of San Pablo, prov. Santa Elena, on 25 February 2012 (Fig. 1). Head, neck and throat dark metallic green contrasting with white underparts and dark upperparts. Flanks and belly chestnut, with white tail and dark undertail-coverts; yellow iris, black spatulate bill and orange legs. Very rare boreal migrant to Ecuador, most of the few records are from Ecuasal, except one at La Segua marsh, prov. Manabí, on 3 March 2007[5]. At Ecuasal it was recorded on 29 February 1988 (P. Shepherd & A. Marshall)[12], with a male on 20 January 2007 (R. S. Ridgely & B. Haase), another on 21 February 2010[6], and a record of seven in January 2008 (R. S. Ridgely & F. Sornoza)[6]. Recently in 2011, it has been recorded for the first time in Galápagos, on Isabela[9]. *A. clypeata* breeds widely in the Holarctic and, in the Western Hemisphere, usually wintering between the southern USA and Colombia[8].

Slate-coloured Coot *Fulica ardesiaca*
Singles on 26 June 2011 (AEÁ, RV & K. Balón) and 1 September 2011 (AEÁ) at Pacoa salt lakes. An Andean species of the central and northern cordilleras, at 2,200–3,900 m[11] and a common resident in coastal Peru[1,2,4], in south-west Ecuador a population was discovered by R. S. Ridgely in 1991 at José Velasco Ibarra dam, Santa Elena Peninsula; two years later, a max. 200, including young, were counted there[12]. This dam of 424 ha is dependent on rainwater and has been dry since 2008. *F. ardesiaca* is very scarce on the Santa Elena

Figure 1. Male Northern Shoveler *Anas clypeata*, Ecuasal salt lakes, Pacoa, prov. Santa Elena, Ecuador, February 2012 (R. Villón)

Figure 2. Adult Marbled Godwit *Limosa fedoa*, Mar Bravo, Salinas, prov. Santa Elena, Ecuador, August 2008 (A. E. Ágreda)

Peninsula and in south-west Ecuador, although singles were observed annually in 2003–06 at Ecuasal and up to 16 were present on 16 February 2007 at El Azúcar dam[6]. This permanent reservoir of 350 ha, 20 km from Pacoa, is part of a hydraulic system for water transfer and could provide suitable habitat.

Marbled Godwit *Limosa fedoa*
On 29 August 2008 an adult was photographed (Fig. 2) in a salt pond at Mar Bravo, Salinas (AEÁ, F. Hernández-Baquero), foraging in shallow water with other shorebirds, including Short-billed Dowitcher *Limnodromus griseus*, Semipalmated Sandpiper *Calidris pusilla*, Wilson's Phalarope *Phalaropus tricolor* and Lesser Yellowlegs *Tringa flavipes*. Very rare boreal migrant to coastal Ecuador: the first record was a single at Ecuasal in February 1980[12] with a second in January 2001 at the same locality (F. Hernández-Baquero pers. comm.). Fig. 2 represents the first modern documentation for the species in Ecuador[3]. Several records in prov. Manabí province are present in the Ecuadorian Committee for Ornithological Records (CERO) database.

Least Seedsnipe *Thinocorus rumicivorus*
On 23 May 2011 an adult male at Ecuasal salt lakes, Pacoa (AEÁ). Identification was based on the following: small, chunky body and short legs, head and upperparts brown with yellowish fringes to feathers, pale overall appearance, face, neck-sides and breast grey contrasting slightly with rest of white underparts, two black stripes from throat-sides form central stripe on upper breast, separating again on lower breast and disappearing on flanks. In flight, black flight feathers and axillaries, and white underwing-coverts. Iris dark and bill short and yellowish. Photographs were taken but are of insufficient quality to be published. Known in Ecuador from specimens taken on the Santa Elena Peninsula in January–February 1898[12]. Marchant[10] reported a party of c.8 birds in April 1954 that he 'believed were this species', while two were observed by T. Davis on 11 July 1974 near Salinas[12]. On 26 February 2003 an adult male was photographed near Ecuasal salt lakes at Mar Bravo (B. Riera & L. Navarrete)[6]. Records in Ecuador probably correspond to *T. r. cuneicauda* which is resident in northern Peru[7,12]. Ridgely & Greenfield[12] suggest a resident breeding population exists (at least formerly) based on the two immatures collected in 1898, but two expeditions from the American Museum of Natural History in the early 1900s already failed to find the species at Santa Elena[3]. We consider that the species is best considered a vagrant to Ecuador.

Andean Lapwing *Vanellus resplendens*
On 27 May 2011, two were photographed by RWVV, BJSM & K. Balón at the Santo Domingo estuary, San Pablo, prov. Santa Elena (Fig. 3). They were with several Grey-headed *Chroicocephalus cirrocephalus* and Laughing Gulls *Leucophaeus atricilla*, Elegant *Thalasseus elegans*, Sandwich *T. sandvicensis*, Royal *T. maximus* and Gull-billed

Figure 3. Pair of Andean Lapwings *Vanellus resplendens*, Santo Domingo estuary, San Pablo, prov. Santa Elena, Ecuador, May 2011 (B. Suárez)

Figure 4. Adult Caspian Tern *Hydroprogne caspia*, Jambelí archipelago, prov. El Oro, Ecuador, January 2012 (A. Ágreda)

Terns *Gelochelidon nilotica*. Andean Lapwing is extremely rare in lowland Ecuador, with all records being recent. Our sighting is the third on the Santa Elena Peninsula, with previous records by Haase[6], on 30 June 2003 at Ecuasal salt lakes and 16 July 2004 at El Azúcar dam, prov. Santa Elena.

Caspian Tern *Hydroprogne caspia*
On 19 January 2012 during a visit to the Jambelí archipelago, prov. El Oro, AEÁ & RWVV observed and photographed (Fig. 4) an adult in winter plumage, on a sandbar 50 m away, together with Laughing Gulls *Leucophaeus atricilla*, Royal *Thalasseus maximus* and Sandwich Terns *T. sandvicensis*. The *H. caspia* was larger than the other birds, with a heavy blood-red bill tipped blackish, and black-streaked forehead and crown. Accidental visitor to the coast of Manabí, with a previous record from the Chone area, on 30 July 1996 by S. N. G. Howell[12]. Ours is the second, and the southernmost report in western South America.

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First records of Yellow-throated Vireo *Vireo flavifrons* in Ecuador

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Reportamos las primeras observaciones del Vireo Goliamarillo *Vireo flavifrons* en Ecuador, en base a tres registros separados, provenientes de las estribaciones andinas del noreste, estribaciones andinas noroccidentales y trópico húmedo noroccidental (febrero 2008, noviembre 2011, marzo 2012). El incremento en la intensidad del trabajo ornitológico de campo en Ecuador durante los últimos años ha generado un crecimiento en la cantidad de registros nuevos para el país, incluyendo especies migratorias y / o errantes como este vireo.

Yellow-throated Vireo *Vireo flavifrons* is a fairly common breeder in the eastern USA and south-east Canada[6,9], wintering from eastern Mexico[5] to northern Venezuela[3], with a few records as far south as Popayán, dpto. Cauca[12] and one at Mitú, dpto. Vaupés[4], southern Colombia. It is a widespread, common migrant and winter resident in Costa Rica[2,8,9,11] but our records, three sightings from February 2008 to March 2012, represent the southernmost ever, and the first for Ecuador[7].

Field observations

First record.—A single was observed by JN on 10 February 2008, at 10h35–10h40, at 1,495 m along the Coopmans Trail at Wildsumaco Lodge (00°41'S, 77°36'W), 1 km south of Pacto Sumaco, in Sumaco Napo Galeras National Park, prov. Napo. Habitat consisted of scattered medium–tall trees in a cattle pasture near mature secondary forest, c.150 m from primary forest. The area was a mosaic of pastures, secondary forests in various stages, and tall primary forest on generally hilly terrain. The bird was searching for insects c.6 m up in an open tree. Light conditions were good and the bird was observed at a distance of c.12 m using binoculars. It fed alone, although a mixed-species flock was nearby. It was identified to the genus *Vireo* due to its general behaviour and plumage, and careful notes and illustrations were made later the same day (Fig. 1). An hour later, using Sibley[10], it was identified to species.

It was slightly larger than Blackburnian Warbler *Dendroica fusca* with a proportionately large head. Upperparts and head bright green with very obvious broad yellow eye-ring and supraloral. Lores dark. Throat and upper breast bright yellow ending abruptly at mid breast, sharply contrasting with white underparts and undertail-coverts. Wings dark with two broad white wingbars, and white fringes to tertials and primaries. Tail dark with narrow white fringes to rectrices. Eyes black and large-looking. Stout, dark bill, with slightly hooked tip. Legs dark. Grey rump not visible.

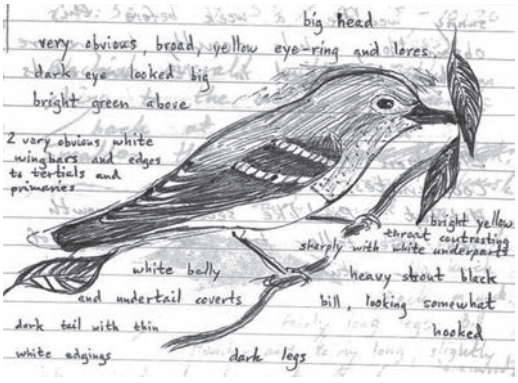

Figure 1. Field sketch of Yellow-throated Vireo *Vireo flavifrons* observed at Wildsumaco Lodge, prov. Napo, Ecuador, 10 February 2008 (J. Nilsson)

When feeding, the bird 'shivered' its tail sideways, very subtly but fast. This behaviour, not previously reported in literature[9–11], was seen several times during one observation bout of five minutes. The species exhibits complex behaviour during breeding, including wing and facial feather shivering[9]. It is also known to cock its tail[11]. Movements were sluggish compared to *D. fusca* or the resident Brown-capped Vireo *V. leucophrys*.

Second record.—On 24 November 2011, an adult Yellow-throated Vireo was observed by AS-U at 10h30–11h20 at an elevation of 35 m along the Tululbí river trail in the grounds of Tundaloma Lodge (01°10'59.57"N 78°45'18.91"W), c.17 km from San Lorenzo, prov. Esmeraldas. Habitat consisted of tall trees, c.30 m, with second growth bordering the river and pioneer plants interspersed with large grasses and dense thickets abutting the lodge gardens. The bird was located by call, then seen foraging alone in the midstorey c.10 m up. The observer imitated the bird's vocalisations and it responded immediately in an agitated manner, hopping sideways and calling more emphatically, approaching to within 5 m. Light conditions

Figure 2. Yellow-throated Vireo *Vireo flavifrons*, Los Cedros Reserve, prov. Imbabura, Ecuador, 15 March 2012 (J. Garcia-Dominguez)

were good and the observation was made using binoculars. The individual was identified to species based on the observer's previous experience in North and Central America.

Third record.—A single was photographed feeding on insects attracted to the dining room lights at Los Cedros Reserve, prov. Imbabura (00°18'N 78°46'W), at 1,350 m on 15 December 2011 by J. Poon & J. de Coux. Presumably the same bird was relocated there by JFF on 15 March 2012 and seen sporadically over three consecutive days at 1–5 m range. JG-D photographed the same bird several times (Fig. 2). It was observed in a garden adjacent to secondary forest, with fairly sparse low-stature trees and bushes, providing acontinuous cover from garden to forest. The species was recorded again at Los Cedros on 5 January 2013. Noticeable plumage differences were noted, but local residents (M. Obando and J. de Coux pers. comm.) suggest that the bird remained year-round.

It was identified by the rich yellow throat, contrasting white belly, dark wings with broad white bands, yellow eye-ring, 'large' eyes and grey rump. The identification was confirmed after consulting Dunning[1]. The bird moved sluggishly between branches, including its entire body sideways on a few occasions. No aggressive or flocking interactions were observed with other insectivores, including *V. leucophrys*, Red-eyed Vireo *V. olivaceus*, *D. fusca*, Montane Woodcreeper *Lepidocolaptes lacrymiger*, Dusky-capped Flycatcher *Myiarchus tuberculifer*, Common Tody-Flycatcher *Todirostrum cinereum*, House Wren *Troglodytes aedon*, Black-and-white Warbler *Mniotilta varia* and Slate-throated Redstart *Myioborus miniatus*.

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Short Communications

First record of Arctic Tern *Sterna paradisaea* for Nicaragua

In the New World, Arctic Tern *Sterna paradisaea* breeds from Greenland (c.84°N) and Alaska (71°N) to Cape Cod, Massachusetts (41°N) and California (38°N)[1,3], with non-breeders recorded in New York state in summer (May–August)[6] and Mexico (18°N)[9,10]. Its annual round-trip of c.40,000 km is mainly pelagic with many individuals wintering at the edge of the Antarctic pack-ice[3]. The few observations and recoveries of banded birds indicate two main pelagic routes: south over the eastern Atlantic and Pacific Oceans in autumn, and north in spring over a broader front that includes central regions of both oceans, with an unknown number making long, high-altitude, overland flights[3,10]. To our knowledge, the following represents the fourth documented record for Central America.

Figure 1. Map showing the location of the Nicaraguan observation of Arctic Tern *Sterna paradisaea*; the large, black circle denotes the río Ostional mouth (11°06'28.95"N 85°45'42.75"W).

Figure 2. First-year Arctic Tern *Sterna paradisaea*, Ostional Bay, Nicaragua, 23 September 2008 (Marvin A. Tórrez)

On 23 September 2008, we were training ecotourism guides from Ostional, Nicaragua. Weather conditions ranged from overcast to partially sunny, with intermittent light showers. At 09h10 we saw a mid-sized immature tern on the rocky shoreline near a small fishing village just south-west of the río Ostional mouth (11°06'28.95"N 85°45'42.75"W) (Fig. 1). It was approached to within 2 m. The bird was exhausted; its left wing drooped and it gaped intermittently. After several minutes, the bird stood up, its very short orange legs barely visible. We studied the tern for c.10 minutes before it flew c.10 m away. We approached it again, but did not pressure the bird. After a few minutes, it flew toward the open sea. Its flight was laboured because of the onshore wind and perhaps due to its poor physical condition. Although there were no significant regional storms in the Pacific Ocean for at least four days prior to 23 September 2008 (www.nhc.noaa.gov/2008epac.shtml), at the time heavy rains were observed over Costa Rica, visible in the distance.

