

Further breeding records from the Ecuadorian Amazonian lowlands

Harold F. Greeney and Rudolphe A. Gelis

Received 3 July 2007; final revision accepted 13 December 2007
Cotinga 29 (2008): 62–68

Presentamos información sobre la reproducción de 54 especies de la Amazonia ecuatoriana, fruto de trabajo de campo en seis localidades distintas. Describimos por primera vez el nido de algunas especies (Ninfa Tijereta *Thalurania furcata* y Mosquerito Bigotillo *Myiobius barbatus*), al tiempo que proveemos nueva información detallada sobre la anidación de otras seis especies. Es importante que se sintetice y analice estos aportes a nuestro conocimiento sobre la ecología reproductiva de las aves amazónicas de modo que comprendamos los mecanismos responsables de la estacionalidad reproductiva.

The past decade has witnessed exponential growth in the field of Ecuadorian ornithology⁵. In particular, since the publication of *Birds of Ecuador*³¹, contributions by various authors have greatly expanded our understanding of the basic breeding ecology of a variety of species^{1,8,9,19,23}. Prior to this, however, the early work of Marchant^{26,27} in south-west Ecuador stood as our most complete picture of Ecuador's breeding avifauna, from a given region. It was not until the late 20th century that further contributions expanded our knowledge of seasonal reproductive patterns, with multiple works, mainly over the last decade, greatly enhancing our understanding^{2,3,10,14,15,18,24,28,29}.

During the past four years, during the course of other field work, we made casual observations on breeding birds at various localities in north-east Ecuador. Here we report 80 observations of 54 species from the lowlands of Amazonian Ecuador. As we did not undertake sustained research at any one location, the records presented below do not strictly reflect breeding seasonality in the region. In conjunction with previous^{10,12,15,17,21} and future contributions, however, these data should help elucidate seasonal patterns of avian reproduction in Ecuador's northern Amazon.

Records are presented in taxonomic order following Ridgely & Greenfield³¹, with detailed accounts followed by a list of other records, using the following abbreviations: 1) for localities: Cuyabeno Faunistic Reserve, 00°02'N 76°12'W (CU), Sacha Lodge, 00°26'S 76°27'W (SL), La Selva Lodge, 00°29'S 76°22'W (LS), Napo Wildlife Center, 00°31'S 76°26'W (NW), Sani Lodge, c.6 km north-east of LS (SA), Tiputini Biodiversity Station, 00°45'S 75°45'W (TB); 2) for breeding activity: active nest of unknown stage (AN), nest building (B), adult carrying material (CM), incubating (I), feeding nestlings (N), feeding fledglings (F) and juvenile-plumaged bird (J).

Species accounts

Pale-vented Pigeon *Columba cayennensis*

On 19 September 2005 at SL, we found two active nests. One contained a partially incubated, all-white egg (35.0 by 25.7 mm) and the second nest, a single young nestling. Both nests were just above water level within partially floating vegetation in an older, regrowing oxbow lake. Both were loose platforms of sticks resting directly on a flat bed of grass and aquatic vegetation. One nest measured 21–25 cm wide by 5–6 cm tall, with a poorly defined cup measuring 10–12 cm wide by 2–3 cm deep. These nests were similar, but placed considerably lower than, nests of the species described from Panama³⁸.

Smooth-billed Ani *Crotophaga ani*

On 20 September 2005 at SL, we found a nest with eight partially incubated, pale, chalky-blue eggs, all of which were scratched or worn in places, revealing the chalky white layer under the blue. Mean egg measurements (\pm SD) were 33.6 (\pm 1.3) by 25.7 (\pm 0.6 mm; range = 31.5–35.7 by 24.7–26.5 mm). The bulky stick nest was lined with several species of thick green leaves (including *Inga*) and was placed 1.8 m up, on top of a cut-off stump with copious new growth obscuring the nest. It measured 19 cm tall by 23 cm wide, with stray sticks poking out making it as wide as 60 cm. Inside the cup was slightly oblong, measuring 12–13 cm wide and 7.5 cm deep. We found a different nest, on 19 September, 3 m up in a vine tangle, and still under construction. All observed nests were similar in construction and placement to those from elsewhere in the species' range^{6,22,35}.

