



- Colombia, Instituto de Investigación de Recursos Biológicos Alexander von Humboldt & Ministerio del Medio Ambiente, Bogotá.
- Ridgely, R. S. & Greenfield, P. J. 2001. *The birds of Ecuador*, vol. 1. Cornell Univ. Press, Ithaca, New York.
- Rodner, C., Lentino, M. & Restall, R. 2000. *Checklist of the birds of northern South America*. Pica Press, Robertsbridge.
- Salaman, P., Donegan, T. M. & Cuervo, A. M. 2002. New distributional bird records from Serranía de San Lucas and adjacent Central Cordillera of Colombia. *Bull. Brit. Orn. Cl.* 122: 285–303.
- Sibley, D. A. 2001. *The Sibley guide to birds*. National Audubon Society, New York.
- Stattersfield, A. J., Crosby, M. J., Long, A. J. & Wege, D. C. 1997. *Endemic Bird Areas of the world: priorities for biodiversity conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK.
- Stotz, D. F., Fitzpatrick, J. W., Parker, T. A. & Moskovits, D. K. 1996. *Neotropical birds: ecology and conservation*. Univ. Chicago Press.
- Strewe, R. (in press, a) Birds and conservation value of the San Salvador Valley, Sierra Nevada of Santa Marta, north-east Colombia. *Revista Asociación Colombiano de Ornitología* 1.
- Strewe, R. (in press, b) The threatened birds of the río Frio Valley, Sierra Nevada de Santa Marta, Colombia. *Cotinga* 22.
- Todd, W. E. & Carriker, M. A. 1922. The birds of the Santa Marta region of Colombia: a study in altitudinal distribution. *Ann. Carnegie Mus.*, vol. 14.
- Troncoso, P. F., van der Wolf, P. A. J. & Ahumada, J. A. 1995. The Lilac-tailed Parrotlet (*Touit batavica*), a new record for Colombia. *Caldasia* 18(86): 147–148.

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A survey of the Serranía de Jungurudó, an isolated mountain range in eastern Panama

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Received 4 April 2003

Eastern Panama is a well-known centre of endemism for birds. In a recent analysis by BirdLife International, Stattersfield *et al.* (1998) examined the distribution of restricted-range birds (those with a total world range of less than 20,000 km²) and defined 218 Endemic Bird Areas (EBAs), based on the co-occurrence in a given area of two or more of such species. Eastern Panama includes parts of two of these EBAs.

The Darién Highlands EBA is defined as the highlands of eastern Panama and westernmost Colombia above 700 m. Eleven restricted-range species are entirely confined to it, with another five found both there and in other EBAs. The Darién Lowlands EBA includes the lowlands and foothills of eastern Panama and westernmost Colombia up to c.1,000 m. It has four species entirely confined to it, with another nine found both there and in other areas (Stattersfield *et al.* 1998).



Several of the species of this EBA are primarily found in foothills and so are restricted to the lower slopes of the same ranges where the highland endemics occur.

In addition to the species listed by Stattersfield *et al.* (1998), the restricted-range Ochraceous Wren *Troglodytes ochraceus* occurs in the Darién Highlands EBA, and Yellowish-green Tyrannulet *Phylloscartes flavovirens* and Tawny-capped Euphonia *Euphonia anaeae* occur in the Darién Lowlands EBA. Stattersfield *et al.* (1998) listed Nariño Tapaculo *Scytalopus viciniior* as a species of the Darién Highlands, but it has recently been determined (Krabbe & Schulenberg 1997) that the Darién birds belong to a newly described species, Chocó Tapaculo *S. chocoensis*, which also has a restricted range.

Three main mountain ranges run in parallel lengthwise along the isthmus in easternmost Panama (Fig. 1). The range along the Caribbean coast, the Serranía de Darién, includes the highest peak in the region, Cerro Tacarcuna (1,875 m). The Serranía de Pirre (1,550 m) occupies the centre of the isthmus, with the outlying ridge of the Altos de Quía to its south-east along the Colombian border. Along the Pacific coast, the highest part of the ranges, at the headwaters of the ríos Sambú and Jaqué, is known as the Serranía de Jungurudó. The maximum elevation indicated on