Several morphological characters diagnostic in separating *S. paradisaea* from, e.g., Common *S. hirundo*, Roseate *S. dougallii* and Black Terns *Chlidonias niger*, are visible in Figs. 2–3. The bird's conspicuous cap, pale-banded mantle, rectrices, patterned (pale, rather than dark grey) primaries and tertials, suggest a juvenile in

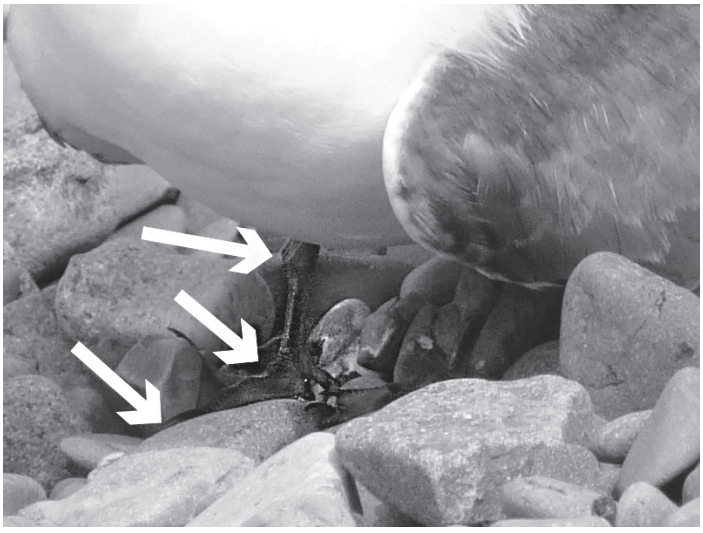

Figure 3. Close-up of the legs of the first-year Arctic Tern *Sterna paradisaea* (Marvin A. Tórrez). The elongated middle toe (lower white arrow) is proportionately longer than the tarsometatarsus (visible between upper and middle white arrows), a characteristic that separates this species from the similarly plumaged Common Tern *S. hirundo*.

moult (D. Dittmann & L. Bevier *in litt*. 2009). Its very long wings and long outer rectrices, which extended well beyond the wingtips (Fig. 2) indicate a *Sterna*; and its short tarsi and clearly visible small tarsometatarsus to the length of middle toe (+ claw) ratio (Fig. 3), short, delicate black bill (Fig. 2) and small head, give it a Black Tern-look, all of which indicate Arctic Tern (S. Cardiff, R. Clapp, D. Dittmann *in. litt*. 2009). The bird's mantle was medium grey. A black auricular 'finger' extended onto the face (Fig. 2) and, although the wing-coverts were brown, whereas the flight feathers were grey, the brown carpal bar (Fig. 2) was not as strikingly contrasting as *S. hirundo*. In flight no black margins to the outer rectrices were visible, but the overcast conditions precluded good views of the tail.

There is one published record of Arctic Tern for mainland Central America. On 19 October 1994, a single adult was photographed (VIREO #v06/47/017) at the río Jiboa mouth (13°21'32.40"N 89°02'16.80"W), El Salvador[4]. In Costa Rica, there are published reports from various offshore locations[5], including Cocos Island[2,8], with an unpublished photographic record by J. Vandergaast from Playa Azul, near Tárcoles (www.angelfire.com/bc/gonebirding/news20.html: accessed 2 January 2012). The species is unknown from Panama's mainland[7]. The only Central American record of *S. paradisaea* within the BIRDNET database (www.nmnh.si.edu/BIRDNET/) is a juvenile female collected by S. Sinclair on 3 November 1987 (Los Angeles County Museum 104230). The emaciated tern was floating on the Pacific Ocean and was being harassed by a Peregrine Falcon *Falco peregrinus* near Cañas Island (08°23'N 78°49'W) in the Pearl archipelago, c.40 km west of Panama.

Movements of young Arctic Terns are poorly documented[3] because migration is presumably primarily pelagic, where the species is frequently seen alone or in small, compact groups of <20 individuals (J. Hatch *in litt*. 2009). Although we cannot eliminate the possibility of factors other than adverse climatic conditions in forcing the young tern ashore, e.g., malnutrition, parasites, disease, etc., apart from appearing physically exhausted, no additional maladies were noted (Fig. 2). It is more likely that the 'beached' juvenile was migrating south when it was blown off course because of heavy rains and strong winds.

With the current pattern of records and contemporary understanding of the species' southbound migration route, this species is not anticipated to occur in Nicaragua on a regular basis. We conclude that Arctic Tern is accidental or at least irregular in Nicaragua and adjacent, offshore waters.

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Figure 1. Snowy-bellied Hummingbird *Amazilia edward*, Ujarrás, Paraíso, prov. Cartago, Costa Rica, October 2011 (Ernesto M. Carman)

First record of Snowy-bellied Hummingbird *Amazilia edward* on the Caribbean slope of Costa Rica, and another record from the Caribbean slope of Panama

Snowy-bellied Hummingbird is endemic to Costa Rica and Panama[8], with one record from north-west Colombia[1]. In Costa Rica it occurs on the southern Pacific slope[4,8] possibly blocked by the high mountains of the Cordillera Talamanca, as occurs with other species[3,5].

On 27 October 2011 we photographed (Fig. 1) an immature visiting flowers of the cultivated *Sechium edule* (Cucurbitaceae) in Ujarrás, Paraíso, prov. Cartago, 1,036 m (09°83'873"N 83°83'799"W). A bird (we assume the same) was seen there repeatedly until 19 December 2011. To our knowledge, this the first record of *A. edward* on Costa Rica's Caribbean slope.

The Ujarrás Valley receives an important influence from the Pacific due to a low pass in the Cordillera de Talamanca near Casamata, prov. Cartago (EMC unpubl.). Such passes in montane ranges are well recognised as 'gateways' for species dispersal[2,6] and taxa such as the Snowy-bellied Hummingbird probably reach the Caribbean slope via this low pass.

We also observed *A. edward* on 13 June 2008 near Catalina, prov. Chiriquí Grande (08°86'298"N 82°17'974"W) on the Caribbean slope of Panama, which supplements two other observations in this area[7].

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First record of Yellow-bellied Sapsucker *Sphyrapicus varius* from the Andes

On 5 December 2010, KMB & A. Uribe were with a tour group at Río Blanco Ecological Reserve, dpto. Caldas, Colombia, when AU spotted a woodpecker unfamiliar to him. KMB acquired a very brief view just before the bird flew and recognised it as a sapsucker *Sphyrapicus* sp. None of the other tour participants saw the bird well enough to identify it. KMB's view was insufficient to eliminate Red-naped Sapsucker *S. nuchalis*, but that species occurs as far south only as north-west Mexico[2,11], so he tentatively identified the bird as the much more likely Yellow-bellied Sapsucker *S. varius*, which winters regularly in small numbers to Panama[8] and irregularly to the Netherlands Antilles[7].

On 29 January 2011, AU was accompanying another tour group led by REW & DU when he spotted the bird in the same location. DU obtained photographs as it approached in response to pre-recorded *S. varius* calls

Figure 1. First-winter female Yellow-bellied Sapsucker *Sphyrapicus varius*, Río Blanco Ecological Reserve, dpto. Caldas, Colombia, 29 January 2011 (Daniel Uribe)

(although it did not vocalise) and the bird was confirmed as a first-winter female *S. varius*.

The bird's conspicuous white wing patches unequivocally identify it as a *Sphyrapicus* (Fig. 1). REW's field notes mention whitish head stripes with, especially on the nape, some brownish tones; a moderate amount of dull, poorly defined red on the crown (from the photographs, apparently confined to the forecrown) but none on the nape; a white throat; an incomplete, black chest crescent; extensive, blackish streaking and mottling on the sides; extensive, white laddering on the back, tinged with cream and buff; and barred, white, outer rectrices on an otherwise black tail. The photographs also reveal some yellow on the lower belly.

The poorly defined and incomplete head and breast markings indicate a bird in pre-formative moult, which in *S. varius* is typically completed on the wintering grounds[6]. *S. nuchalis*, in contrast, completes the same moult much earlier[7] and has red on the nape and throat, and a darker back[2,6]. In *S. varius*, the lack of red on the throat indicates a female. Females of this species winter further south than males[11] and greatly outnumber males in southern parts of the winter range[3].

The site where the bird was found (05º04.643'N 75º26.247'W) is characterised by montane secondary forest at 2,700 m beside a single-track, dirt road and close to cleared pasture and a small settlement. This is typical of the species' winter habitat in southern Central America, which is described as forest edge, light woodland and semi-open habitats, chiefly at 900–3,000 m[8,10,11].

The December sighting occurred <2 weeks after the first documented records on the South American mainland[1,4]. Clearly, an unprecedented number of sapsuckers reached South America that winter. The Río Blanco bird constitutes the first record from the Andes and the southernmost ever.

Although we are unaware of any evidence to suggest higher than usual numbers of *S. varius* elsewhere in winter 2010–11, the species' population is increasing overall, which could lead to more extralimital records. For example, in eastern North America the Breeding Bird Survey shows an estimated 2.6% annual population increase in 1999–2009[9], which is aso reflected in 1999–2010 Christmas Bird Count data from the USA, but not from areas further south[5].

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Range extension for Rio Negro Gnatcatcher *Polioptila (guianensis) facilis* in Colombia

Rio Negro Gnatcatcher *P. facilis* is a poorly known, rare and local bird found primarily in southern Venezuela and north-west Brazil. Usually considered a subspecies of Guianan Gnatcatcher *P. guianensis*, recent studies have suggested it might merit species rank given morphological and vocal differences[9]; the split has been accepted by some authorities[2,8], but not universally[5,7].

The first record of 'Guianan' Gnatcatcher *P. guianensis sensu lato* in Colombia was in 1992, when a male was observed in a mixed-species flock at the Serranía de Naquen, dpto. Guainía[4,6]. The sighting was referred to *P. facilis* on range and the published description did not specifically distinguish the bird from *guianensis*. On 8 January 2012, in *terra firme* forest near the village of Urania, c.6 km east of Mitú, dpto. Vaupés, we observed a pair of *P. facilis* foraging in a mixed-species canopy flock beside a man-made clearing (01°15'54"N 70°10'57"W). They were observed for c.10 minutes through binoculars and a telescope at c.40–50 m range. Identification was straightforward: the birds had a classic gnatcatcher shape and jizz—very small with quite long, narrow tail usually held cocked, and small, slender bill. Head, upperparts, wings and breast uniform, fairly dark bluish-slate, clearly contrasting with white belly. Tail blackish with white outer tail feathers, but precise pattern not noted. Overall appearance somewhat reminiscent of Slate-throated Gnatcatcher *P. schistaceigula*, albeit with paler upperparts. No eye-ring was noted on the bird briefly seen through the telescope. This was initially puzzling, as McMullan *et al*.[5] stated that an 'obvious eye-ring' is a feature of 'Guianan' Gnatcatcher. However, an eye-ring is present in some of the *P. guianensis* complex, but not *facilis*[9]. The only possible confusion species in this region of Colombia, Tropical Gnatcatcher *P. plumbea* has all-white underparts (including the breast) and darker wings contrasting with the mantle, with at least a slight pale wing panel. The birds foraged high in the canopy (20+ m), were very active, often disappeared from view, and seemed to favour bare branches and twigs. Other species present included Orinoco Piculet *Picumnus pumilus*, Pygmy Antwren *Myrmotherula brachyura*, Slender-footed Tyrannulet *Zimmerius gracilipes*, and several tanagers and woodcreepers.

Our record is the second for Colombia, a range extension of c.230 km and the westernmost of the taxon. The record is not entirely unexpected, as Mitú is in the Orinoco-Negro White-sand Forest Endemic Bird Area (EBA 065) and holds most endemics of this region[3]. Because this gnatcatcher's range is essentially limited to the EBA, its presence in dpto. Vaupés is unsurprising. Renewed attention from birders and ornithologists has resulted in numerous recent range extensions around Mitú[1], and additional field work will undoubtedly lead to more discoveries.

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Figures 1–2. Juvenile Slaty-backed Forest Falcon *Micrastur mirandollei*, Playa de Oro, prov. Esmeraldas, Ecuador, 30 July 2010 (Dušan M. Brinkhuizen)

Slaty-backed Forest Falcon *Micrastur mirandollei* in north-west Ecuador

Slaty-backed Forest Falcon *Micrastur mirandollei* is rarely encountered but widespread in humid lowland forest from Costa Rica south to Brazil[1,2]. For Ecuador, Ridgely & Greenfield[5] noted confirmed records in the Amazonian lowlands and an unconfirmed record from the north-west. Documented reports from western Ecuador known to us are as follows: (1) a tape-recording considered probably of this species made near San Lorenzo, prov. Esmeraldas, on 23 February 1997, by J. Nilsson[5]; (2) a bird tape-recorded at Río Canandé, prov. Esmeraldas, on 12 September 2006, by P. Coopmans & J. Olah (pers. comm.); and (3) a report at Playa de Oro, prov. Esmeraldas, that requires confirmation, by O. Jahn[4].

On 30 July 2010 we observed a Slaty-backed Forest Falcon at the start of the waterfall trail within the territory of the Playa de Oro community, prov. Esmeraldas, at c.150 m (00°51'N 78°44'W). The bird was calling from within primary forest characterised by an abundance of large trees reaching heights of c.30–40 m and sparse undergrowth. We sound-recorded it (www.xeno-canto.org; XC92172) and on playback the bird instantly flew towards us but we acquired only brief views. Shortly thereafter, we relocated it perched in a small tree c.4 m above ground. We approached it to c.8 m and obtained photographs (Figs. 1–2). The bird called persistently throughout the observation.

We identified it as a juvenile Slaty-backed Forest Falcon from the literature[1–3,5]. It was a mid-sized *Micrastur* with uniform dark grey upperparts including face and neck, pale whitish underparts, with a scaly breast pattern of clear dark chevrons formed by dark brown feather fringes; uppertail dark with three narrow whitish bands and a narrow white tip; eye-ring, bill base and legs were yellow. Potential confusion species such as Bicoloured Hawk *Accipiter bicolor*, Semiplumbeous Hawk *Leucopternis semiplumbeus* and three other *Micrastur* spp. known from Playa de Oro[4] do

not show a combination of scaled breast pattern with uniform grey upperparts[2,3,5]. The vocalisation was rather plaintive, a rising series of c.10–13 nasal *aah* notes delivered continuously, somewhat reminiscent of Laughing Falcon *Herpetotheres cachinnans*. Our recording supports the identification as Slaty-backed Forest Falcon. The bird's persistent calling from the lower forest strata suggests that its nest may have been nearby as is known for other juvenile *Micrastur* (U. Valdez pers. comm.).

Our record is the first photographed, and perhaps the first visual observation of Slaty-backed Forest Falcon in western Ecuador. The species is known from the Pacific lowlands of Colombia south to south-west Nariño[3], and its occurrence in north-west Ecuador was therefore to be expected[5].

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New records of Chilean Flamingo *Phoenicopterus chilensis* and Franklin's Gull *Larus pipixcan* in mainland Ecuador

In February and November 2010, I photographed two waterbirds in north-west Ecuador outside their known ranges: a Franklin's Gull *Larus pipixcan* in prov. Pichincha and a Chilean Flamingo *Phoenicopterus chilensis* in prov. Esmeraldas.

On 3 February 2010, on the access road to Mindo (00°02'56"S 78°46'33"W; 1,280 m), I observed a first-winter Franklin's Gull, which I digiscoped confirming the following features: rear crown dark brown to blackish contrasting with white nape, white eye-ring striking but incomplete, forehead white and short bill (Fig. 1), while the contrast between the greyish mantle and brownish wings aged the bird[2,4].

On 24 November 2010, an adult Chilean Flamingo was at Laguna de la Ciudad (01°06'N 79°07'W; 7 m), a brackish marsh 10 km south-west of La Tola community, prov. Esmeraldas (Fig. 2). The red 'knees' contrasting with bluish tarsi, and pink bill base are diagnostic.