Greater Ani *Crotophaga major*

On 26 March 2006 at NW, we found a nest containing four nestlings at the edge of a small stream, 1.5 m above the water. We observed the nest for nearly one hour, during which time at least three adults provisioned the nestlings. We

identified three prey items, a lichen-mimic mantid, a large spider and a treefrog (*Hyla* sp.). The nest we observed, as well as the communal breeding activity of this species, was similar to that described from elsewhere in its broad range^{38–40}.

Hoatzin *Opisthocomus hoazin*

At SA, we discovered several nests. On 8 January 2005 a nest, 2.5 m above the water in a 4-m tall shrub-like tree, contained two eggs measuring 52.6 by 36.9 and 51.1 by 36.8 mm. On 18 January 2005 another nest, 2.5 m above the water and well shaded by *Monotrichardia* sp. (Araceae) leaves, contained one nestling with pin feathers not breaking their sheaths, and c.15 mm long. One adult brooded the chick, which was fairly agile at climbing sticks but did not jump from the nest on our approach.

At LS, on 20 May 2002, we observed an adult *O. hoazin* sheltering a fledgling under its wing, several metres from a nest. Subsequently, on 22 June 2005, a nest 4 m up in a *Cassipourea* sp. (Rhizophoraceae) tree contained two eggs which were incubated by both adults. While incubating, both adults occasionally stood, leaned into the nest, and vibrated their neck and head in the manner described previously as rapid probing^{15,20}. Like other species with large, loose, predominantly stick nests^{13,16,17}, we feel that the function of this movement in this species is probably the testing and strengthening of nest architectural integrity.

At SL we also found several nests around the main oxbow lake (Pilchecocha). On 25 March 2006 we observed an adult covering two half-grown nestlings during a morning rain shower. Subsequently, on 13 January 2007, we observed two nests, each with two nestlings, 2.7 m and 3.5 m above the lake.

At NW, on 26–30 March 2006, we found two additional nests, one with two eggs and the other with two nestlings. At least two pairs were also seen moving with young fledglings during this period. At CU, on 29 August 2003, we also observed adults with a dependent fledgling. In combination, these records suggest most breeding in north-east Ecuador occurs in December to July, the wetter months in this area. Similarly, records from Venezuela suggest wet-season breeding in that country^{5,30}.

Black-bellied Thorntail *Popelairia langsdorffi*

On 13 September 2003 at SA, we discovered a female *P. langsdorffi* on a small, neat, lichen-encrusted cup nest, saddled over a small branch near the outer crown of a large *Ceiba* sp. tree, 5 m below the crown of the c.40 m tall tree. When returning to the nest, the female appeared to have a preferred perch, which was regularly used prior to approaching. Before returning, we once observed

the bird hovering near a social spider colony, appearing to either gather webs or to consume small insects/spiders. During the approach the female generally hovered 20–40 cm from the nest, for up to 30 seconds, changing position while maintaining orientation towards the nest. During a total of four hours of observation over the next two days, generally in the morning and evening, the bird's behaviour suggested that it was still incubating. Mean duration of attendance bouts (\pm SD; $n=7$; range 3.0–56 minutes) was 22 ± 19 minutes. Periods of absence ($n=8$) were of 1–31 minutes and averaged 10.5 ± 10 minutes. Upon the female's arrival at 09h25 on 15 September, she paused at the rim and fed the nestlings out of sight inside the nest. Subsequently, on 15 September, and again on the morning of 17 September, the female continued to perch on the nest for periods ($n=5$) ranging from 3–24 minutes (mean 16 ± 8.8 minutes). Periods of absence ($n=5$) lasted 3–26 minutes (mean 10.8 ± 9.5 minutes). In total, the eggs were covered 65% of the observed incubation period, and brooded nestling(s) were covered 61% of the time. In addition to the observations above, on 21 September 2005 at SL, we found a female building a nest in a situation nearly identical to that described above. Whilst these nests are considerably higher than nests described from Brazil³², it is probable that many canopy nests are overlooked and that the species regularly breeds in the canopy.