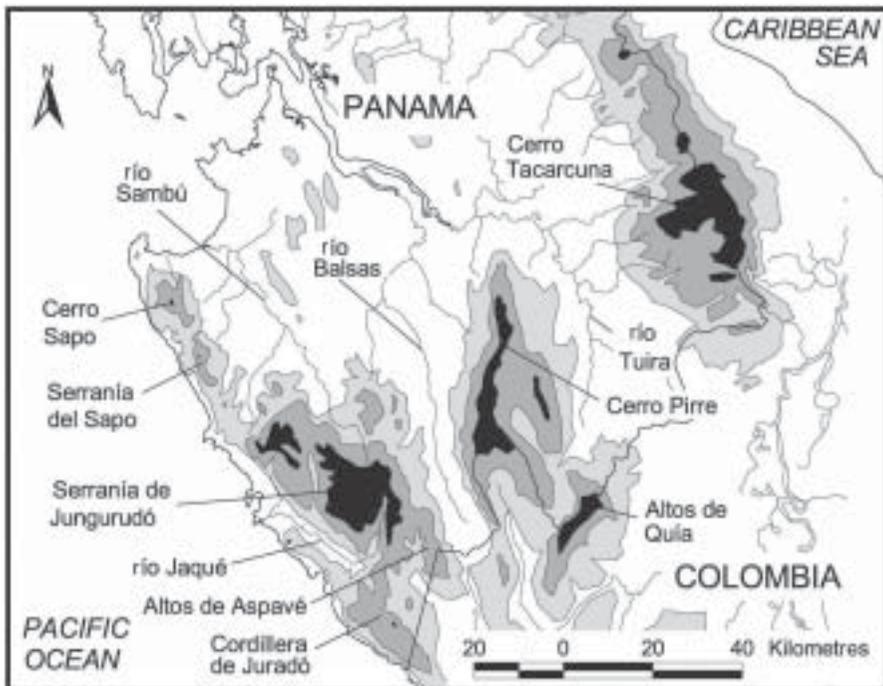


Figure 1. Mountain ranges of eastern Darién, Panama. Light grey = land above 200 m; dark grey = 500 m; black = 1,000 m.





available maps (INGTG 1993) is *c.* 1,700 m. The Serranía de Sapo extends north-west from the Jungurudó and terminates at Cerro Sapo (1,145 m) near the town of Garachiné. To the south-east of the Jungurudó and connected to it are the ranges of the Cordillera de Juradó and the Altos de Aspavé. These Pacific ranges are isolated from the Serranía de Pirre, *c.* 30 km to the east, by the valleys of the ríos Balsas and Juradó, which are below 200 m.

The Caribbean and central ranges of Darién have both been well studied ornithologically. Cerro Tacarcuna was surveyed by H. E. Anthony and D. S. Ball in 1915 (Anthony 1923), by C. Handley in 1959, P. Galindo in 1963, and A. Wetmore in 1964. Cerro Pirre was visited by E. A. Goldman in 1912, by R. Benson in 1928, O. Pearson in 1938, A. Wetmore in 1961, P. Galindo in 1972, and M. Robbins in 1982 (Robbins *et al.* 1985). Cana on the slopes of Cerro Pirre now has a small tourist lodge and is visited frequently by birding groups. The Altos de Quía was visited in 1970 by P. Galindo (Wetmore & Galindo 1972) and by R. Ridgely in 1975 (Ridgely & Gwynne 1989).

In contrast, the Pacific ranges have been little studied. The only site that has previously been surveyed is Cerro Sapo at the northern end of the range, by T. Barbour, W. S. Brooks and C. F. Underwood in 1922 (Barbour & Brooks 1923), and D. Feathers in 1941 (Bond & Meyer de Schauensee 1944). The Serranía de Jungurudó itself has not previously been visited by ornithologists.

Study Areas and Methods

GRA made an initial trip to the Jungurudó area between 10–15 January 1996, ascending the southern side of the range from the upper río Jaqué valley near the village of El Mamey (07° 28'N, 78° 00'W), and reaching 945 m on 12 January. GRA, DGC and KMA surveyed the Serranía de Jungurudó more extensively from 8–23 August 1997, ascending from its northern side. We reached the range via the río Sambú, camping at the last Embera Indian village on the river, Boca de Pavarandó, on 8 August, and on 9 August at the junction of the río Sambú and río Antaral (07° 43'N, 78° 01'W). We then ascended the valley of the río Antaral, camping at 195 m on 10 August, 680 m on 11 August, and 900 m on 12 August. On 13 August we established a base camp at 840 m on Cerro Antaral (07° 37'N, 78° 00'W). We remained at this site until 22 August, working up to an elevation of *c.* 1,000 m. We were unable to reach the summit of the range due to broken terrain and dense vegetation. Cloud forest on this part of the Jungurudó range begins at *c.* 900 m. Although the best available map of the area (INGTG 1993), originally prepared by the Raytheon Corporation from radar data obtained in 1967, indicates that the range reaches an elevation of 1,700 m, our altimeter readings suggested that its maximum elevation actually may be only about 1,200 m.

In addition to walking trails and streams in the area, on 17–19 August we carried out *c.* 130 hours of mist-netting near the base camp, using 6–8 nets, 12 m long with a 36-mm mesh. We tape-recorded vocalizations using Sony TCM-5000 portable



tape-recorders with Sennheiser short shotgun microphones, and collected specimens by shotgun and by mist-netting.