Franklin's Gull is a passage migrant and boreal winter visitor to Ecuador, with few records away from the coast[2]. Chilean Flamingo is a nomadic visitor mainly to south-western coasts, and north to prov. Manabí[1,2],

Figure 1. Franklin's Gull *Larus pipixcan*, near Mindo, prov. Pichincha, February 2010 (Manuel Sánchez Nivicela)

Figure 2. Chilean Flamingo *Phoenicopterus chilensis*, Laguna de la Ciudad, prov. Esmeraldas, November 2010 (Manuel Sánchez Nivicela)

with a high-Andean record from Limpiopungo Lake, Cotopaxi National Park[3]. My record of Franklin's Gull is the first for Pichincha, whilst that of Chilean Flamingo is the northernmost in Ecuador, c.390 km from Ecuasal, where large groups occur[1].

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First record of Black Tern *Chlidonias niger* for the northern Andes

On 21 December 2010, at 09h00–12h00, I observed a Black Tern *Chlidonias niger* at Laguna de Yambo (01°06'S 78°35'W), prov. Cotopaxi, in the Interandean valley of the central highlands of Ecuador, at 2,550 m. The bird foraged at the south end of the lake, periodically resting on dead trees in the water (Fig. 1).

It was identified as a *Chlidonias* tern by the buoyant, nighthawk-like flight, short black bill and short, slightly notched tail[2,4,6]. The dark grey mantle, back, rump, tail and upperwing-coverts, blackish shoulder bar, short black legs and head pattern (Fig. 1) are indicative of Black Tern[2,4,6]. Additional photographs are available on request.

This is the first published record of *C. niger* from the northern Andes[1,3–5]. *C. niger* is a boreal migrant that winters in South America, but mainly at sea. It is common off the Caribbean and Pacific coasts of Colombia[3], but uncommon in Ecuador (mainly prov. Manabí and Guayas)[4] and Peru[6], and accidental in Chile and Argentina[2]. It rarely ventures inland, being only occasionally seen at coastal lagoons or freshwater lakes[4,6]. Occurrence in the Andes is known from two records in the Peruvian puna, near Cusco, dpto. Cusco[6]: 2–3 on 6 January 2003 at Huacarpay lake by P. O'Donnell, and one on 11 December 2011 at Huaypo lake by A. Durand (*fide* T. S. Schulenberg & G. Engblom *in litt*. 2012). It had never been reported in the highlands of Ecuador and remains to be recorded away from the coast in Colombia[1,4,5].

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Figure 1. Black Tern *Chlidonias niger*, Laguna de Yambo, prov. Cotopaxi, Ecuador, December 2010 (P.-Y. Henry)

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The nest, eggs and nestlings of Grey-chinned Hermit *Phaethornis griseogularis*

Phaethornis is one of the largest genera of hummingbirds, with 26 species distributed throughout tropical America[6]. The nests and general breeding biology for most species have been studied, and the genus is well known for its lekking behaviour[6]. The reproduction of Grey-chinned Hermit *Phaethornis griseogularis*, however, is almost completely unstudied. The species ranges from Colombia and Venezuela to northern Peru, at elevations of 600–2,000 m[5,6]. Based on the distributions given by Schuchmann[6] and Ridgely & Greenfield[5], the nest we studied belonged to *P. g. porcullae*, which taxon is restricted to the Tumbesian region of south-west Ecuador and north-west Peru. Gould[2], in the plate accompanying his discussion of this species, figured two nests, drawn from examples in his own collection. Although Gould[2] provided no further details or locality data for these nests, they are figured with the nominate subspecies, and thus probably belong to *P. g. griseogularis*. Thus, although the nest of Grey-chinned Hermit has previously been illustrated, this is the first formal description.

On 10 February 2010 we found a nest of *P. griseogularis* at the Jorupe Reserve, near Macará,

Figure 1. Eggs of Grey-chinned Hermit *Phaethornis griseogularis porcullae*, prov. Loja, Ecuador, 10 February 2010 (Harold F. Greeney)

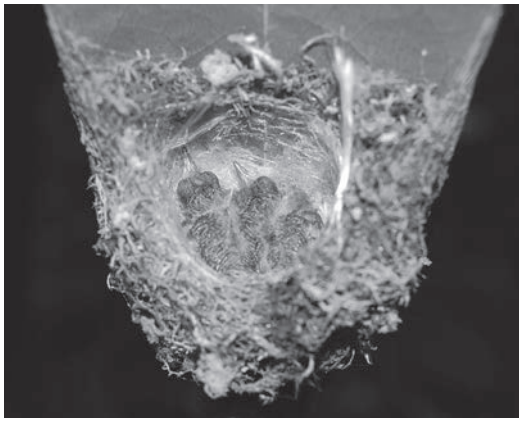

Figure 2. Nestlings of Grey-chinned Hermit *Phaethornis griseogularis porcullae* five and six days old, prov. Loja, Ecuador, 19 February 2010 (Harold F. Greeney)

Figure 3. Adult Grey-chinned Hermit *Phaethornis griseogularis porcullae* incubating two eggs, prov. Loja, Ecuador, 12 February 2010 (Harold F. Greeney)

prov. Loja, south-west Ecuador (04°23'S 79°57'W; 600 m). At 08h45 we flushed an adult from a nest which contained two immaculate white eggs (Fig. 1) that measured 12.27 × 8.05 mm and 12.15 × 7.95 mm, and weighed 0.40 and 0.39 g, respectively. At 16h00 on 13 February, the second egg described above had hatched, but we were unable to detect any pips in the shell of the other egg. The single nestling weighed 0.37 g, indicating that it had hatched only shortly before our arrival. It was pink-skinned, darker dorsally, and bore 11 pairs of beige-coloured natal plumes on its back. At 06h45 the following morning the other egg remained unhatched, but on our return that day at 14h00 the nest contained two nestlings. At this time the newly hatched nestling weighed 0.37 g and the one which was now one day old 0.48 g. We weighed them only once more, on 17 February at 06h45. While we were unable to identify the nestlings individually, one was significantly heavier (0.86 g), and we presume the other (0.65 g) to have been the younger sibling. By six days of age the nestlings were porcupine-like, with contour feather pins emerged from the skin (Fig. 2). These pin feathers began breaking their sheaths by day seven or eight, and the nestlings appeared well feathered by day 17 or 18. The nest was visited every two days and, on 6 March at 08h40, it still contained two nestlings that appeared very close to fledging. On 7 March, at 15h00, one nestling had left the nest, but we were unable to locate it. The second nestling remained at 08h30 the following day, but was gone by 12h00 on 9 March. Thus, hatching occurred c.24 hours apart and the nestlings fledged at least 24 hours apart, possibly even closer to 48 hours. These observations provide a nestling period of 21–23 days for *P. griseogularis*, similar to that reported for other small *Phaethornis*[3,6–8].

In typical hermit style, the nest was attached to the underside of a leaf, 1.3 m above the ground (Fig. 3), at the bottom of a small riparian area. The leaf belonged to an unknown species of Lauraceae, and measured c.28 cm long by 6.5 cm wide (max. dimensions). The nest comprised a complex mix of small bark pieces, seed down, small dried flower inflorescences and (predominantly) green moss. It was bound together and attached to the leaf with copious spider webs, and had a sparse inner lining of soft white seed down (Fig. 1). The front rim (furthest from the leaf) was c.1 cm lower than the portion attached to the leaf. Internally the cup measured 28 mm wide by 24 mm deep at the shallowest point. Externally the nest was 47 mm wide by 38 mm front to back (perpendicular to the axis of the leaf blade). From the back rim of the nest (against the leaf) to the tip of the leaf it measured 49 mm, and 32 mm from the front rim. The nest had a well-formed 'tail' of material dangling below the leaf, which extended 11 cm, with an additional 4 cm of sparse scraps below this.

Unsurprisingly, the nests illustrated by Gould[2] appear very similar to the nest described here, including having the appearance of being composed, at least externally, of moss and seed down. Similarly, the nest of *P. griseogularis* closely resembles, in form and attachment, those of other *Phaethornis*[6], including two well-studied species thought to be closely related; Stripe-throated *P. striigularis*[4,7,8] and Reddish Hermits *P. ruber*[1,3]. The other two presumed relatives of *P. griseogularis*, Black-throated Hermit *P. atrimentalis* and White-browed Hermit *P. stuarti* still lack published descriptions of their nests.

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White-bellied Pygmy Tyrant *Myiornis albiventris*, new to Ecuador

White-bellied Pygmy Tyrant *Myiornis albiventris* occurs locally on the east slope of the Andes and outlying ridges in Peru and northern Bolivia, where it inhabits the canopy and midstorey of humid upper tropical forest, often in vine tangles, forest edges and treefall gaps[2,5,6]. The northernmost localities in Peru are Cordillera

Figures 1–3. White-bellied Pygmy Tyrant *Myiornis albiventris*, Shaime, prov. Zamora-Chinchipe, Ecuador, 14 December 2010 (Dušan M. Brinkhuizen)

Azul National Park[1,6] and the nearby río Huallaga Valley[6,7] (D. F. Lane pers. comm., www.xeno-canto.org, XC36573).

In December 2010 we visited Yankuam Lodge, in the upper tropical zone of the río Nangaritza Valley, immediately west of Cordillera del Condor, prov. Zamora-Chinchipe, south-east Ecuador[3]. On 14 December we explored a new road to the bank of the río Nangaritza opposite the settlement of Shaime (04°19'S 78°39'W). The recently cut gravel road exited primary into secondary forest near the river, where DMB's attention was drawn to an insect-like call at c.980 m elevation. The series of piping, tinkling trills, *trree' iir' eewr* and *tru' tu' truw*, uttered in quick succession, apparently by two individuals counter-calling, was sound-recorded (XC94108). Three tiny round-bodied tyrannids in the canopy were detected and appeared to be *Myiornis*; in response to playback of a pre-recorded song of White-bellied Pygmy Tyrant (XC20691) they came closer and were photographed. They had olive-green upperparts, bright yellow fringes to the primaries, secondaries and tertials, two yellow wingbars, a very short tail, grey neck and face sides, large dark ear-coverts spot, buffy eye-ring and lores, prominent dark grey striping on the throat and breast extending to the flanks, otherwise white underparts with unmarked belly, a pink mandible and pink legs (Figs. 1–3). One bird sang in response (XC94107) and was positively identified as White-bellied Pygmy Tyrant[5,6]. The only *Myiornis* known in eastern Ecuador is Short-tailed Pygmy Tyrant *M. ecaudatus*[4], which differs in its uniform dark grey head with a bold white eye-ring and entirely unmarked underparts (including breast and flanks)[2,5,6]. In Ecuador, Short-tailed Pygmy Tyrant is usually found below 400 m[4] and to our knowledge it has not been recorded from the río Nangaritza (N. Krabbe pers. comm.). White-bellied Pygmy Tyrant has a streaked breast and flanks, and might therefore be confused with Scale-crested Pygmy Tyrant *Lophotriccus pileatus*, which is larger and longer tailed, and has distinct rufous fringes to the crest feathers[2,5,6].

We have made or know of 11 subsequent records from the area in 2010–13, six documented by photographs or tape-recordings (N. Athanas, S. Woods, I. Campell, P. Cervantes; R. Ahlman, A. Spencer [XC86217]; and DMB unpubl.), indicating the presence of at least seven territories within a c.12 km transect south of Yankuam, with territories north and south of Miazi, at Shaime, and near Heroes del Cóndor at Laberinto de las Mil Ilusiones. Although the area supports extensive primary forest, most birds were observed in the canopy and midstorey of lightly disturbed edge habitat along roadsides. The above records extend the species' breeding range c.275 km north-west and are the first for Ecuador. Due to its very small size, rather unobtrusive vocalisations and the fact that it often forages high in the canopy, the species has probably been under-recorded and may be more widespread in the eastern Andes and outlying ridges than known.

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Northern Shoveler *Anas clypeata*, a new species for the Galápagos Islands, Ecuador

Northern Shoveler *Anas clypeata* breeds across much of the northern Holarctic and, in the Western Hemisphere, winters in southern North America, the West Indies, Central America and north-west South America[2,5,6]. In mainland Ecuador there were six records in 1988–2012, in prov. Santa Elena and Manabí (Table 1).

On 22 October 2011, PF and a group of tourists photographed an unusual bird, apparently healthy judging by its behaviour and fresh plumage, at Punta Moreno lagoon (00°43'6.24"S 90°20'21.41"W), Isabela Island, Galápagos, Ecuador. It had a long, broad spatula-like, orange bill with blackish culmen, reddish-orange legs and brownish-mottled body (with darker upperparts). PF identified it as a Northern Shoveler and the photographs (Fig. 1) subsequently permitted GJU to confirm the identification and to establish that the bird was an adult female.

Figure 1. Northern Shoveler *Anas clypeata*, Punta Moreno lagoon, Isabela Island, Galápagos, Ecuador, 22 October 2011 (Peter Freire)

This is the first record of Northern Shoveler in the Galápagos and brings the number of bird species recorded in the archipelago (including vagrants and introductions)[3,4,7] to 156. Northern Shoveler must be considered a vagrant to the archipelago.

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Table 1. Northern Shoveler *Anas clypeata* records from mainland Ecuador.

Date	Location			No. of individuals	Observers
	Lagoon	Sector	Province		
29 Feb 1988	Ecuasal	Mar Bravo	Santa Elena	one male, one female	P. Shepherd, A. Marshall[1,2,6]
20 Jan 2007		Pacoa		one male	R. S. Ridgely, B. Haase, F. Sornoza, R. Quinn[1,2]
3 Mar 2007		La Segua	Manabí	one male	J. F. Freile[1]
Jan 2008	Ecuasal	Pacoa	Santa Elena	seven	F. Sornoza[2]
21 Feb 2010				one male	B. Haase[2]
Jan–May 2012				15	B. Haase (pers. comm.)

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First record of Andean Teal *Anas andium* in Lambayeque, Peru

At Tinajones Reservoir (06°37'48"S 79°26'04"W; 190 m), Lambayeque region, north-west Peru, on 10 January 2012, we noticed a mid-sized, dark-billed and dark-headed duck in flight. When it landed, we identified it as an Andean Teal *Anas andium* (Fig. 1). The bird fed at a vegetated margin of the reservoir with c.1,000 Slate-coloured Coots *Fulica ardesiaca* and several hundred ducks, mainly Cinnamon *A. cyanoptera* and Blue-winged Teals *A. discors* and White-cheeked Pintails *A. bahamensis*. Andean Teal is resident at high-altitude wetlands from Venezuela to southern Ecuador and northernmost Peru, where it was first found in northern Cajamarca and Piura in 2003[1]. Our record is the first in Lambayeque, the southernmost ever, and possibly the lowest altitude on record for the species.

Figure 1. Andean Teal *Anas andium*, Tinajones Reservoir, Lambayeque, Peru, 10 January 2012 (Robert S. R. Williams)

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Large-billed Tern *Phaetusa simplex* west of the Peruvian Andes

In recent years, many bird species new to Peru and significant range extensions have been obtained in north-west Peru[1,3]. These new data are important to better understand species distributions, biogeographical relations and conservation status. Here we report a new species for the west slope of the Peruvian Andes, from Lambayeque.

In Peru, Large-billed Tern *Phaetusa simplex* is a fairly common resident on Amazonian rivers[5]. In Ecuador it is also found east of the Andes, with a few old records from the western lowlands, in the lower río Guayas drainage[4], but is now considered very rare there. On 16 January 2012, EP saw four birds at 13h30

Figure 1. Large-billed Tern *Phaetusa simplex*, Humedales de Eten, Lambayeque, Peru, 31 January 2012 (Edevaly Puse-Fernández)

near the mouth of the río Reque, at Humedales de Eten (06°55'15"S 79°52'39"W; 0 m, Fig. 1). On 31 January 2012, one was videotaped at 11h00 at the same spot. These records are the first from the west slope of the Peruvian Andes. The species had not been previously recorded at this site[2].