Fork-tailed Woodnymph *Thalurania furcata*

On 21 September 2005 at SL, we found a nest with a female incubating two pure white, undeveloped eggs (Fig. 1). They measured 12.9 by 8.8 and 13.0 by 8.9 mm. The nest was 90 cm above a small stream draining an oxbow lake. It saddled a $>45^\circ$ angled branch, making the nest wedge-shaped in profile. The main support branch was 8 mm in diameter, and an additional 6 mm diameter horizontal side branch supported the base of the nest. It was a tiny cup constructed almost entirely of seed down of at least two types, one pale, the other pale brown, and bound together and to the branch with spiderwebs. The nest was rather untidy, with seed down hanging below the nest up to 6 cm, and a few pieces of lichen pasted to the outside (Fig. 2). It measured 40 mm wide outside, with an inner cup of 23 mm wide by 20 mm deep. Outside, due to the extreme angle of the thin supporting branch, the nest was 46 mm tall distally (in relation to the supporting branch) but only 9 mm tall proximally.

While videotaping the nest we made two remarkable observations. The first was that always on returning to the nest the female brought a bit of material or spiderweb. After settling onto the eggs the bird added the material by thrusting the bill rapidly in and out of the nest lining (or rim), in a sewing machine-like fashion, presumably inter-

weaving the fibres or spreading web through the structure of the nest. Whilst such behavior has been described for other Neotropical birds (see Greeney *et al.*¹⁶ for summary), its function is obscure. In this case, at least, the movement is obviously used for building or firming the nest, as described for a guan, a heron and Long-wattled Umbrellabird *Cephalopterus penduliger*^{13,16,17}. Finally, c.20 minutes before we returned to collect the camera, numerous *Dolichoderus* ants (not army ants) moved down the branch onto the nest. The female flew from the nest and began flicking ants from the branch and nest with her bill. She continued to do so, occasionally perching on the rim briefly, while increasing numbers of ants entered the nest. The female left only when we returned to retrieve the camera, having removed more than 25 ants. Next day, however, the female was incubating and the nest and eggs appeared unharmed. Similar dedicated nest defence against ants has previously been documented for a manakin¹¹ and an antpitta³⁶, but we are unaware of any other published reports of hummingbirds doing so.

We observed a nest at which the second and final egg was laid on 29 August 2003, at TB. This nest was sited 1.8 m above ground in a 4-m tall Solanaceae tree, 2.5 m from the forest edge and 4 m from inhabited cabins. It was saddled over a narrow (8 mm diameter) branch, at the point where it branched laterally (5 mm diameter branch), and was 10 cm below a small social spider (*Anelosimus eximus*) colony. The inner cup measured 19 mm wide by 18 mm deep. Outside the nest was 41 mm wide and, due to the sloping support, 16 mm tall on one side and 32 mm tall on the other. On 28 August, the single, undeveloped, immaculate white egg in the nest measured 13.2 × 19.2 mm. This nest eventually failed when the spider colony expanded and prohibited the female from returning to cover the eggs.

Both nests described above were neat cups of white and pale brown seed down, generally with white down inside and darker down covering the outside. They were both saddled over narrow, down-sloping branches, and were decorated with few or no lichens on the outside. This appears to be the first detailed description, from South America³⁶, of the nest and eggs of this fairly widespread species, which is similar to nests described for other *Thalurania*³³.

Whiskered Flycatcher *Myiobius barbatus*

The first nest was discovered on 26 August 2003, at TB, where we observed apparently only one adult incubating two eggs. The nest was suspended from the tip of a small rootlet, 2.6 m over a small stream in *terra firme* forest. The eggs were white with heavy dark red and lavender flecking and blotching, forming an indistinct ring at the larger

end. They measured 17.9 by 13.7 and 18.2 by 13.7 mm. On 27 August, we filmed the nest from 06h00 to 18h00 and on 28 August from 08h30 to 18h00. The eggs were covered 54% of the observation period, during bouts of 14.5–42.2 minutes (mean ± SD = 27.5 ± 7.1 minutes). Only one adult was ever observed nearby at one time. It approached the nest, perching 2–3 m away, then flying directly to the nest. On all five occasions we approached the nest, the adult was incubating with its head into the nest and tail sticking out.