Results

We report here observations of species of limited distribution or rare in Panama, especially restricted-range species. Endemic species of the Darién Lowlands EBA are indicated by an asterisk, and those of the Darién Highlands EBA with a double asterisk. Additional species occurring above 700 m are listed in the appendix. Selected recordings have been deposited with the Library of Natural Sounds (LNS), Cornell University, Ithaca, New York, USA, and specimens have been deposited at the Museo de Vertebrados of the Universidad de Panama, Panama City, Panama (MVUP) and at the American Museum of Natural History (AMNH), New York, USA.

***CHOCÓ TINAMOU** *Crypturellus kerriae*

Occasional at lower elevations. One was tape-recorded at our camp at the mouth of the río Antaral on 9 August 1997, and heard there again on 22 August. The call was also heard at our camp at 680 m on 11 August. The species is otherwise known in Panama from two specimens taken on the Altos de Quía in 1970 (Wetmore & Galindo 1972, Wetmore *et al.* 1984), and from sight records and calls heard above Cana on Cerro Pirre (various observers). On 21 February 1995 P. Phillips (pers. comm.) obtained the wing of one (MVUP 2206) from Embera Indian hunters in the upper valley of the río Jaqué (07° 29'N, 77° 57'W). The species is considered threatened (Vulnerable) at the global level (BirdLife International 2000).

BLACK-AND-WHITE HAWK EAGLE *Spizastur melanoleucus*

One was seen soaring high over the Jungurudó ridgetop on 20 August 1997. The species is rare in Panama and throughout its range. The only previous records from Darién have been from Cana on Cerro Pirre and from the valley of the río Tuirá (Ridgely & Gwynne 1989).

PLUMBEOUS PIGEON *Patagioenas plumbea*

Very common in both lowlands and highlands, and heard calling almost every day. Two birds were tape-recorded (LNS 96086 and 96087) and then collected by shotgun near the base camp on 14 August 1997 (AMNH 834071 and MVUP 2204 respectively). These represent the first specimens from Middle America. Both specimens had pale cream-coloured eyes and grey wing-linings, characteristic of *Patagioenas plumbea* (Gibbs *et al.* 2001). The very similar Short-billed *P. nigrirostris* and Ruddy Pigeons *P. subvinacea* also occur in Darién. However, both have red or reddish eyes. *P. nigrirostris* has dark greyish-brown wing linings, and in *P. subvinacea* they are cinnamon (Gibbs *et al.* 2001).

These birds gave a distinctive three-note call (*whit-mo-go*), sometimes with the third note slurred (*whit-mo-go'o*). The tape-recordings were compared with samples



from South America obtained from the Library of Natural Sounds. They matched closely LNS 72408 from Esmeraldas, Ecuador; LNS 84089 from Pichincha, Ecuador; and LNS 80905 from Cundinamarca, Colombia. However, they differed from LNS 80834 from Cundinamarca, a distinctly four-noted call. According to Gibbs *et al.* (2001), calls of *P. plumbea* are geographically variable. The closest subspecies for which Gibbs *et al.* (2001) described the call, *delicata* of western and central Amazonia, has a three-note call. Gibbs *et al.* (2001) did not provide a description of the call of *chapmani* of western Colombia and Ecuador. The calls of *P. nigrirostris* and *P. subvinacea* are both typically four-noted (Gibbs *et al.* 2001). GRA also heard the call of this species near the headwaters of the río Jaqué, on the southern flanks of the Serranía de Jungurudó, on 15 January 1996.

TABLE 1

Distribution of restricted-range species of the Darién Highlands Endemic Bird Area, and of foothills species of the Darién Lowlands Endemic Bird Area, in the mountains of eastern Darién. 'Pacific' includes the Serranía de Jungurudó and Cerro Sapo. 'Central' includes the Serranía de Pirre and the Altos de Quía. 'Caribbean' includes Cerro Tacarcuna. Range extensions from this study are indicated with an asterisk. Note: Blue-and-gold Tanager *Bangsia arcaei* occurs only in the western part of the Endemic Bird Area.