P. simplex must be a vagrant to the Peruvian coast due to the scarcity of records from a relatively well-surveyed area. It is unknown if these birds originated from western Ecuador or lowland eastern Peru, but given the lack of recent records from the former, they probably came from Amazonian Peru.

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New distributional records of Rufous-necked Puffbird *Malacoptila rufa* and Pearly Antshrike *Megastictus margaritatus* in Peruvian Amazonia

We present the first confirmed records of Rufous-necked Puffbird *Malacoptila rufa* and Pearly Antshrike *Megastictus margaritatus* in the Pucallpa region of the Ucayali basin in Peruvian Amazonia. These records extend the known geographic range of *M. rufa* by at least 200 km south to dpto. Ucayali, and fill a significant gap in the known distribution of *M. margaritatus*.

Both species are restricted to tropical evergreen forests of Amazonia where they forage in the understorey, often in pairs[7,9]. *M. rufa* is fairly common within its range, which spans parts of Peru, Bolivia and Brazil[7,9], with two recognised subspecies, *M. r. rufa* and *M. r. brunnescens*, of which *M. r. rufa* occurs south of the Amazon, from north-east Peru to the Madeira River in Brazil, and from north-east Bolivia to eastern Mato Grosso, Brazil[5]. In Peru, the southernmost published record of *M. rufa* is from Sarayacu, Loreto[8,11]. West of the Ucayali, the southernmost published records of *M. rufa* are from Santa Cruz and Yurimaguas, Loreto[10]. Our records of *M. rufa* represent a range extension of c.200 km south.

M. margaritatus is a monotypic species that is rare to uncommon and patchily distributed throughout its range, possibly being most frequent in *terra firme*[7,9]. It occurs in southern Venezuela, eastern Ecuador, north-east and east-central Peru, west-central Brazil, and in extreme south-east Colombia[13]. In south-central Peru, it is very local[7], with the southernmost records from Lagarto, on the east bank of the Ucayali River at 10°35'50"S 73°52'40"W[12]. West of the Ucayali, there are also records from the floodplain of the Cushabatay in Loreto[1]. Our records of *M. margaritatus* represent the first

Figure 1. Rufous-necked Puffbird *Malacoptila rufa*, prov. Coronel Portillo, dpto. Ucayali, south-west Peru, 8 August 2010 (Juan Molina Vilca)

Figure 2. Pearly Antshrike *Megastictus margaritatus*, prov. Coronel Portillo, dpto. Ucayali, south-west Peru, 29 July 2010 (Juan Molina Vilca)

Table 1. Capture information and mensural data for individuals of Rufous-necked Puffbird *Malacoptila rufa* and Pearly Antshrike *Megastictus margaritatus* captured in July and August 2010.

Species	Band number	Wing-chord	Weight (g)	Fat*	Pectoral muscle**	Capture date	Capture time	Capture location	
Malacoptila rufa	D000114	87	41.2	1	3	8 August	07h10	08°30'4.231"S	74°42'1.186"W
Malacoptila rufa	D000115	87				8 August	08h10	08°30'4.231"S	74°42'1.186"W
Malacoptila rufa	E000104	88	38.5	0	2	23 July	07h45	08°30'15.833"S	74°42'13.77"W
Malacoptila rufa	E000105	90	42	0	2	23 July	07h45	08°30'15.833"S	74°42'13.77"W
Megastictus margaritatus	C000119	72	20.9	0	2	29 July	09h56	08°30'15.833"S	74°42'13.77"W
Megastictus margaritatus	C000123	60	22.3	1	1	31 July	07h20	08°30'13.706"S	74°41'59.903"W

* 0 = No visible fat, 1 = trace of fat

** 1 = muscle rather depressed, 2 = muscle slightly rounded, 3 = muscle fully rounded

Codes taken from Redfern & Clark[6]

between these two sites, and help fill an apparent gap in the species' distribution.

During July–August 2010, we captured four *M. rufa* and two *M. margaritatus* in a forest on the west bank of the río Ucayali, south-west of Pucallpa in the Coronel Portillo district of Ucayali at 74°42'W 08°30'S. The forest was characterised by moderate levels of human disturbance from selective logging and subsistence hunting. All six individuals were trapped in mist-nets (12 m × 2.6 m; 36 mm mesh), measured, photographed and banded with aluminum bands marked with a unique code and the inscription 'PERU www.corbidi.org'.

We captured a pair of *M. rufa* together on 23 July 2010 at 07h45 and another pair on 8 August 2010 at 07h10. One bird (band no. D000115) escaped and we were only able to take a photograph and record its wing-chord. Of the other three individuals, none was reproductively active, or in body or wing moult. Because *M. rufa* is sexually monomorphic, sexing was impossible. Neither did we definitively age them, but all were probably adults based on the lack of obvious juvenile characters and the presence of two feather generations.

The first *M. margaritatus* was trapped on 29 July 2010 at 09h45 and the second on 31 July 2010 at 07h20; both were adult males based on plumage coloration and their completely pneumatised skulls. Both had signs of a brood patch, but neither showed cloacal protuberance or feather moult. One (band no. C000119) was in light (1–10%) body moult. Both weighed close to 20.2 g, the mean body mass for this species[2]. We did not record any female *M. margaritatus* during our field work.

These new distributional records, discovered during a short field season, strongly argue the need for further ornithological inventories of lowland forests in the Ucayali drainage. Because this region remains understudied biologically (T. S. Schulenberg pers. comm.), it is probable that the area harbours other previously unreported resident birds. Some urgency exists for such baseline surveys as the region is being rapidly transformed by logging and agricultural expansion. In 1999–2005, >50% of all deforestation in Peruvian Amazonia was in the Pucallpa region[4]. Although *M. rufa* and *M. margaritatus* are considered Least Concern by the IUCN[3], both species are highly sensitive to disturbance[9] and could disappear if logging and habitat fragmentation continue at present levels.

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Black Bushbird *Neoctantes niger*: new record from Bahuaja Sonene National Park, Peru

On 20 September 2011 we mist-netted an adult female Black Bushbird *Neoctantes niger* (Fig. 1) in a patch of *Guadua weberbaueri* bamboo and secondary forest, in Bahuaja Sonene National Park, Puno, Peru, at 289 m (13°23'20.16"S 69°29'44.19"W). We trapped the bird during a survey of Cerro Cuchilla, as part of a biological inventory for the Wildlife Conservation Society. The bird was not in breeding condition: 37 g, bill length (to skull) 16.2 mm, bill width 5.01 mm, bill depth 7.25 mm, wing 77 mm, tarsus 23.53 mm and tail 60 mm.

Black Bushbird is widely but patchily distributed in Amazonia[4,7], mainly in north-east Peru (Loreto) and adjacent Brazil, Colombia and Ecuador[5] (Fig. 2). More isolated populations occur in Manu National Park in south-east Peru[6] and along the middle rio Madeira and western Pará (Brazil)[5]. However, given its rarity[6], the species is easily overlooked. The nearest known to locality to Bahuaja Sonene National Park is Cocha Cashu Biological Station (Manu National Park), 270 km to the north-west, where despite being one of the most studied areas in the Peruvian lowlands the only reports of Black Bushbird are those of Terborgh *et al*.[6] and Lambert[2]. In 2011, a team led by G. Londoño (pers. comm.) found Black Bushbird for the first time in the Kosñipata Valley, south-east Peru, despite having surveyed the same area over the previous four years. The species was not reported during a rapid inventory of the Candamo watershed in 1993[3], although INRENA[1] mentioned *N. niger* for Bahuaja Sonene National Park, without clarifying the basis for the species' presence on this list.

We believe our Cerro Cuchilla record represents a previously undocumented resident population within Bahuaja Sonene National Park and the Tambopata watershed. This population has gone undetected probably due to the species' skulking behaviour and lack of coverage. Our record is the southernmost of the species and the first for Puno. We hypothesise that its range could extend into Bolivia, where the species should be searched

Figure 1. Female Black Bushbird *Neoctantes niger*, Bahuaja Sonene National Park, Puno, Peru, September 2011 (Gabriel Jamie / Wildlife Conservation Society)

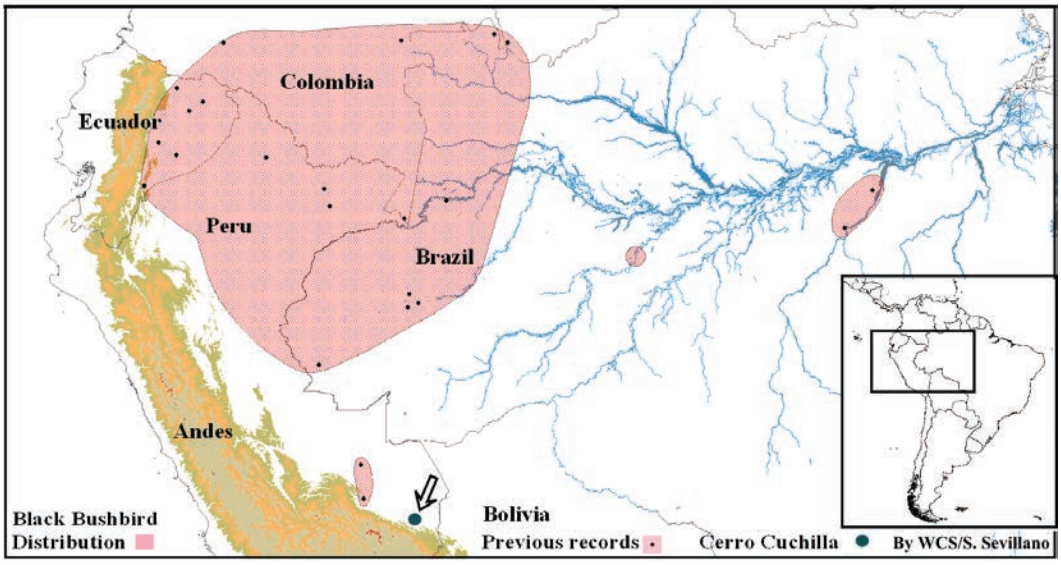

Figure 2. Map showing Black Bushbird *Neoctantes niger* distribution following Ridgely *et al.*[5], with arrow indicating Cerro Cuchilla, Bahuaja Sonene National Park, Puno (Peru).

for in Madidi National Park, which shares similar habitats to those where it has been found in south-east Peru.

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Range extension for the Endangered Cochabamba Mountain Finch *Compsospiza garleppi* in Chuquisaca, Bolivia

Ornithological studies in Bolivia commenced early in the 19th century, yet distributional data are still lacking for many species because many regions remain under-explored[13]. The southern

departments of Chuquisaca, Potosí and Tarija are biologically among the least explored areas of the country; they are not only poorly known, but also possess few protected areas[7,15]. Here we report the first record of Cochabamba Mountain Finch *Compsospiza garleppi* from dpto. Chuquisaca, c.275 km south of the closest known locality.

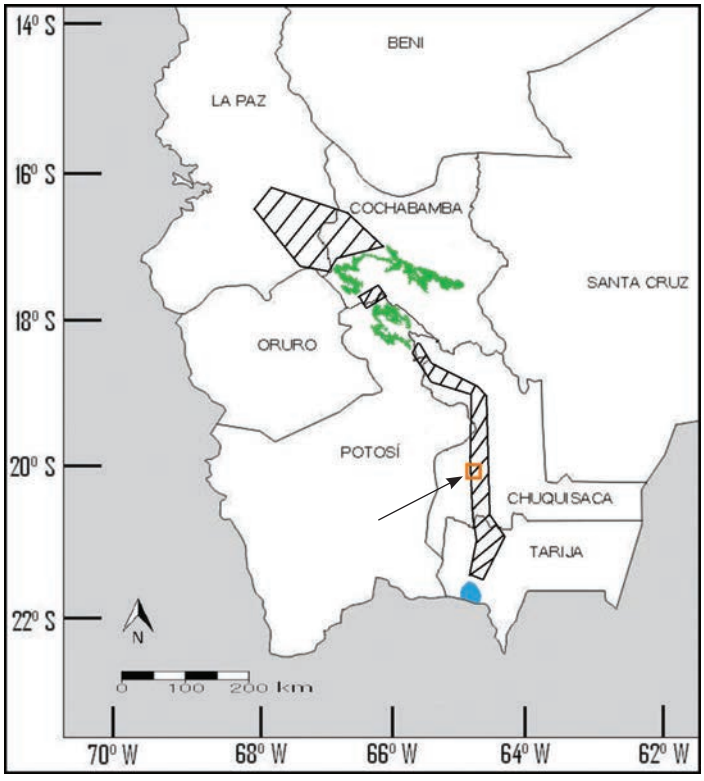

Figure 1. Map showing the new locality (open square with arrow) for Cochabamba Mountain Finch *Compsospiza garleppi* in Chuquisaca. The modelled range[11] is shown in green and the barred polygons represent priority areas to search for *C. garleppi*. The range of Tucumán Mountain Finch *C. baeri* is shown in blue[5].

C. garleppi is endemic to Bolivia, occurring at 2,700–3,900 m in the transitional zone between the Inter-Andean Dry Valleys and *Puna* life zones[3]. Its known distribution comprises 25 localities in dptos. Cochabamba and Potosí[3,9]. It inhabits semi-humid montane scrub, in valleys with ravines and scattered *Polylepis* and *Alnus* trees. Cochabamba Mountain Finch is listed as Endangered, owing to continued habitat loss within its small and fragmented range[3].

On 13 August 2012, near the locality of Órganos Punta, Chuquisaca, in south-central Bolivia (20°17'S 64°52'W; Fig. 1), we observed two *C. garleppi* (presumably a pair) in a ravine, flying fast between small bushes and perching for a few seconds (Fig. 2). The birds fed briefly on the ground and then disappeared. The ravine where the observation was made is in the Boliviano-Tucumano Ceja de Monte scrublands (e.g. *Baccharis* sp., *Echinopsis* sp., *Salvia* sp.), just above the Ceja de Monte subhumid-humid woodland (including *Polylepis crista-galli*), within the transitional zone between semi-humid *puna* and the Inter-Andean Dry Valleys[12,14]. The ravine is c.40 m from a dirt road and is characterised by patches of 2–3 m-tall scrubs within a matrix of grassland, and some rocky outcrops (Fig. 3).

Herzog *et al.*[11] modelled the potential distribution of *C.*

Figure 2. Cochabamba Mountain Finches *Compsospiza garleppi*, Órganos Punta, dpto. Chuquisaca, Bolivia, August 2012 (Diego R. Méndez)

Figure 3. Habitat of Cochabamba Mountain Finch *Compsospiza garleppi*, Órganos Punta, dpto. Chuquisaca, Bolivia (Diego R. Méndez)

garleppi (Fig. 1), indicating that the species' range extends south as far as northern Potosí, in the area adjacent to extreme north-west Chuquisaca. Likewise, based on records and environmental data, Guerrero[9] modelled a similar range and suggested that, although less likely, the species' range could extend north-west as far as La Paz and to the south throughout central Chuquisaca as far as Tarija. Our record demonstrates that its distribution reaches southern Chuquisaca and could extend much further to the south than previously suspected.