A second nest was found on 23 June 2005, at NW, suspended from the tip of a branch, 1.1 m over a small stream in *terra firme*. It contained a single, undeveloped egg, cold and 'slimy' as is often the case for newly laid eggs (HFG pers. obs.). The egg measured 18.0 by 12.7 mm, and was marked as previously described.

Both nests were constructed almost exclusively of dark fungal rhizomorphs and rootlets, with much incidentally attached material, including dead leaves and sticks. Each had a thin lining of long thin, pale fibres. Both were teardrop-shaped, with a distinctly hooded side entrance, and included a substantial 'tail' below the nest, as well as an upwards extension of material twisted around the attachment point. Measurements of the first nest (Fig. 3) were: outside height 15 cm, plus 30 cm of 'tail' and 60 cm of material wrapped above the nest; outside width 8.5 cm; outside front to back (including hood) 16.5 cm; entrance 'hood' 9.5 cm of overhang; entrance 4 wide by 4.5 cm tall; inner chamber 4.5 cm wide by 6 cm high; cup 2 cm deep.

Whilst nests of the formerly conspecific Sulphur-rumped Flycatcher *M. sulphureipygius* are well described³⁶, this appears to be the first complete nest description for *M. barbatus*. Nest form and eggs appear similar, though both nests of *barbatus* were 'tidier' than that depicted by Skutch³⁶. Additionally, both were generally longer and thinner, including more material twisted above the attachment point and more hanging below the nest. Also, the eggs of *barbatus* were distinctly marked with dark red and lavender, not the 'brown' described by Skutch³⁶. Incubation patterns described for *M. sulphureipygius* (47.5% daylight hours on the nest) were also similar, but mean on-bout length (14.1 minutes) was notably shorter.

Velvet-fronted Grackle *Lamprospira tanagrinus*

On 14 September 2003, at SA, we found a hanging basket-like nest of this species constructed almost entirely of long fibrous roots. It was 16 cm wide and 28 cm tall outside, with several roots dangling over 80 cm below the nest, which was suspended over a narrow (5-m wide) black-water stream and attached to the tip of a 1.5-m long branch of a 3-m tall *Inga* sp. (Mimosaceae) tree. The surrounding area was seasonally inundated with water from the



Figure 1. Completed clutch of Fork-tailed Woodnymph *Thalurania furcata*, Sacha Lodge, prov. Sucumbios, Ecuador, 21 September 2005 (Harold F. Greeney)



Figure 2. Nest of Fork-tailed Woodnymph *Thalurania furcata*, Sacha Lodge, prov. Sucumbios, Ecuador, 21 September 2005 (Harold F. Greeney)

nearby río Napo and had a c.15 m canopy dominated by *Inga*, *Bactris* (Palmae) and *Cassipourea* (Rhizophoraceae) trees. At 06h45 four individuals were around the nest: two tugging on a single stringy fibre, while a third brought additional roots to the nest and a fourth was nearby calling. Several days later we observed at least five adults within 50 m of the nest, but saw none visiting it. The nest of this species has only recently been described²⁵, but almost nothing else has been published on its breeding except for another nest reported from Guyana³⁷.

Additional records

Great Tinamou *Tinamus major*, 19 January 2003, LS (I); **Double-toothed Kite** *Harpagus bidentatus*, 15 September 2003, SA (B, both adults



Figure 3. Nest of Whiskered Flycatcher *Myiobius barbatus*, Tiputini Biodiversity Research Station, prov. Orellana, Ecuador, 26 August 2003 (Harold F. Greeney)