Species		Pacific	Central	Caribbean
Darién Highlands				
Tacarcuna Wood-quail	<i>Odontophorus dileucos</i>			x
Russet-crowned Quail-dove	<i>Geotrygon goldmani</i>	x	x	x
Bare-shanked Screech-owl	<i>Otus clarkii</i>		x	x
Violet-capped Hummingbird	<i>Goldmania violiceps</i>			x
Rufous-cheeked Hummingbird	<i>Goethalsia bella</i>	x	x	
Beautiful Treerunner	<i>Margarornis bellulus</i>	x*	x	x
Tacarcuna Tapaculo	<i>Scytalopus panamensis</i>			x
Chocó Tapaculo	<i>Scytalopus chochoensis</i>	x*	x	
Ochraceous Wren	<i>Troglodytes ochraceus</i>		x	x
Varied Solitaire	<i>Myadestes coloratus</i>	x*	x	x
Sooty-faced Finch	<i>Lysurus crassirostris</i>			x
Tacarcuna Bush-tanager	<i>Chlorospingus tacarcunae</i>			x
Pirre Bush-tanager	<i>Chlorospingus inornatus</i>	x	x	
Yellow-collared Chlorophonia	<i>Chlorophonia flavirostris</i>		x	
Green-naped Tanager	<i>Tangara fucosa</i>	x*	x	x
Pirre Warbler	<i>Basileuterus ignotus</i>		x	x
Darién Lowlands (foothills species)				
Chocó Tinamou	<i>Crypturellus kerriae</i>	x*	x	
Purplish-backed Quail-dove	<i>Geotrygon lawrencii</i>			x
Stripe-cheeked Woodpecker	<i>Piculus collopiterus</i>	x	x	
Spiny-cheeked Antshrike	<i>Xenornis setifrons</i>			x
Black-crowned Antpitta	<i>Pittasoma michleri</i>	x	x	x
Tawny-capped Euphonia	<i>Euphonia anaeae</i>			x
Black-and-yellow Tanager	<i>Chrysothlypis chrysomelas</i>	x	x	x



The species also occurs on the Serranía de Pirre, where it has apparently been overlooked until recently due to its close similarity to *P. nigrirostris* and *P. subvinacea*. On 2 May 1994 GRA heard several birds calling near the north end of the Pirre range above the town of El Real. On 11 April 1995 GRA, D. & L. Engleman and others observed a bird with cream-coloured eyes calling on the trail above Cana on Cerro Pirre, and several others were heard. On 30 March 2001, GRA saw and tape-recorded a bird with cream-coloured eyes giving a three-note call on the same trail. P. Coopmans (pers. comm.) heard the species commonly in the 600–1,300 m range at Cana between 30 January–9 February 1992, and tape-recorded it on 2 and 6 February (LNS 60300, 60302, 60333, 60336; catalogued as ‘*Columba* species’). Coopmans heard the species subsequently at Cana on trips in December 1994–January 1995, February 1996 and March 1998. G. Rompré (pers. comm.) saw a bird with pale eyes and heard it calling at 550 m near the north end of the Pirre range on 21 April 1995.

We found Short-billed Pigeon to be rare on the Jungurudó, with one heard calling at 300 m on 11 August 1997, and greatly outnumbered by *P. plumbea*. We did not see or hear Ruddy Pigeon.

****RUSSET-CROWNED QUAIL-DOVE** *Geotrygon goldmani*

Common in the highlands near our base camp, recorded almost every day, mostly by voice. This restricted-range species is endemic to the highlands of Darién and eastern Panamá province. It is otherwise known from Cerro Jefe and Cerro Brewster and the Serranía de Majé in eastern Panama province, and in Darién from Cerro Tacarcuna, Cerro Pirre, and Cerro Sapó (Wetmore 1968, Ridgely & Gwynne 1989). The species is considered Near Threatened at the global level (BirdLife International 2000).

CENTRAL AMERICAN PYGMY-OWL *Glaucidium griseiceps*

GRA heard one at the village of El Mamey on the upper río Jaqué on 9 and 15 January 1996, and one was seen and heard at our camp in the lowlands on the río Antaral on 9 and 10 August 1997. This rare to uncommon species is elsewhere known from Darién from the lower Chucunaque River, and from Cana and the lower slopes of Cerro Pirre (Wetmore 1968, Ridgely & Gwynne 1989).

TOOTH-BILLED HUMMINGBIRD *Androdon aequatorialis*

Occasional in the highlands, recorded on 13, 17 and 21 August 1997. One female was collected on 17 August (MVUP 2026). Previously recorded in Panama from Cerro Tacarcuna, Cerro Pirre and Cerro Sapó (Wetmore 1968).

GREEN THORNTAIL *Discosura conversii*

A male was seen by GRA at *c.* 750 m on a ridge above the río Jaqué on 13 January 1996. The species is otherwise known from Darién from near Cana on Cerro Pirre (Wetmore 1968, Ridgely & Gwynne 1989).

****RUFOUS-CHEEKED HUMMINGBIRD** *Goethalsia bella*

Very common in the highlands, recorded every day. A male and a female were collected on 17 August 1997 (MVUP 2209, 2210). One was seen also by GRA on 12 January 1996 at 900 m, above the headwaters of the río Jaqué. This species is endemic to the highlands eastern Darién, being otherwise known from Cerro Pirre and Cerro Sapo (Wetmore 1968, Ridgely & Gwynne 1989). This species is considered Near Threatened at the global level (BirdLife International 2000).