Although no specific locality is mentioned, surveys for Cochabamba Mountain Finch in areas of suitable habitat in Chuquisaca in the early 1990s failed to record the species[8]. Our observation, made during a short survey, suggests that further effort is needed to detect the species in southern Bolivia, and indeed elsewhere in the country. For example, it is thought that populations in Cochabamba and Potosí—separated by c.70 km—are isolated by geographic barriers (e.g. the río Caine) and the lack of suitable habitat[2]; accordingly, the birds in Chuquisaca could represent a different population, as the locality is >200 km south of the closest record and separated by a vast area with limited suitable habitat, although surveys are needed to confirm this.

Ornithological surveys are also required to check if the species reaches dpto. La Paz and if it occurs in the border area between dptos. Cochabamba and Potosí, as well as between the new locality in Chuquisaca and sites in Potosí, and to the south of the new locality in Chuquisaca, as far as dpto. Tarija (Fig. 1). Moreover, genetic studies are needed to assess the relationships and connectivity among the species' populations.

Another issue raised by our observation is the possibility that a contact zone between *C. garleppi* and Tucumán Mountain Finch *C. baeri* exists. In Bolivia, the Vulnerable and closely related *C. baeri*, which occurs in similar habitats, has been recorded only in south-east Tarija[5] (Fig. 1). Surveys south of the new locality for Cochabamba Mountain Finch in Chuquisaca, in addition to attempting confirm the presence of this species, should also search for *C. baeri* north of its currently known distribution.

We recorded 25 other bird species during two hours at Órganos Punta, including three Near Threatened and seven restricted-range species[4,10]. Based on the A1 and A3 criteria for the selection of Important Bird Areas (IBAs)[6], the area around the new locality for *C. garleppi* could be proposed as an IBA. With only two national and three municipal / departmental protected areas, large parts of Chuquisaca are unprotected[7]. The presence of an IBA in this region could focus future ornithological studies—particularly on Cochabamba Mountain Finch—and strength the organisation of the protected area system towards effective biodiversity conservation.

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Observations at a nest of Crested Eagle *Morphnus guianensis* in the southern Gran Sabana, Venezuela

Crested Eagle *Morphnus guianensis* is a low-density, Near Threatened, resident of forested areas of Middle and South America that is known in Venezuela from three specimens and a few other records, most recently from the llanos in 2006[12], from Junglaven, Amazonas, in December 2006 (G. M. Kirwan *in litt*. 2012), and five observations by AC in the region of El Paují, Bolívar, since June 2008[2]. The latter involved both pale- and barred-phase birds. AC has also seen Harpy Eagle *Harpia harpyja* twice nearby[2] (c.1 and 3 km from the Crested Eagle sightings). This and a report by G. M. Kirwan (*in litt*. 2012) of nests of both species seen in the early 2000s within 1 km of each other in the Serra dos Carajás, Pará, Brazil, provide additional evidence of their sympatry[5,11], although Thiollay observed that their territories did not overlap in two study areas in French Guiana[9]. Nesting in Venezuela, in 1981, was reported in Hilty[6], and there are breeding data for Brazil (north of Manaus) in 1984[1], for Guatemala in 1995[10] and Peru in 2002[7].

On 1 April 2011, we heard several long, high-pitched, unfamiliar whistles emanating from forest canopy close to the El Paují–Santa Elena dirt road in the southern Gran Sabana, Bolívar, near a ridge in the río Surucún basin (in the headwaters of the río Caroní). On searching, we discovered a pair of Crested Eagles, close to a very large nest in the main fork, at canopy level, of an emergent tree. Annual rainfall[3] in this region is 2,000–2,250 mm and the Surucún supports largely intact primary forest of c.400 km^2. The nest site is on a gentle slope, c.20 m lower and 220 m from the ridge at 990 m elevation, along which is the road carrying 30–60 vehicles per day. A logging trail passes below the nest tree and has been used recently. To avoid drawing the attention of hunters to the nest and because detailed breeding data are available[1,10], we elected to sporadically monitor the nest from the ground, despite the inherent limitations. We opened a separate path to our main observation location and did not meet anyone during our visits to the nest, thereby fulfilling one of our principal objectives, to avoid jeopardising the breeding attempt.

The nest tree, a *Balizia pedicellaris* (Fabaceae), has compound leaves mostly at its extremities, so that the tree is open with unusually 'clean' branches, providing easy access for a large raptor, and is a well-lit location. The trunk, of 1.05-m diameter near ground level, rises vertically to the primary fork c.23 m above ground, where the nest is located. Here, the tree separates into several large, widely spread, crooked branches, with upper foliage 12–15 m above the nest. Most trees around the nest have crowns below c.24 m with a more open area and lower growth c.70 m to the north-west, and an old

treefall c.40 m to the south. The nest is higher than most adjacent trees, particularly those downslope thereby providing a wide view over the canopy to the north, which direction was normally used by the eagles for take-off. The nest was c.1 m in diameter, 0.8 m deep, and comprised sticks up to c.3 cm in diameter, with lianas growing on the sides, possibly originating from leafy lianas brought by the eagles (Fig. 2). Such 'adorning' of the nest with greenery has been reported previously[1].

We visited the nest on 22 occasions between 1 April and 1 November 2011, for a total of 70 hours, including some day-long visits. We were unable to precisely determine the dates of laying and hatching. However, we did observe the young eagle's first flights and could therefore estimate the hatching date as 17 May, based on 114 days to fledging[10]. By comparing our own observations with 11 developmental milestones provided by Whitacre *et al*.[10], we can confirm 17 May as a fair estimate of hatching date. Laying and commencement of brooding occurred between 1 and 15 April, consistent with the incubation period of 40–50 days assumed by Bierregaard[1].

We first saw the young eagle on 30 June, at c.44 days of age (it was not seen on days 10, 13, 21 and 28). On 30 June the female was away from the nest for 80% of the day, including a period of 30 minutes of light rainfall. In lowland Guatemala[10], the female only left the young alone at 59 days. It is probable that this difference reflects the cooler climate (and considerably higher elevation) of our site, relieving the female of the need to shade the young earlier in its development.

Development of the young and adult behaviour was otherwise similar to those in lowland Guatemala, with two exceptions. Firstly, the young appeared less excitable (e.g., less jumping during wing exercising and less reaction to over-flying vultures and other large birds) and secondly, and more significantly, we observed the female withhold food from

Figure 1. Female Crested Eagle *Morphnus guianensis*, 30 June 2011; note white crest feathers tipped black, and absence of barbules basally on the main crest feather; tail barring is pale greyish brown above and white below (Anthony Crease)

Figure 2. Female Crested Eagle *Morphnus guianensis* on nest, 30 June 2011 (Anthony Crease)

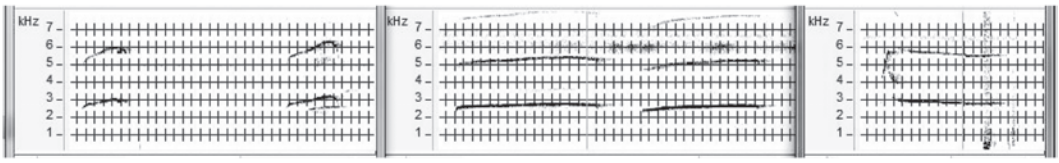
Figure 3. Unfledged young Crested Eagle *Morphnus guianensis*, c.105 days of age, 30 August 2011 (Anthony Crease)

Figure 4. Juvenile Crested Eagle *Morphnus guianensis* in nest tree post-fledging, c.133 days old, 27 September 2007 (Anthony Crease)

the young for many hours, during consecutive full-day visits 81 and 99 days after estimated hatching, which behaviour has not previously been reported in the literature.

At 81 days, the female left the nest area at 06h12, was seen soaring overhead at 10h30 and returned to the nest at 11h08, remaining in the environs without a break of more than 15 minutes until 14h13. Additionally, during this period, the young made begging whistles almost constantly, again implying the adult's continuous presence. At 13h16 the female was seen with a Woolly Mouse Opossum *Micoureus demerarae*, presumably captured during the period of absence prior to 11h08. However, the prey was not delivered to the young until nearly 16h58. During this period the female landed and quickly took off from the nest on seven occasions without depositing the prey, despite the nestling's begging; and also whistled sporadically from nearby, causing the pullus to redouble its begging calls. The eventual delivery just permitted the young to feed before dusk. Similar behaviour was observed 18 days later, when an unidentified large batrachian was withheld for c.4 hours. Whatever the reason for this behaviour, it appears that other factors than maximum weight gain, which would best be achieved by feeding the young rapidly, are functioning.

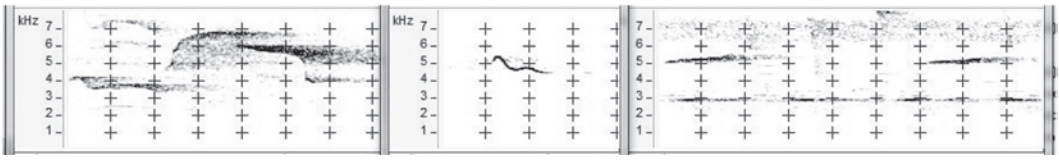
The female did not incubate the egg or remain with the young continuously, but took short absences when it was warm or the nest was sunlit. However, she was always present early in the morning prior to hatching and when the young was <50 days old, and she therefore presumably spent the night on the nest during this c.100-day period. At 81 days after hatching, the female was not on the nest before sunrise and was only present eight minutes during the entire day, with absences from the nest area of several hours at a time. From this age (and probably earlier) only the female was observed bringing (and



5. Normal whistles of adults; note slightly lower pitched whistle of a second distant eagle at bottom right

6. Long double whistle of female

7. Long single whistle of female with short introductory notes



Begging whistle of eaglet at 28 days

High-pitched, short double-whistle of female, *weeyuh*

8. Begging whistle of eaglet at 81 days

9. Whistles of eaglet after fledging (133 days); ignore lower trace (insect)

Figure 5 'Normal whistles', three from one bird (probably the female), two from the other at slightly lower pitch.
Figure 6. Long doubled whistle from female.
Figure 7. Variant of female's long whistle with introductory 'squeal', which is also commonly given alone.
Figure 8. Begging whistle of young at 81 days.
Figure 9. Whistles of post-fledged young at 133 days.
All recordings made with EDIROL R-09HR and Sennheiser ME-67 microphone by Anthony Crease; software: Wavesurfer.

withholding) prey. The male was not seen to deliver prey after the young was 50 days old.

The male's participation in the breeding process was primarily to feed the female during the incubation period, and both the female and the nestling in the early stages. He also assisted with nest maintenance by bringing sticks. Once the female could leave the young alone and commence hunting, the male was rarely seen nearby. His visits with food were generally <10 minutes in duration although, exceptionally, during our (30-minute) morning and afternoon visits on 6 May (c.11 days before estimated hatching), the male remained above the nest while the female incubated. When the male delivered food, the female always vacated the nest beforehand, unlike at the nest observed by Bierregaard[1].

On our final visit on 1 November, 53 days after fledging, the young was not present in the nest tree at 05h25 and neither it nor the adults were seen nearby.

Plumage of the barred-phase male closely matches illustrations and descriptions in major references[4,6,8]. The juvenile's plumage also corresponds to previously published information[4,8], except that the entire crest and nape was white (Figs. 3–4).

An extreme dark phase, which is relatively scarce and was described as *M. taeniatus*[5], was illustrated in Ferguson-Lees & Christie[4] and briefly described by Bierregaard[1]. Our female was even darker and further differed in having no white on the wings, back or nape; brownish tones were visible in strong sunlight (Fig. 1); underparts almost black except for diffuse white bars around the thighs; undertail-coverts white, and no barring visible on upper belly or above; three tail bars appeared bright white from below but pale brownish grey above (Fig. 1); single long crest feather white, tipped black (Fig. 1); and entire underwing boldly and coarsely barred black and white.

Crest shape is a function of wind direction, leading to surprising variations (cf. Figs. 1 and 2). In the female, the basal part of the quill of the single longest crest feather was devoid of barbs for c.30% of its length, perhaps due to wear as it is pushed to and fro between the shorter crest feathers when rotating the head in windy conditions (Fig. 1). Loss of barbs was not observed in the juvenile at 19 weeks, supporting the hypothesis of wear as the cause of loss.

Vocalisations comprise whistles of variable length, separation and pitch pattern, and always show a second, and sometimes also a faint third, harmonic. On 1 April 2011, when both adults were at the nest prior to laying, they uttered similar whistles ('normal whistles'), of 1.0–1.4 seconds duration, their pitch rising slightly to a peak of 2.7–3.0 kHz, then falling slightly, *wiieeeuh* (Fig. 5). In the sonogram, three loud whistles by one bird and two fainter ones by the other at slightly lower pitch and longer spacing are visible. The louder whistles are probably from the female, which appears stronger voiced, based on our cumulative experience. The female also made loud and much longer (2.5–3.6 seconds) whistles of similar pitch and pattern on 6 July 2011 (Fig. 6). Whether this reflected warning or alarm is unclear. The whistles were mostly given doubled with the second somewhat shorter (75%). A variant of the long whistle was also recorded

in which the pitch dropped very slightly through 3 kHz and was preceded by a short (0.38-seconds) high-pitched, bisyllabic squeal, *skee'yuh* (Fig. 7), which rises from 4 to 6 kHz, before falling. This squeal was also commonly given alone.

Begging whistles of the young at 81 days are short (0.35 seconds), see Fig. 8, and have a characteristic pattern, which peaks early at 5.5 kHz and then falls, rises and falls to c.4.5 kHz; *tsiu*. They are similar to those recorded at 50 days and appear to be an attempt to reproduce the adult's 'squeal'. These begging whistles were given in bouts of 3–10 with 1–2 seconds between whistles. As previously reported[10], the young appeared only to beg when the adults were in view or audible, and was otherwise silent. At 19 days after fledging, the juvenile gave a different whistle (presumably not begging as the adults were absent), similar in pattern to the 'normal' whistles of adults, but higher and shorter, *twee* (Fig. 9).

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Range extension for Many-banded Araçari *Pteroglossus pluricinctus* in Amazonian Brazil: conservation and biogeographical significance

Nine species of *Pteroglossus* occur in northern South America. Many-banded Araçari *P. pluricinctus* is a species of primary and old secondary lowland forest. The species is widespread in north-west Amazonia, in eastern Ecuador, north-east Peru, neighbouring Colombia and Venezuela, and reaches its eastern limit between the rios Negro and Solimões[21], in Brazil, probably on the 'middle Rio Negro'[22]. Despite being large and noisy, distributional uncertainties persist concerning some species of *Pteroglossus* (e.g. *P. beauharnaesii*[17]). Here we present new records of *P. pluricinctus*, extending its known distribution eastwards both north and south of the Rio Negro.

Observations

On 20 July 2002, SHB observed at least three Many-banded Araçaris foraging in a 35–40 m emergent tree in Jaú National Park (JNP), in the canopy of tall *terra firme* forest near the park's administrative headquarters at Monteiro (02°35'52"S 63°22'09"W: Site 1, Fig. 1). This is the first record of the species in JNP and the fourth *Pteroglossus* to be recorded in the park[5].