Figure 4. Adult Bare-necked Fruitcrow *Gymnoderus foetidus* brooding a single nestling, Sacha Lodge, prov. Sucumbios, Ecuador, 24 March 2006 (Murray Cooper)

building, 30 m up in *Ceiba* sp., c.10 from main trunk in canopy); 20 September 2005, SL (presumed I, sitting constantly, 25 m up); **Speckled Chachalaca** *Ortalis guttata*, 12 January 2007, SL (F); **Grey-necked Wood Rail** *Aramides cajanea*, 23 March 2006, SL (I, two eggs, nest 1.5 m above

ground on broken trunk, in dense understorey at border between clearing and old second-growth *terra firme* forest with little standing water); **Blue-headed Parrot** *Pionus menstruus*, 18 January 2003, NW (J); **Great-billed Hermit** *Phaethornis malaris*, 5 September 2002, TB (I, two eggs); 6 August 2005, SL (N, two c.10 day-old nestlings, 1.2 m up in 3-m tall *Phytelephas* sp. palm in primary *terra firme* forest, total nest length 210 mm, cup inside width 30 mm, outside width 70 mm, cup depth 40 mm); **Straight-billed Hermit** *P. bourcieri*, 28 August 2003, TB (I); **Buff-tailed Sicklebill** *Eutoxeres condamini* 26 March 2006, NW (I, two eggs, nest on spiny palm frond 1 m above small black-water stream); **Amazonian White-tailed Trogon** *Trogon viridis*, 21 September 2005, SL (B, male excavating termitarium); **Ringed Kingfisher** *Megaceryle torquata*, 30 August 2003, CU (N); **Amazon Kingfisher** *Chloroceryle amazona*, 30 August 2003, CU (N); **Great Jacamar** *Jacamerops aureus*, 28 August 2003, TB (AN, 8 m up in termitarium); **Many-banded Aracari** *Pteroglossus pluricinctus*, 13 January 2007, SL (F, fed Lauraceae fruit by adult); **White-throated Toucan** *Ramphastos tucanus*, 12 January 2007, SL (N, 30 m up in dead tree, adult feeding large tarantula (Theraphosidae) to nestlings); **Chestnut Woodpecker** *Celeus elegans*, 28 March 2006, NW (N, 3.5 m up beside black-water stream); **Cream-coloured Woodpecker** *C. flavus*, 25 March 2006, SL, (B, pair excavating 4 m up in dead trunk, 5 m from a black-water stream); **Lineated Woodpecker** *Dryocopus lineatus*, 27 September 2003, LS (AN); **Yellow-tufted Woodpecker** *Melanerpes cruentatus*, 27 September 2003, LS (B, excavating in live *Inga* tree); **Crimson-crested Woodpecker** *Campephilus melanoleucos*, 28 March 2006, NW (B, excavating 4 m up in 6-m tall trunk beside black-water stream); **Wedge-billed Woodcreeper** *Glyphorhynchus spirurus*, 8 January 2006, SA (I, two eggs, nest cavity entrance c.80 cm above ground in dead tree of c.10 cm dbh, in *terra firme* near swampy forest); **Spotted Woodcreeper** *Xiphorhynchus erythropygius*, 28 September 2003, LS (N); **Slender-footed Tyrannulet** *Zimmerius gracilipes*, SL (B, 35 m up in *Ceiba* sp.); **Yellow-browed Tody-Flycatcher** *Todirostrum chrysocrotaphum*, 19 September 2005, SL (AN, 35 m up, no nearby wasp nest); 13 January 2007, SL (B, same tree as previous nest, 75 cm from vespid wasp nest); **Drab Water Tyrant** *Ochthornis littoralis*, 20 September 2005, SL (N, two nestlings); **Great Kiskadee** *Pitangus sulphuratus*, 21 January 2003, LS (N, older); 18 January 2005, SA (N, three nestlings, 2 m up); **Social Flycatcher** *Myiozetetes similis*, 18 January 2005, SA (I, three eggs measuring 16.1 × 22.7, 15.3 × 23.0 and 15.6 × 23.0 mm, nest 1.5 m above water in flooded forest