GREENISH PUFFLEG *Haplophaedia aureliae*

Common in the highlands, recorded almost every day. One male was collected on 18 August 1997 (MVUP 2211). Known otherwise in Panama only from Cerro Tacarcuna and Cerro Pirre (Wetmore 1968, Ridgely & Gwynne 1989).

***STRIPE-CHEEKED WOODPECKER** *Piculus collopterus*

Rare in the foothills, recorded on 12 August and on 22 August 1997 at 650 m. Previously recorded from Veraguas; eastern Colón Province; Cerro Azul, Cerro Jefe and Cerro Chucantí in Panamá province; and in Darién from the upper Jaqué Valley and Cerro Pirre (Wetmore 1968, Ridgely & Gwynne 1989).

****BEAUTIFUL TREERUNNER** *Margarornis bellulus*

Uncommon in the highlands, with individuals seen on 15, 19, and 20 August 1997. A female was collected 15 August and a male on 19 August (MVUP 1975, 1976). This Darién Highlands endemic is otherwise known from Cerro Tacarcuna and Cerro Pirre (Wetmore 1972), Altos de Quía (Ridgely & Gwynne 1989) and the Serranía de Majé (Angehr & Christian 2000). The species is considered Near Threatened at the global level (BirdLife International 2000).

SHARP-TAILED STREAMCREEPER *Lochmias nematura*

Rare in the highlands. One was seen in a steep ravine on 15 August 1997 (DGC). Otherwise known in Panama from Cerro Malí (near Cerro Tacarcuna), Cerro Pirre and the Altos de Quía (Wetmore 1972, Ridgely & Gwynne 1989).

***BLACK-CROWNED ANTPITTA** *Pittasoma michleri*

This restricted-range species was rare in the highlands, recorded on 12 and 13 August 1997. It is rare but widespread in the Darién lowlands and foothills (Wetmore 1972, Ridgely & Gwynne 1989).

****CHOCÓ TAPACULO** *Scytalopus chocoensis*

Common in wet ravines in the highlands. A pair was tending a nest with two nestlings within 40 m of our base camp, and these were collected on 19 August 1997 (tape-recorded as LNS 09089 and 09090; AMNH 834072 and 834073). Christian (2001) described the nest and nesting behaviour. In addition, two other adult males were collected, on 16 and 17 August (MVUP 2207, 2208), and a juvenile on 15 August



1997 (LNS 09088, AMNH 834074). Two forms of *Scytalopus* are known from eastern Darién. Two specimens (a male and a female) collected on Cerro Pirre by O. Pearson in 1938 were originally assigned to Nariño Tapaculo *S. viciniior* (Wetmore 1972). In a recent revision, Krabbe & Schulenberg (1997) included the Cerro Pirre birds in a newly described taxon, *S. chocoensis*, whose range extends along the western flank of the Andes in Colombia and Ecuador. *S. chocoensis* males lack facial patterning (Krabbe & Schulenberg 1997). The Pale-throated, or Tacarcuna, Tapaculo *S. panamensis* is endemic to Cerro Tacarcuna. Males have a broad silvery superciliary stripe beginning above and extending behind the eye. The breeding male from the Jungurudó has a faint but definite light grey superciliary stripe and a faint greyish crescent on the cheek. The superciliary stripe is much less distinct than that of *S. panamensis*. The other two male specimens lack any facial patterning. Other males seen on the Jungurudó had traces of a facial pattern. Some male *Scytalopus* on Cerro Pirre also have a trace of a facial pattern (GRA pers. obs.). Calls of the Jungurudó birds closely resemble recordings of *S. chocoensis* provided by N. Krabbe.

BRONZE-OLIVE PYGMY-TYRANT *Pseudotriccus pelzelni*

Rare in the highlands. A pair was observed in cloud forest at c.1,000 m on 20 and 21 August 1997 (DGC). The species is otherwise known in Panama only from Cerro Tacarcuna and Cerro Pirre (Wetmore 1972, Ridgely & Gwynne 1989).

GREEN MANAKIN *Chloropipo holochlora*

Very common in the highlands. In Panama the species occurs from Cerro Brewster in eastern San Blas eastwards, and is rare to uncommon (Ridgely & Gwynne 1989). A nest found on 15 August 1997 was described by Christian (2001).

WHITE-WINGED SWALLOW *Tachycineta albiventer*

A group of seven was seen on the río Sambú (DGC and KMA) during our descent of the river on 25 August 1997. This represents the second report of this species from Panama, the first being by Seutin (1998) on the río Balsas.

SOOTY-HEADED WREN *Thryothorus spadix*

Uncommon in the highlands. Otherwise known in Panama from Cerro Tacarcuna, Cerro Pirre and the Altos de Quía (Wetmore *et al.* 1984, Ridgely & Gwynne 1989).