On 1 November 2010 at 07h30, AAB observed a group of nine Many-banded Araçaris in the uppermost part of a dead tree c.7 m above the intact canopy of surrounding *terra firme* forest near Sitio Santa Rita (03°12' 41.2"S 60°11'32.9"W: Site 3, Fig. 1), in Iranduba municipality, Amazonas (Fig. 1). The group called for c.6 minutes and then flew deeper into the forest in single file. The distance (250 m), conditions (slightly overcast but dry) and clear view, provided good observational conditions. The site is some 350 km east of the JNP locality.

As at JNP, three other *Pteroglossus* occur in the eastern

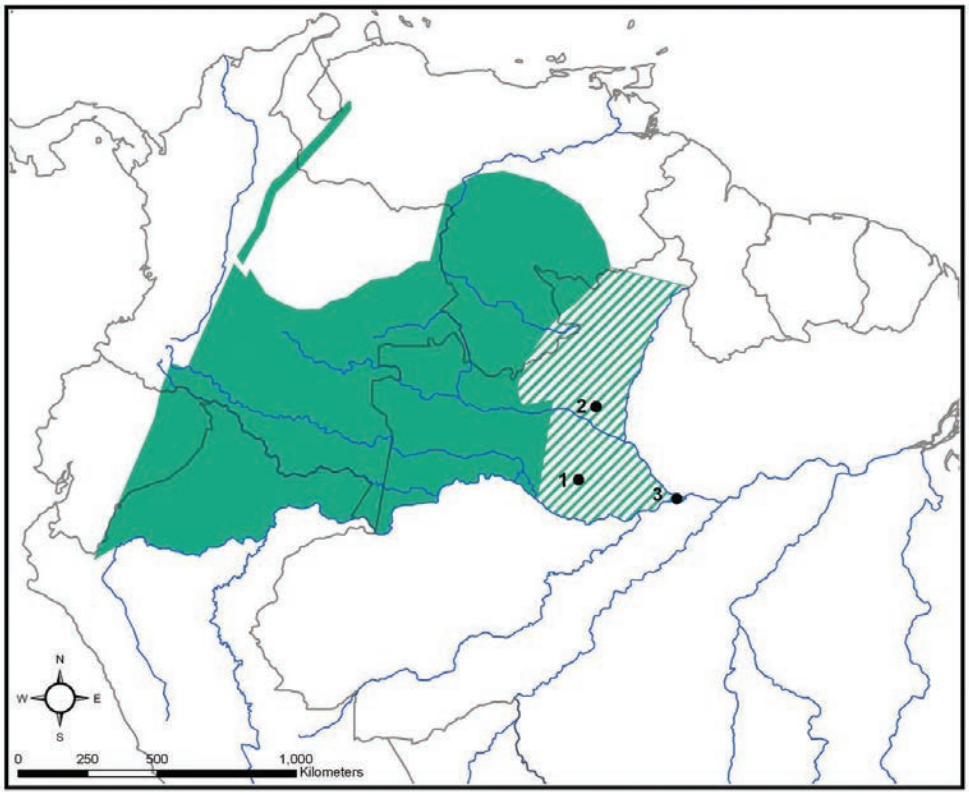

Figure 1. The distribution of Many-banded Araçari *Pteroglossus pluricinctus*. Dark grey = previously documented range, hatched area = newly extended range. Sites: 1 = Jaú National Park; 2 = Araçá Mountains; 3 = Sitio Santa Rita.

part of the Negro–Solimões interfluvium (Ivory-billed *P. azara*, Chestnut-eared *P. aracari* and Lettered Araçaris *P. castanotis*). During both encounters just detailed, the presence of two complete black breast-bands distinguished the birds from *P. castanotis* or *P. inscriptus*, whereas the dark bill with a white blaze on the upper mandible eliminated *P. azara*.

In August 2008 SHB observed five *P. pluricinctus* in low-stature secondary forest (00°14'8.3"S 62°48'13.2"W: Site 2, Fig. 1) at the foot of the Araçá Mountains, northern Amazonas. Other sympatric *Pteroglossus* are Green Araçari *P. viridis* (distinguished from *P. pluricinctus* by its smaller size, green back, unbarred breast and the presence of a horizontal red stripe on the bill) and *P. azara flavirostris* (distinguished from *P. pluricinctus* by bill pattern, and the absence of yellow / black breast-bands).

Discussion

South of the rio Negro, in the Negro–Solimões interfluvium, Restall *et al*.[21] and Haffer[13] indicated the species' easternmost limit to be the headwaters of the Jaú River, and questioned whether it might occur in the west of the Negro–Solimões interfluvium. Our records not only confirm that the species occurs at this easternmost boundary (cf. Fig. 1), but provide an eastward range extension of c.350 km, indicating that the species probably occurs throughout the Negro–Solimões interfluvium. North of the Negro, range maps for *P. pluricinctus*[16,21] suggest the species occurs well west of the rio Branco (Fig. 1). The record in the Araçá Mountains is the first for *P. pluricinctus* east of the rios Padauiri and Araçá, making it highly probable that its range reaches the rio Branco itself (see Fig. 1).

Presence in the Araçá Mountains is predictable being neither unusual in terms of habitat nor biogeography, given that there is no real barrier to the north-easternmost limits of the species' range, whereas the rio Branco is a major biogeographical barrier for many taxa[18], including birds[19]. The Jaú region also lacks a major habitat disjunction, nor is it a broad river by Amazonian standards. For example, *Ramphastos* toucans are often observed traversing the Jaú, and other rivers in the region (e.g. the Carabinani) in mere minutes, making this range extension within the Negro–Solimões interfluvium unsurprising. However, our records are of two-fold significance: firstly, the genus *Pteroglossus* was one of

those employed by Haffer[12–15] to illustrate the Pleistocene refugia hypothesis, the known distributions of its nine members conforming closely to several of these areas (cf. Lees & Peres[17]). In his analysis of the Amazonian avifauna, Haffer[14] considered *P. pluricinctus* endemic to the upper rio Negro basin (the Imeri Centre of Endemism). However, as demonstrated here, the species' distribution is clearly broader than previously known. As with the greatly expanded distribution recently reported for Yapacana Antbird *Myrmeciza disjuncta*[4], our observations reveal that the extent of the Imeri refugium needs to be modified; indeed such a south and eastwards extension as suggested by our *P. pluricinctus* data was proposed by Cracraft[9] as long ago as 1988.

Secondly, our results reveal how much remains to be learned concerning the ranges even of obvious species like *Pteroglossus*. Furthermore, sites such as the Araçá Mountains are little visited and still as poorly known biologically[1,6,11] as when Prance & Johnson[20] discussed their affinities 20 years ago. Sitio Santa Rita lies between Iranduba and Manacapuru, towns of >30,000 people, an area undergoing rapid land-use change following the construction of a bridge across the rio Negro at Manaus[7]. No complete environmental impact assessments were undertaken prior to the project's initiation, with the commissioned reports (e.g. De Souza Carvalho[10]) having little biological content. Remarkably, biogeographical reviews of central Amazonia show that, although the two municipalities most effected by new land usage are <100 km from the state capital Manaus, the area lacks adequate inventories for most vertebrates (e.g. fish[8,23], bats[2], birds[3,4]). These sightings underscore the need for rapid biological assessments, both for conservation planning and to test biogeographical models, not only in remote areas such as the Araçá Mountains, but also near towns such as Manacapuru and Iranduba. In the east of the Negro–Solimões interfluvium such inventories should serve both to establish protected areas and to record what currently exists.

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First records of Chestnut-headed Tanager *Pyrrhocoma ruficeps* from Goiás, central Brazil

Chestnut-headed Tanager *Pyrrhocoma ruficeps* is a distinctively plumaged Thraupidae generally considered to be endemic to the Atlantic Forest in north-east Argentina (Misiones), south-east Paraguay and south-east Brazil (from Espírito Santo south to Rio Grande do Sul). N. Moura and I encountered a pair of *P. ruficeps* on 23 January 2012 at the Reserva Particular do Patrimônio Natural (RPPN) Fazenda Pousada dos Anões, Alto Paraíso de Goiás, in the Chapada dos Veadeiros, Goiás. The pair was observed at 14h15 as they crossed a narrow vehicle track in gallery forest within a vast matrix of well-preserved *cerrado* physiognomies at 14°19'S 47°29'W (1,130 m). The pair fed on coarse grasses and remained largely within cover. I obtained a good-quality recording of their contact calls—an unobtrusive high-pitched *tip.... tip* archived on www.xeno-canto.org (XC93479) but they were unresponsive to playback of their own vocalisations and we lacked any pre-recorded songs. I obtained poor-quality photographs of the male, of which two are archived on WikiAves (WA556855 and 556853). These images are sufficient to resolve the male's silver bill, dark lores, chestnut head and grey wings, body and tail, which in combination are diagnostic of this tanager. We maintained aural and occasional visual contact for 20 minutes until the pair moved away.

Other birds observed in the same forest fragment included Ochre-cheeked Spinetail *Synallaxis scutata*, Russet-mantled Foliage-gleaner *Syndactyla dimidiata*, Rufous Gnateater *Conopophaga lineata*, Grey Elaenia *Myiopagis caniceps*, Black-tailed Flycatcher *Myiobius atricaudus*, Sepia-capped Flycatcher *Leptopogon amaurocephalus*, Greenish Schiffornis *Schiffornis virescens*, Helmeted Manakin *Antilophia galeata*, Pale-bellied Tyrant-Manakin *Neopelma pallescens* and White-bellied Warbler *Basileuterus hypoleucus*. Recent records of Greenish Schiffornis (e.g., WA556549) from the Pousada dos Anões also represent a minor range extension from the previous northern limit, Nova Veneza in central Goias[4,5]. Although Chestnut-headed Tanager is considered to be associated with bamboo[6], we did not observe the large-stemmed *Guadua paniculata* anywhere around Alto Paraíso de Goiás, which is perhaps above this bamboo's altitudinal tolerance (it was abundant to the west, lower down, close to the town of Colinas do Sul). Subsequently, D. Kverno photographed (WA682653, 682636) a pair of *P. ruficeps* at Tabapuã dos Pireneus (15°46'S 48°48'W) in the municipality of Cocalzinho de Goiás (30 km north of Pirenopolis) on 8 July and 25 August 2012. This pair associated with a mixed flock including Saffron-billed Sparrow *Arremon flavirostris*, Yellow-bellied Seedeater *Sporophila nigricolis* and Ochre-cheeked Spinetail *Synallaxis scutata*, foraging in grasses in the understorey of gallery forest (D. Kverno *in litt*. 2012). The previous northernmost documented record is from the Casca D'Anta waterfall, Serra da Canastra National Park, Minas Gerais (>660 km from the Chapada dos Veadeiros), where a pair was observed and tape-recorded on 13 August 2005[7]. However, the species has previously been reported (documentation unclear) from the Distrito Federal, at Fazenda Agua Limpa, just 150 km south-west of Fazenda Pousada dos Anões[2]. Antunes & Willis[1] suggested that Chestnut-headed Tanagers breed in the Serra do Mar and Serra do Mantiqueira, and migrate to the interior during the austral winter.

These new records—during both the austral summer and winter—appear out of synch with what would be expected of long-distance migrants or vagrants. Further observations are required to ascertain whether the Chapada dos Veadeiros might host a resident population of *P. ruficeps* (which is apparently naturally rare anywhere in the north of its range) or just occasional visitors. Recent years have witnessed a suite of discoveries in Goiás of Atlantic Forest 'endemic' birds whose ranges were considered not to reach interior Brazil and the Cerrado biome. These include Shrike-like Cotinga *Laniisoma elegans*[3] and Pin-tailed Manakin *Ilicura militaris*[4], thus increasing ornithological field work in the fragments of humid montane forest in Goiás may yet reveal more surprises.

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Southernmost record for Rufous-backed Antvireo *Dysithamnus xanthopterus*, in Santa Catarina, Brazil

Rufous-backed Antvireo *Dysithamnus xanthopterus* is endemic to the coastal mountains of south-east Brazil from Rio de Janeiro to Paraná[4], where it inhabits cloud forests above 700 m, sometimes syntopically with Plain Antvireo *D. mentalis*[2]. In south Brazil, it is known from fragments of *Araucaria* forest in the municipality of Telêmaco Borba, Paraná[1] (although these records have been questioned[3]), with recent records in the municipalities of Quatro Barras (E. Pereira pers. comm.) and Adrianópolis (L. R. Deconto pers. comm.), on the Atlantic slope. In Santa Catarina it was recorded by A. E. Rupp (pers. comm.) at Serra Dona Francisca (c.760 m), Joinville, but his record is unpublished.

On 26 August 2012, a male *D. xanthopterus* was photographed (Fig. 1) and sound-recorded (xeno-canto.org, XC109388) at RPPN Prima Luna (27°15'39.56"S 49°01'31.57"W), at 900 m, municipality of Nova Trento, Santa Catarina. The bird sang

Figure 1. Rufous-backed Antvireo *Dysithamnus xanthopterus*, Nova Trento, Santa Catarina, Brazil, August 2012 (Glauco Kohler)

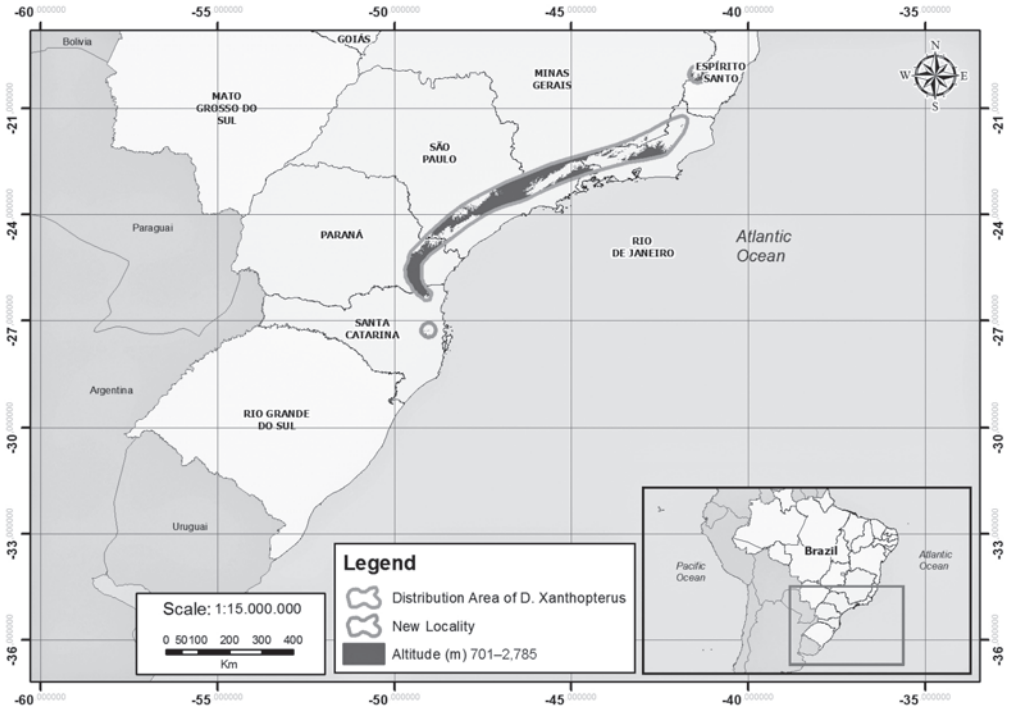

Figure 2. The new locality for Rufous-backed Antvireo *Dysithamnus xanthopterus* in Santa Catarina relative to the species' known distribution in south-east and southern Brazil.

spontaneously above the observers for c.20 minutes, before flying off.

Our new locality expands the species' range c.170 km south from Joinville (Fig. 2) and is not connected to other montane forest areas known to support *D. xanthopterus*. Such data highlight the importance of more intensive field work, as many gaps in our knowledge of species' distributions merely reflect a lack of research. The biogeography of the southern Brazilian Atlantic Forest requires further study, both to understand former distributions and how geological events (such as the formation of the Itajaí-Açu basin) might have shaped current species distributions and segregate populations.

D. xanthopterus should be searched for in forested areas of Santa Catarina's montane plateau (municipalities of Bom Jardim da Serra, Urubici and Praia Grande) as well as in adjacent Rio Grande do Sul, given their environmental characteristics.

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Neotropical Notebook

Neotropical Notebook contains two sections. The first summarises records published elsewhere in the literature, following the format previously established in *Cotinga*. The second lists unpublished and undocumented records. Photographs are published where appropriate.

PUBLISHED RECORDS FROM THE LITERATURE

CARIBBEAN

Cuba

Formerly only a vagrant to the country, **American Avocet** *Recurvirostra americana* has recently been recorded breeding in Cuba, with two colonies located in the Ciénaga de Birama in June 2007[64].

Grenada

Large-billed Tern *Phaetusa simplex* has been recorded on Grenada (and in the Lesser Antilles) for the first time, a bird present on 31 May–1 June 2010[130].

MIDDLE AMERICA

Belize

Harpy Eagle *Harpia harpyja* has been discovered nesting in the country for the first time[109].

Costa Rica

The latest (2012) update to the country's checklist includes the addition of eight completely new records not resulting from changed taxonomy—**Canvasback** *Aythya valisineria*, **Redhead** *A. americana*, **Hooded Merganser** *Lophodytes cucullatus*, **Great Shearwater** *Puffinus gravis*, **Manx Shearwater** *P. puffinus*, **Galápagos Shearwater** *P. subalaris*, **White-tailed Tropicbird** *Phaethon lepturus* and **Red-tailed Tropicbird** *P. rubricauda*—as well as seven for which more complete evidence is now available, namely **Markham's Storm Petrel** *Oceanodroma markhami*, **Clapper Rail** *Rallus longirostris*, **Grey Gull** *Leucophaeus modestus*, **Rufous Nightjar** *Antrostomus rufus*, **Aplomado Falcon** *Falco femoralis*, **Western Kingbird** *Tyrannus verticalis* and **Brown-chested Martin** *Progne tapera*[91]. Ten new species for Cocos Island have been reported recently, namely **Green-winged Teal** *Anas* (*crecca*) *carolinensis*, **Northern Shoveler** *A. clypeata*, **Sora** *Porzana carolina*, **Short-billed Dowitcher** *Limnodromus griseus*, **Yellow-throated Vireo** *Vireo flavifrons*, **Blackpoll Warbler** *Setophaga striata*, **Summer Tanager** *Piranga rubra*, **Painted Bunting** *Passerina ciris*, **Blue Grosbeak** *Passerina caerulea* and **Yellow-headed Blackbird** *Xanthocephalus xanthocephalus*[57]. A detailed look at the breeding biology of **White-eared Ground Sparrow** *Melozone leucotis* has revealed that the species constructs two different types of nest[114].

El Salvador

The first country record of **Plain Chachalaca** *Ortalis vetula* was made in Montecristo National Park in July 2012[99], while the first **Southern Lapwing** *Vanellus chilensis*, a species that is spreading north in Central America, was photographed in March 2012[1].

Mexico

Goosander (Common Merganser) *Mergus merganser* has been photographed in Durango[82] (one of the southernmost records ever) and **Red-breasted Nuthatch** *Sitta canadensis* is a new species for the state of Chihuahua[88]. A number of novel distributional records have been published for the globally threatened **Black-capped Vireo** *Vireo atricapilla*[78]. **Crane Hawk** *Geranospiza caerulescens*, **Purple Gallinule** *Porphyrio martinicus*, **Keel-billed Toucan** *Ramphastos sulfuratus*, **Black-crowned Tityra** *Tityra inquisitor* and **Bobolink** *Dolichonyx oryzivorus* have been added to the avifauna of Hidalgo[126], while **Kentucky Warbler** *Geothlypis formosa* has been confirmed in the same state[20], **Mexican Jay** *Aphelocoma californica*, **Black-vented Oriole** *Icterus wagleri* and **Montezuma Oropendola** *Psarocolius montezuma* are new for Tamaulipas[107], with **Aplomado Falcon** *Falco femoralis* reconfirmed for there, and **Black Tern** *Childonias niger*, **Willet** *Tringa semipalmata* and **Snowy Plover** *Charadrius nivosus* all recorded for the first time in Querétaro[56]. The invasive **European Starling** *Sturnus vulgaris* has been discovered breeding in the city of Pachuca, Hidalgo[45]. **Snail Kite** *Rostrhamus sociabilis* has been added to the avifauna of Jalisco[100] and **Black-throated Magpie-Jay** *Calocitta colliei* to that of Michoacán[3]. **Crested Guan** *Penelope purpurascens* has been discovered at several new localities in Puebla and Oaxaca[46]. **Red-legged Honeycreeper** *Cyanerpes cyaneus* has been found breeding in the Sierra Madre del Sur, Guerrero[14], and **Military Macaw** *Ara militaris* has been discovered in the north of the same state[128], with a breeding colony in north-east Guerrero[62]. The spread of **Eurasian Collared Dove** *Streptopelia decaocto* continues, with the first breeding records in the Yucatán[25]. The nests and eggs of **Clarion Wren** *Troglodytes tanneri*[123], **Cozumel Vireo** *Vireo bairdi*[65] and **Rose-bellied Bunting** *Passerina rositae*[97] have been described.

Nicaragua

Known from very few previous records in Nicaragua, **Ladder-backed Woodpecker** *Picoides scalaris* has been recorded on the country's north-east Pacific coast[26].

Panama

Three new records for Panama are also first records for Middle America and the AOU's North American Checklist region: **Long-winged Harrier** *Circus buffoni*, **Large-billed Seed Finch** *Oryzoborus crassirostris* and **Yellow-hooded Blackbird** *Chrysomus icterocephalus*[5].

SOUTH AMERICA

Argentina

White-chinned Sapphire *Hylocharis cyanea* is known from just one previous record in Argentina, in Buenos Aires in 1926, but a dead specimen was discovered at the border of Salta and Jujuy provinces in October 2010[31]. There have been further records of **Swallow-tailed Hummingbird** *Eupetomena macroura* in Misiones province[21]. Among new province records, the following six species are all new for San Juan: **Buff-necked Ibis** *Theristicus caudatus hyperorius*, **Snowy-crowned Tern** *Sterna trudeaui*, **Greater Ani** *Crotophaga major*, **Blue-tufted Starthroat** *Heliomaster furcifer*, a **doradito** *Pseudocolopteryx* sp. and **Tawny-crowned Pygmy Tyrant** *Euscarthmus meloryphus*[72]. **Puna Flamingo** *Phoenicoparrus jamesi*[74], as well as **Dinelli's Doradito** *Pseudocolopteryx dinellianus*[73], and separately **Grey Potoo** *Nyctibius griseus*[37] and **Green-backed Firecrown** *Sephanoides sephaniodes*[79] have also been added to the same province's avifauna, **Steinbach's Canastero** *Pseudasthenes steinbachi* to that of Río Negro[8], **Yellow-billed Cacique** *Amblyramphus holosericeus* appears to be establishing itself in Mendoza[80], **Barn Swallow** *Hirundo rustica* has been discovered breeding in La Pampa[89], while **Mitred Parakeet** *Aratinga mitrata* and **Slaty Thrush** *Turdus nigriceps* are new for Santiago del Estero[28]. New research suggests that **Quebracho Crested Tinamou** *Eudromia formosa* is declining in northern Argentina[19], while separately Smith *et al*.[120] report on aspects of the species' distribution, breeding and vocalisations; in contrast, the rare **Black-bodied Woodpecker** *Dryocopus schulzi* appears to be doing better than thought, at least in the mountains of Córdoba[55]. The first detailed breeding data for the widespread **Olivaceous Woodcreeper** *Sittasomus griseicapillus* have appeared[15].

Bolivia

The nest and eggs of **D'Orbigny's Chat-Tyrant** *Ochthoeca oenanthoides* have been described from observations in dpto. La Paz[81], and observations concerning the occurrence and breeding of **Crowned Eagle** *Urubitinga coronata* in dpto. Beni have also been reported[12].

Brazil

Two new species have been added to the national list: **Little Thornbird** *Phacellodomus sibilatrix* (in Rio Grande do Sul, January 2012)[11] and Chaco **Earthcreeper** *Tarphonomus certhioides* (same state, July 2012)[104], while records of **Bulwer's Petrel** *Bulweria bulwerii* (off Rio de Janeiro, December 2011)[63] and **Least Seedsnipe** *Thinocorus rumicivorus* (São Paulo, April 2012) are the first documented occurrences in Brazil[22]. Further records of **White-winged Tern** *Chlidonias leucopterus* in far southern Brazil have also been published[32]. Subject to considerable ornithological attention in recent years, Guilherme[53] has provided an overview and checklist of the birds of Acre, the latter numbering 667 confirmed species at present. A major contribution by Lees *et al*.[67] presents the results of a five-month survey of the birds of Paragominas, Pará, which recorded 440 species, with voucher documentation obtained for 418 of these; among the many notable range extensions were the first records for Pará and Amazonia of **Spotted Piculet** *Picumnus pygmaeus*, the first records east of the rio Tocantins of **Large-headed Flatbill** *Ramphotrigon megacephalum* and **Yellow-shouldered Grosbeak** *Parkerthraustes humeralis*, and multiple observations of the threatened *paraensis* subspecies of **Cinnamon-throated Woodcreeper** *Dendrexetastes rufigula*. Our knowledge of the avifauna of Tocantins continues to grow apace, with Dornas *et al*.[36] reporting important range extensions of **Marbled Wood Quail** *Odonthophorus gujanensis*, **Blackish Nightjar** *Hydropsalis nigrescens*, **Striolated Puffbird** *Nystalus striolatus*, **Gould's Toucanet** *Selenidera gouldii*, **Manu Antbird** *Cercomacra manu*, **Chestnut-throated Spinetail** *Synallaxis cherriei*, **Bright-rumped Attila** *Attila spadiceus*, **Purple-breasted Cotinga** *Cotinga cotinga* and **Pale-bellied Mourner** *Rhytipterna immunda* from there. New records and breeding data for **Sooty Swift** *Cypseloides fumigatus*, from the states of Bahia, Goiás, Minas Gerais and Tocantins, have substantially improved our knowledge of the species[90]. Dias *et al*.[34] have reviewed the status and distribution of **Arctic Tern** *Sterna paradisaea* in Brazil.

An interesting work is that of Simpson *et al*.[119], who prepared a list of 417 documented bird species in the well-watched municipality of Ubatuba, in coastal São Paulo, and a popular area with both resident and foreign birdwatchers on account of its many Atlantic Forest endemics, globally threatened species and rarities. **Bare-faced Ibis** *Phimosus infuscatus*, **Grey-bellied Hawk** *Accipiter poliogaster*, **Yellow-breasted Crake** *Porzana flaviventer*, **White-barred Piculet** *Picumnus cirratus* and **Creamy-bellied Gnatcatcher** *Polioptila lactea* have been added to the state list for Santa Catarina[111], as have **Great Dusky Swift** *Cypseloides senex*, **Masked Gnatcatcher** *Polioptila dumicola* and **Solitary Cacique**

Procacicus solitarius, while records of **Long-tufted Screech Owl** *Megascops sanctaecatarinae*, **Long-trained Nightjar** *Macropsalis forcipata*, **Greenish Tyrannulet** *Phyllomyias virescens* and **Southern Antpipit** *Corythopis delalandi* are the first for the state to be published for at least 40 years[2]. Among other new or important state records published since our last review are the first **Chilean Skua** *Stercorarius chilensis*[23] and **Stygian Owl** *Asio stygius* for Espírito Santo[118], **Blue-crowned Parakeet** *Aratinga acuticaudata* in Minas Gerais[95], the first **Hyacinth Visorbearer** *Augastes scutatus* for Bahia[127], **Rondônia Bushbird** *Clytoctantes atrogularis* in Acre[54], the first **Caatinga Antwren** *Herpsilochmus sellowi* for Tocantins[94], the first **Common Tody-Flycatcher** *Todirostrum cinereum*[85] in Santa Catarina, the first **Russet-winged Spadebill** *Platyrinchus leucoryphus* for Bahia[7], the first documented **Black-crowned Monjita** *Xolmis coronatus* in São Paulo[69], the first **Masked Water Tyrant** *Fluvicola nengeta* for Distrito Federal[102], the first **Ashy-headed Greenlet** *Hylophilus pectoralis* in Mato Grosso do Sul[13], and the rediscovery of **Yellow-legged Tinamou** *Crypturellus noctivagus* in Rio Grande do Sul[29], while nine new localities for **Great Dusky Swift** in Rio Grande do Sul have been reported[71] and the range of **Ochre-breasted Pipit** *Anthus nattereri* has been extended 170 km northwards in Minas Gerais[83]. Pacheco Nunes *et al*.[96] have reviewed the distribution of **Fasciated Tiger Heron** *Tigrisoma fasciatum* in south-central Brazil, in the states of Mato Grosso, Mato Grosso do Sul and Goiás. Ubaid *et al*.[125] present new records of **Buff-fronted Owl** *Aegolius harrisii* in Minas Gerais and São Paulo, including the discovery of a nest. For Mato Grosso do Sul, **Sulphury Flycatcher** *Tyrannopsis sulphurea* was a new state record, while **Black-throated Trogon** *Trogon rufus*, **Rufous-capped Motmot** *Baryphthengus ruficapillus*, **Buff-bellied Puffbird** *Notharchus swainsoni*, **Rufous-capped Spinetail** *Synallaxis ruficapilla* and **Bare-throated Bellbird** *Procnias nudicollis* were all unusual there[87]. **Burrowing Owl** *Athene cunicularia* is expanding its range across the Brazilian Amazon, undoubtedly in response to ongoing deforestation[44]. **Ocellated Crake** *Micropygia schomburgkii*, **Checkered Woodpecker** *Veniliornis mixtus*, **Sharp-tailed Tyrant** *Culicivora caudacuta* and **Black-masked Finch** *Coryphaspiza melanotis* have all been documented in the southern Espinhaço of Minas Gerais[84]. Among breeding data recently published are works on **Grey-bellied Hawk** *Accipiter poliogaster*[16], **White-rumped Hawk** *Buteo leucorrhous*[132], **Long-tufted Screech Owl**[124], **Least Nighthawk** *Chordeiles pusillus*[70], **Ochraceous Piculet** *Picumnus limae*[117], **Red-billed Scythebill** *Campylorhamphus trochilirostris*[43], **Great Antshrike** *Taraba major*[66], **Marsh Antwren** *Stymphalornis acutirostris*[103], **Chestnut-belted Gnateater** *Conopophaga aurita*[68] and **Yellow-olive Flatbill** *Tolmomyias sulphurescens*[4].