****VARIED SOLITAIRE** *Myadestes coloratus*

Very common in the highlands. Two males were collected on 17 and 18 August 1997 (MVUP 1979, 1982). This species is endemic to the eastern Darién highlands, otherwise being found on Cerro Tacarcuna and Cerro Pirre (Wetmore *et al.* 1984, Ridgely & Gwynne 1989), and recently discovered on the Serranía de Majé (Angehr & Christian 2000).



GREY-AND-GOLD TANAGER *Tangara palmeri*

Uncommon in the highlands. Otherwise known in Panama from Cerro Tacarcuna, Altos de Quía, Cerro Pirre and Cerro Sapo (Wetmore *et al.* 1984, Ridgely & Gwynne 1989), with recent sightings from Nusagandi in eastern San Blas province (D. Engleman, pers. comm.) and from Cerro Azul in eastern Panama province (W. Adsett & G. Seutin, pers. comm.).

****GREEN-NAPED TANAGER** *Tangara fucosa*

Uncommon in the highlands. A female was collected on 21 August 1997 (MVUP 2212). The nest and nesting behaviour of a pair found on 20 August were described by Christian (2001). The species is endemic to the eastern Darién Highlands, and is otherwise known only from Cerro Malí near Cerro Tacarcuna and Cerro Pirre (Wetmore *et al.* 1984). The species is considered Near Threatened at the global level (BirdLife International 2000).

ORANGE-BELLIED EUPHONIA *Euphonia xanthogaster*

Common in the highlands. Otherwise known in Panama from Cerro Pirre, Altos de Quía, Cerro Sapo and the río Jaqué valley (Wetmore *et al.* 1984, Ridgely & Gwynne 1989).

SCARLET-BROWED TANAGER *Heterospingus xanthopygius*

Rare, one seen at c.700 m on 11 August 1997 (DGC). Known in Panama from the Tuira River valley, Cerro Pirre, Cerro Sapo and the Jaqué River valley (Wetmore *et al.* 1984, Ridgely & Gwynne 1989).

****PIRRE BUSH-TANAGER** *Chlorospingus inornatus*

Very common in the highlands. Endemic to the eastern Darién highlands, and previously recorded only on Cerro Pirre and Cerro Sapo (Wetmore *et al.* 1984, Ridgely & Gwynne 1989). One male was collected on 20 August 1997 (MVUP 1974).

***BLACK-AND-YELLOW TANAGER** *Chrysothlypis chrysomelas*

This restricted-range species was fairly common in the highlands. It is otherwise fairly widely distributed in both western and eastern Panama, and known in Darién from Cerro Tacarcuna, Cerro Pirre, Cerro Sapo and Cerro Quía (Wetmore *et al.* 1984, Ridgely & Gwynne 1989).

STRIPE-HEADED BRUSH-FINCH *Buarremon torquatus*

Two were seen by GRA at 750 m near the headwaters of the río Jaqué on 12 January 1996. This rare to uncommon species is otherwise known from Darién from Cerros Pirre and Tacarcuna (Wetmore *et al.* 1984, Ridgely & Gwynne 1989).

**YELLOW-GREEN GROSBEEK** *Caryothraustes canadensis*

A small flock was seen at 640 m on 22 August 1997. Otherwise known in Panama only from Cerro Pirre (Wetmore *et al.* 1984, Ridgely & Gwynne 1989).

Conclusions

The avifauna of the Serranía de Jungurudó is most similar to that of the nearby Serranía de Pirre, but also shares species with the more distant Cerro Tacarcuna. Of the 11 restricted-range species of the Darién Highlands Endemic Bird Area known to occur on Pirre, we found seven on the Jungurudó (Table 1). Four of these also occur on Cerro Tacarcuna. Except for Russet-crowned Quail-dove, Rufous-cheeked Hummingbird and Pirre Bush-tanager, previously known from Cerro Sapo, these represent the first records from the Pacific ranges of Darién. The species occurring on Pirre that we did not encounter were Bare-shanked Screech-owl *Otus clarki*, Ochraceous Wren *Troglodytes ochraceus*, Pirre Warbler *Basileuterus ignotus* and Yellow-collared Chlorophonia *Chlorophonia flavirostris*. All of these, except the wren, usually occur at higher elevations than we were able to reach on the Jungurudó; the lower elevational limits for these species listed by Ridgely & Gwynne (1989) are 1,080, 750, 1,350 and 1,200 m respectively. Of the seven species of the Darién Lowlands Endemic Bird area that are found primarily in foothills, we found four on the Jungurudó (Table 1); two of these also occur on Cerro Tacarcuna. Of these, the records of Chocó Tinamou are the first for the Pacific ranges.