Chile

The second and third records of **Dark-billed Cuckoo** *Coccyzus melacoryphus* were made in 2011, in January and May[18]. **Chilean Mockingbird** *Mimus thenca* has been found breeding in the northern part of Chiloé Island[24]. Interesting records mainly from March 2011–February 2012 reported in *La Chiricoca* include: the country's third documented record of **White-capped Albatross** *Thalassarche cauta* off Region V in November 2011, **Henderson Petrel** *Pterodroma atrata* on Easter Island in May 2011 (species only recently documented there), a **Mottled Petrel** *P. inexpectata* in the Drake Passage in February 2012 (no documented records for Chile), a **Red-tailed Tropicbird** *Phaethon rubricauda* off Region III in January 2012, a **Blue-footed Booby** *Sula nebouxii* off Arica in November 2011, a **Brown Pelican** *Pelecanus occidentalis* off Region II in February 2012, two adult **Yellow-crowned Night Herons** *Nyctanassa violacea* in Arica in April 2011 (see *Cotinga* 32: 157–158 for the first country records), a **Purple Gallinule** *Porphyrio martinicus* in Region XV in July 2011, the first documented record of **Wandering Tattler** *Tringa incana* on Easter Island, in March 2011 (and for **Sanderling** *Calidris alba* in December 2010), one or two **Brown Skuas** *Stercorarius antarcticus* on Bartolomé, in the Diego Ramírez archipelago in September–October 2011 (first documented record for Chile), two **Lesser Nighthawks** *Chordeiles acutipennis* in Region I in March 2011, the first Chilean record of **Glittering-bellied Emerald** *Chlorostilbon lucidus* photographed in the Metropolitan Region in December 2011, four records of **Great Kiskadee** *Pitangus sulphuratus* between late October 2011 and early February 2012 and a **Grey-breasted Martin** *Progne chalybea* in Region III in October 2011 (second Chilean record)[9,10].

Colombia

An expedition in 2011 to the Amazonian state of Guainía produced two new species for the national checklist, **Crimson Fruitcrow** *Haematoderus militaris* (sight record only) and **Spotted Tanager** *Tangara punctata* (photographs)[101], while **Pacific Hornero** *Furnarius cinnamomeus* has been found in the country for the first time (in dpto. Nariño)[75] and the second Colombian record of **Forster's Tern** *Sterna forsteri* involved two birds photographed on the north coast in March 2011[110]. Overlooked until recently, a specimen dating from October 1969 of **Black-and-white Tanager** *Conothraupis speculigera* is the first country record[131]. **Red-breasted Merganser** *Mergus serrator* has been recorded for the first time on Providencia and San Andrés, both of which are in the Caribbean but politically part of Colombia[129].

Avian inventories in the Serranía de San Lucas in northern Colombia yielded many novel distributional data, among them range extensions for **Pavonine Cuckoo** *Dromococcyx pavoninus*, **Lyre-tailed Nightjar** *Uropsalis lyra*, **White-tipped Sicklebill** *Eutoxeres aquila*, **Western Woodhaunter** *Hylocistes virgatus*, **Buff-fronted Foliage-gleaner** *Philydor rufum*, **Spotted Woodcreeper** *Xiphorhynchus erythropygius*, **Slaty Antwren** *Myrmotherula schisticolor*, **White-crowned Tapaculo** *Scytalopus atratus*, **Rufous-browed Tyrannulet** *Phylloscartes superciliaris*, **Orange-billed Nightingale-Thrush** *Catharus aurantiirostris*, **Golden Tanager** *Tangara arthus* and **Yellow-throated Bush Tanager** *Chlorospingus flavigularis*[35]. The first records in more than a decade of the globally threatened **Santa Marta Wren** *Troglodytes monticola* were made in December 2011[76]. Two new localities for **Todd's Parakeet** *Pyrrhura picta caeruleiceps* have been found in the north-east of the country[17]. **Red-crowned Woodpecker** *Melanerpes rubricapillus* appears to be expanding southwards, having recently arrived in dpto. Valle del Cauca[41]. Among interesting breeding biology data are papers on the endemic **Black Inca** *Coeligena prunellei*[77], **Red-bellied Grackle** *Hypopyrrhus pyrohypogaster*[92] and **Santa Marta Brush Finch** *Atlapetes melanocephalus*[93], as well as **Blue-naped Chlorophonia** *cyanea*[39]. *Contra* the comment in *Cotinga* 34: 183, Pale-legged Warbler *Basileuterus signatus* had already been removed from the Colombian checklist mentioned therein.

Ecuador

Natural history notes and new distributional information for **Indigo Flowerpiercer** *Diglossa indigotica* have been presented[121]. **Canary-winged Parakeet** *Brotogeris versicolorus* has been added to the country's list based on an established exotic population in Guayaquil[40]. Solano-Ugalde & Real-Jibaja[122] present records of 18 species that improve our understanding of their distributions in eastern Ecuador. Guevara *et al*.[52] censused birds in Sangay National Park, Morona-Santiago, recording 127 species, of which four—**White-bearded Hermit** *Phaethornis hispidus*, **Black-mandibled Toucan** *Ramphastos ambiguus*, **Spectacled Bristle Tyrant** *Pogonotriccus orbitalis* and **Wing-banded Wren** *Microcerculus bamba*—represented range extensions. Breeding data for Ecuadorian birds continue to be published at a prodigious rate due to the efforts of Harold Greeney and his colleagues, with recent papers including a comparative look at **Ecuadorian** *Columbina buckleyi* and **Croaking Ground Doves** *C. cruziana*[58], and new data for **Collared Inca** *Coeligena torquata*[86], **Ochre-breasted Antpitta** *Grallaricula flavirostris*[50], **Crescent-faced Antpitta** *G. lineifrons*[48] and **Black-capped Hemispingus** *Hemispingus atropileus*[49].

Falkland Islands (Malvinas)

The observation of a **Royal Penguin** *Eudyptes schlegeli* on New Island in January 2011 might represent the first confirmed record for the archipelago[33].

French Guiana

Relatively few nests of the secretive **Sungrebe** *Heliornis fulica* have been described, but to these can be added the first in French Guiana, in January 2009[59]; new nesting data for **Green Araçari** *Pteroglossus viridis* have also been published from the country[60]. Note that the incorrect scientific name was given in association with the first Black-and-white Tanager *Conothraupis speculigera* (not *C. mesoleuca*) reported in *Cotinga* 34: 184, 188.

Peru

Despite many previous avifaunal surveys of extreme north-west Peru, Sánchez *et al*.[112] report the first (or first documented) records for Tumbes of **Comb Duck** *Sarkidiornis melanotos*, **Brown Booby** *Sula leucogaster*, **Double-toothed Kite** *Harpagus bidentatus*, **Ornate Hawk-Eagle** *Spizaetus ornatus*, **Pallid Dove** *Leptotila pallida*, **Mottled Owl** *Ciccaba virgata*, **Buff-fronted Owl** *Aegolius harrisii*, **Rufous-tailed Hummingbird** *Amazilia tzacatl* (first for Peru), **Andean Emerald** *A. franciae viridiceps* (first Peruvian record of this taxon), **Purple-crowned Fairy** *Heliothryx barroti* (sight record only, the first for Peru), **Olivaceous Piculet** *Picumnus olivaceus*, **Line-cheeked Spinetail** *Cranioleuca antisiensis*, **Yellow-bellied Elaenia** *Elaenia flavogaster*, **Sulphur-rumped Flycatcher** *Myiobius barbatus*, **Little Ground-Tyrant** *Muscisaxicola fluviatilis*, **Ochraceous Attila** *Attila torridus*, **Flame-rumped Tanager** *Ramphocelus flammigerus*, **Silvery-throated Tanager** *Tangara icterocephala*, **Bay-crowned Brush Finch** *Atlapetes seebohmi* and **Blue Seedeater** *Amaurospiza concolor*. Robbins *et al*.[105] describe bird surveys over the course of a 30-year period at Abra Maruncunca, Puno, which yielded the first occurrence and clarification of the status in Peru for **Ochre-cheeked Spinetail** *Synallaxis scutata*, **Olivaceous Woodcreeper** *Sittasomus griseicapillus viridis*, **Scimitar-winged Piha** *Lipaugus uropygialis*, **White-necked Thrush** *Turdus albicollis contemptus*, **Blue-browed Tanager** *Tangara c. cyanotis*, **White-browed Brush Finch** *Arremon torquatus* and **Yellow-bellied Siskin** *Sporagra xanthogastra*. Within the context of an avian inventory of Laquipampa Wildlife Refuge, Lambayeque, Angulo *et al*.[6] present notes on 16 species for which the new data consolidate our knowledge of their status and distribution in northern Peru. Further breeding data for the globally threatened **Peruvian Plantcutter** *Phytotoma raimondii*[108], secretive **Olive Finch** *Arremon castaneiceps*[38] and little-known **Selva Cacique**

Cacicus koepckeae have been published[51]. The range of **Ecuadorian Thrush** *Turdus maculirostris* has been extended south to Piura[30] and that of **Rainbow Starfrontlet** *Coeligena iris* to Ancash (and to a new high elevation)[116], while **Southern Caracara** *Caracara plancus* is expanding northwards through the east of the country[98], doubtless in response to deforestation. **Comb Duck** is an addition to the avifauna of Ayacucho[42] and **Semipalmated Plover** *Charadrius semipalmatus* to the list for Manu National Park[115]. The first breeding data for **Bearded Mountaineer** *Oreonympha nobilis*[27], **Stripe-headed Antpitta** *Grallaria andicolus*[47] and **Orange-eared Tanager** *Chlorochrysa calliparea*[113] have been published.

Uruguay

The first records of **Great-winged Petrel** *Pterodroma macroptera* in the country were in May 2003 and March 2007[61].

Venezuela

The first breeding data for the globally threatened and endemic **Plain-flanked Rail** *Rallus wetmorei* have been published[106].

OTHER RECORDS RECEIVED

Belize

The following records were submitted by J & JB. Single **Pinnated** *Botaurus pinnatus* and **American Bitterns** *B. lentiginosus* were at Hopkins, south of Dangriga, Stan Creek, on 22 February 2011, while two of the second-named species were at a pool between San Ignacio and Black Rock Lodge, Cayo, on 19 February 2011 (when known to have been present for at least two weeks). At least 20 **White-winged Doves** *Zenaida asiatica* were at Sittee River, south of Dangriga, Stan Creek, on 22 February 2011 (considered an 'autumn migrant' there; photographed). A **Swainson's Thrush** *Catharus ustulatus* at Black Rock Lodge, near San Ignacio, on 15 February 2011, was presumably a winterer or very early spring migrant (usually not before late March), while a **White-throated Thrush** *Turdus assimilis* was also present at feeders there on 15–19 February 2011 (photographed), and a male **Rose-throated Tanager** *Piranga roseogularis* there on 14 February 2011 was at the southern edge of the species' range, although it is well known to lodge staff. Also at Black Rock Lodge was a female **Western Tanager** *P. ludoviciana* on 13 February 2011 (considered only a vagrant to Belize), while two adult **Altamira Orioles** *Icterus gularis* at Jaguar Reef resort, Hopkins, Stan Creek, on 21 February 2011 (photographed), were well south of the species' range as shown in Jones (2004. *Birds of Belize*).

Colombia

In September 1997, TMD & LD observed several **American Golden Plovers** *Pluvialis dominica* and a **Short-billed Dowitcher** *Limnodromus griseus* at CIAT, between Palmira and Cali, dpto. Valle del Cauca (03°30'14"N 76°21'20"W), where a semi-flooded rice field attracted many migrant waders, including Pectoral Sandpiper *Calidris melanotos* and both yellowlegs *Tringa* spp. The dowitcher was studied carefully with a North American field guide at hand, but no photographs were obtained. Both species are rare migrants in Colombia. A juvenile **Franklin's Gull** *Leucophaeus pipixcan* was at Parque Simón Bolívar, Bogotá (04°39'26"N 74°05'42"W), in October 2011 (Fig. 1; TMD & MM) during a severe storm; there are very few previous inland records for Colombia and this is the first for the Bogotá region. A **Buff-winged Starfrontlet** *Coeligena lutetiae* was photographed (Fig. 2) on 26 January 2012 at 1,700 m at Clarita Botero, Ibague (NA), an unusually low altitude (*cf*. McMullan *et al*. 2011: 2,800–3,700 m).

Figure 1. Franklin's Gull *Leucophaeus pipixcan*, Parque Simón Bolívar, Bogotá, Colombia, October 2011 (Miles McMullan)

Figure 2. Buff-winged Starfrontlet *Coeligena lutetiae*, Clarita Botero, Ibague, Colombia, January 2012 (Nick Athanas)

Cuba

Interesting records from the Sabana-Camagüey archipelago included a very large flock of c.390 **American Avocets** *Recurvirostra americana* and a female-type **Hooded Merganser** *Lophodytes cucullatus* on Cayo Coco on 23 February 2013, with a female **Black-faced Grassquit** *Tiaris bicolor* on Cayo Paredón Grande on 7 March 2013 (ADM), while a series of unusually late records (all from spring 2013) are as follows: **Lesser Scaup** *Aythya affinis* (La Habana, 27 April), **Canvasback** *A. valisineria* (La Habana, 27 April), **Red-breasted Merganser** *Mergus serrator* (Cayo Coco, 3 May) and **Peregrine Falcon** *Falco peregrinus* (Cayo Coco, 4 May) (GMK, WP *et al*.). A **Chimney Swift** *Chaetura pelagica* was over La Cueva de los Portales, Pinar del Río province, on 25 March 2013 (SA, CS). Reports from DA include a **Blue-headed Vireo** *Vireo solitarius* on Cayo Coco on 8–9 March 2013; three **Lesser Black-**

Figure 3. Cape May Warbler *Setophaga tigrina*, Scarborough, Tobago, April 2013 (Beth Ellis)

backed Gulls *Larus fuscus* in Havana on 28 February 2013, with one there on 16 March and three again on 17 March; and a **Savannah Sparrow** *Passerculus sandwichensis* in Parque Lenin, Havana, on 27 February 2013, with three there on 15 March.

Ecuador

Among the many impressive reports featured on the 'Aves Ecuador' website (www.avesecuador.com) are a **Southern Scrub Flycatcher** *Sublegatus modestus* at Pacto Sumaco, Napo, on 11 June 2012 (first record), a male **Northern Pintail** *Anas acuta* at Lago San Pablo, Imbabura, on 28 June–2 July 2012 (first record), a female **Southern Martin** *Progne elegans* at Pañacocha, Sucumbíos, on 16 August 2012 (first documented record), two **Panama Flycatchers** *Myiarchus panamensis* at San Lorenzo, Esmeraldas, on 16 December 2012, and a **Dwarf Cuckoo** *Coccyzus pumilus* at Las Peñas, Esmeraldas, on 17 December 2012 (both first records); all of these are supported by photographs, and some also by sound-recordings.

Peru

On 20 August 2012 an adult **Marvelous Spatuletail** *Loddigesia mirabilis* was observed by JB & TM at Kuelap fortress (06°25'05"S 77°55'24"W), providing only the second record from the west side of the Utcubamba Valley and the highest-known elevation for the species (c.3,020 m). Local people claim that the species breeds there.

Trinidad & Tobago

A **Cape May Warbler** *Setophaga tigrina* was at Scarborough, Tobago on 7 April 2013 (I & BE; Fig. 3).

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