Many of the new records included here represent a significant expansion in the known ranges of several species that occupy very limited geographical areas. Fortunately, there are grounds for optimism for the conservation of the restricted-range species of the Darién mountains. Most of the highlands, including the Jungurudó, have been legally protected within Darién National Park (579,000 ha), with the exception of the Pacific ranges north of Cerro Sapo. Although clearing for subsistence agriculture and logging are having a severe impact on the lowland forests of Darién, at present the highland areas are still mostly untouched.

Acknowledgments

The expedition of 1997 was supported in part by National Geographic Magazine, and in part by Fundación Natura, Panamá, and was carried out as part of an Important Bird Areas project for Panama, under the auspices of BirdLife International and of Fundación Natura. Daniel Casteñeda ably served as guide and organizer for the trip, and Roberto Ibañez, Tom Horton, Bill Hatcher and Chris MacIntosh provided companionship in the field. C. Kernan and P. Phillips organized the 1996 trip to the río Jaqué. We thank the Emberá people of Boca de Pavarandó and of El Mamey for their hospitality and their assistance. ANAM, Panama's Natural Resources Agency, provided the permits for research and collection. We thank N. Krabbe for providing reference recordings of *Scytalopus* species.

References:

- Angehr, G. R. & Christian, D. G. 2000. An ornithological survey of the Serranía de Majé, an isolated mountain range in eastern Panama. *Bull. Brit. Orn. Cl.* 120: 173–178.
Anthony, H. E. 1923. In the footsteps of Balboa. *Natural History* 23: 312–324.



- Barbour, T. & Brooks, W. S. 1923. The Sapo mountains and the Sambú Valley. A biological reconnaissance in southeastern Panama. *Geographical Review* 8: 221–222.
- BirdLife International. 2000. *Threatened birds of the world*. Lynx Edicions, Barcelona & BirdLife International, Cambridge, UK.
- Bond, J. & Meyer de Schauensee, R. 1944. The birds. Pp. 7–56 in G. Vanderbilt. *Results of the fifth George Vanderbilt expedition (1941)*. Acad. Nat. Sci. Phil. Monogr. No. 6.
- Christian, D. G. 2001. Nests and nesting behavior of some little known Panamanian birds. *Ornitología Neotropical* 12: 327–336.
- Gibbs, D., Barnes, E. & Cox, J. 2001. *Pigeons and doves. A guide to the pigeons and doves of the world*. Yale Univ. Press.
- IGNTG. 1993. Darién (Mapa Especial) 1:250,000. Instituto Geográfico Nacional ‘Tommy Guardia’: Panama City.
- Krabbe, N. & Schulenberg, T. S. 1997. Species limits and natural history of *Scytalopus tapaculos* (Rhinocryptidae), with descriptions of the Ecuadorian taxa, including three new species. Pp. 47–88 in Remsen, J. V., Jr. (ed.) *Studies in Neotropical ornithology honoring Ted Parker*. Orn. Monogr. No. 48.
- Ridgely, R. S. & Gwynne, J. A. 1989. *A guide to the birds of Panama*. Second edition. Princeton Univ. Press.
- Robbins, M. B., Parker, T. A., & Allen, S. E. 1985. The avifauna of Cerro Pirre, Darién, eastern Panama. Pp. 198–232 in Buckley, P. A., Foster, M. S., Morton, E. S., Ridgely, R. S., & Buckley, F. G. (eds.) *Neotropical ornithology*. Orn. Monogr. No. 36.
- Seutin, G. 1998. Two bird species new for Panama and Central America: White-whiskered Hermit *Phaethornis yaruqui* and White-winged Swallow *Tachycineta albiventer*. *Cotinga* 9: 22–23.
- Stattersfield, A. J., Crosby, M. J., Long, A. J. & Wege, D. C. 1998. *Endemic Bird Areas of the world: priorities for biodiversity conservation*. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK.
- Wetmore, A. 1968. *The birds of the Republic of Panama. Part 2. Columbidae (Pigeons) to Picidae (Woodpeckers)*. Smithsonian Institution, Washington D.C.
- Wetmore, A. 1972. *The birds of the Republic of Panama. Part 3. Passeriformes: Dendrocolaptidae (Woodcreepers) to Oxyruncidae (Sharpbills)*. Smithsonian Institution, Washington D.C.
- Wetmore, A., Pasquier, R. F. & Olson, S. L. 1984. *The birds of the Republic of Panama. Part 4. Hirundinidae (Swallows) to Fringillidae (Finches)*. Smithsonian Institution, Washington D.C.
- Wetmore, A. & Galindo, P. 1972. Additions to the birds recorded in Panama. *Proc. Biol. Soc. Wash.* 85: 309–312.

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Appendix. Additional species observed above 700 m on the Serranía de Jungurudó.

Great Tinamou *Tinamus major*, common; Little Tinamou *Crypturellus soui*, rare; Tiny Hawk *Accipiter superciliosus*, rare; White Hawk *Leucopternis albicollis*, occasional; Barred Hawk *Leucopternis princeps*, rare; Black Hawk-eagle *Spizaetus tyrannus*, occasional; Ornate Hawk-eagle *Spizaetus ornatus*, occasional; Barred Forest-falcon *Micrastur ruficollis*, not uncommon; Collared Forest-falcon *Micrastur semitorquatus*, rare; Crested Guan *Penelope purpurascens*, uncommon; Black-eared Wood-quail *Odontophorus melanoleucus*, occasional; Tawny-faced Quail *Rhynchortyx cinctus*, occasional; Ruddy Quail-dove *Geotrygon montana*, fairly common; Vermiculated Screech-owl *Otus guatemalae*, rare; Green Hermit *Phaethornis guy*, very common; Green-crowned Brilliant *Heliodoxa jacula*, common; Collared



Trogon *Trogon collaris*, fairly common; Rufous Motmot *Baryphthengus martii*, rare; Red-headed Barbet *Eubucco bourcierii*, rare; Emerald Toucanet *Aulacorhynchus prasinus*, common; Yellow-eared Toucanet *Selenidera spectabilis*, common; Keel-billed Toucan *Ramphastos sulfuratus*, rare; Cinnamon Woodpecker *Celeus loricatus*, rare; Spotted Barbtail *Premnoplex brunnescens*, fairly common; Slaty-winged Foliage-gleaner *Philydor fuscipennis*, uncommon; Ruddy Foliage-gleaner *Automolus rubiginosus*, uncommon; Plain Xenops *Xenops minutus*, rare; Tawny-throated Leaf-tosser *Sclerurus mexicanus*, rare; Wedge-billed Woodcreeper *Glyphorhynchus spirurus*, rare; Spotted Woodcreeper *Xiphorhynchus erythropygius*, very common; Western Slaty Antshrike *Thamnophilus atrinucha*, uncommon; Russet Antshrike *Thamnistes anabatinus*, uncommon; Plain Antvireo *Dysithamnus mentalis*, uncommon; Checker-throated Antwren *Myrmotherula fulviventris*, rare; Slaty Antwren *Myrmotherula schisticolor*, uncommon; Immaculate Antbird *Myrmeciza immaculata*, uncommon; Bicoloured Antbird *Gymnopithys leucapsis*, rare; Ocellated Antbird *Phaenostictus mcleannani*, rare; Spectacled Antpitta *Hylopezus perspicillatus*, rare; Paltry Tyrannulet *Zimmerius vilissimus*, rare; Olive-striped Flycatcher *Mionectes olivaceus*, very common; Scale-crested Pygmy-tyrant *Lophotriccus pileatus*, very common; White-throated Spadebill *Platyrinchus mystaceus*, common; Ruddy-tailed Flycatcher *Terenotriccus erythrurus*, uncommon; Sulphur-rumped Flycatcher *Myiobius barbatus*, uncommon; Tufted Flycatcher *Mitrephanes phaeocercus*, uncommon; Dusky-capped Flycatcher *Myiarchus tuberculifer*, rare; Thrush-like Schiffornis *Schiffornis turdinus*, common; White-ruffed Manakin *Corapipo altera*, very common; Grey-breasted Wood-wren *Henicorhina leucophrys*, very common; Tawny-faced Gnatwren *Microbates cinereiventris*, common; Slaty-backed Nightingale-thrush *Catharus fuscater*, very common; Pale-vented Thrush *Turdus obsoletus*, uncommon; Slate-throated Redstart *Myioborus miniatus*, common; Buff-rumped Warbler *Basileuterus fulvicauda*, rare; Bananaquit *Coereba flaveola*, common; Emerald Tanager *Tangara florida*, common; Silver-throated Tanager *Tangara icterocephala*, very common; Speckled Tanager *Tangara guttata*, occasional; Bay-headed Tanager *Tangara gyrola*, fairly common; Lemon-spectacled Tanager *Chlorothraupis olivacea*, very common; Hepatic Tanager *Piranga rubra*, rare; Dusky-faced Tanager *Mitrospingus cassinii*, occasional; Slate-coloured Grosbeak *Saltator grossus*, fairly common; Chestnut-capped Brush-finch *Buarremon brunneinucha*, common; Scarlet-rumped Cacique *Cacicus uropygialis*, common.

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The downy young of grey teal (*Anatidae*) with first descriptions of the ducklings of Madagascar Teal *Anas bernieri* and Indonesian Teal *A. gibberifrons*

by H. Glyn Young & Mark Brayshaw

Received 17 April 2003

The grey teal are a group of small (*c.*300–700g) *Anas* dabbling ducks from Madagascar, Asia and Australasia. Grey teal are predominantly tree cavity nesters and, in many places, restricted to mangrove forest and associated wetlands. Modern species in this group are often highly dispersive and it is probable that their ancestors spread along coasts and visited islands throughout the Indian Ocean during the