around lake); **Grey-capped Flycatcher** *M. granadensis*, 20 September 2005, SL (AN, 20 m up in *Cecropia*); 12 January 2007 SL (N, 8 m up, 1 m from vespid wasp nest); **White-winged Becard** *Pachyramphus polychopterus*, 14 January 2007, SL (AN); **Pink-throated Becard** *Platypsaris minor*, 5 June 2005, SL (B, female bringing material to nest 30 m up in palm infructescence, within 1 m of old nest presumed to be same species, male singing nearby, nest in primary *terra firme*); **Black-tailed Tityra** *Tityra cayana*, 18 January 2005, SA (B, pair carrying dead dicot leaves to hole c.10 m above ground in 15-m tall dead *Iriarteia deltoidea* (Palmae) trunk, two visits during one hour, spending little time in cavity); **Bare-necked Fruitcrow** *Gymnoderus foetidus*, 24 March 2006, SL (N, nest with young nestling barely visible over rim of tiny nest composed mostly of white fungus-coated twigs, 40 m up in thin crown branches of *Ceiba* sp. (Bombacaceae) (Fig. 4); **Black-billed Thrush** *Turdus ignobilis*, 20 January 2005, NW (I, two eggs, nest 1.5 m above ground, on dock at river edge); **Grey-breasted Martin** *Progne chalybea*, 14 January 2005, TB (N, four newly hatched nestlings, nest 2 m above water in large, partly submerged trunk 4 m above water, cavity untidily lined with vegetation); **White-winged Swallow** *Tachycineta albiventer*, 28 September 2003, LS (N); **Purple Honeycreeper** *Cyanerpes caeruleus*, 19 September 2005, SL (F); **Green Honeycreeper** *Chlorophanes spiza*, 19 September 2005, SL (F); **White-lored Euphonia** *Euphonia chrysopasta*, 6 August 2005, SL (B, 35 m up in epiphyte clump, on 19 September contained nestlings); 13 January 2007, SL (AN, at same location as previous nest); **Orange-bellied Euphonia** *E. xanthogaster*, 21 September 2005, SL (B); **White-vented Euphonia** *E. minuta*, 6 August 2005, SL (B, pair building 35 m above ground); **Rufous-bellied Euphonia** *E. rufiventris*, 3 September 2002, TB (F); **Blue-grey Tanager** *Thraupis episcopus*, 12 January 2007, SL (N, two nestlings 3.5 m up in sheltered epiphyte clump beside river); **Palm Tanager** *T. palmarum*, 14 January 2007, SL (B, 5.5 m up in sheltered eaves of building); **Red-capped Cardinal** *Paroaria gularis*, 27 September 2003, LS (CM); 13 January 2007, SL (N, just hatching); **Yellow-rumped Cacique** *Cacicus cela*, 23 January 2003, LS (active colony, most with nestlings); 14 September 2003, SL (active colony, most building); **Russet-backed Oropendola** *Psarocolius angustifrons*, 10 September 2002, CU (B); 20 January 2005, SL (two active colonies of c.10 and 20 nests, both with nests in all stages); 20 September 2005, SL (B); **Olive Oropendola** *P. yuracares*, 23 January 2003, LS (AN).

Each year we witness the continued degradation of the natural world, with the destruction of tropical forests continuing at

unprecedented rates⁴. Loss of tropical habitats continues unparalleled, yet conservationists find even their best laid plans thwarted by a flawed and patchy understanding of basic natural phenomena. Such aspects of tropical forest ecology as breeding seasonality, habitat use and trophic interactions remain largely undescribed for most areas in the Neotropics. Dedicated contributors to rectifying this dearth of information, such as our friend Paul Coopmans, have made major headway into ameliorating this problem, especially in the past few decades. Paul's vast knowledge and unique understanding of bird vocalisations, in particular, have set the precedent for future research into a variety of important aspects of avian ecology. Future generations will stand on the shoulders of work such as his, as we strive to understand patterns of avian speciation, biogeography, mating systems and social interactions. His contributions, leadership and friendship will be sorely missed.

We hope this small contribution to our understanding of west Amazonian avian breeding ecology will serve as a motivation for others to contribute to our growing knowledge, permitting us to move forward towards our common conservation goals. The sharing of such baseline natural history data is fundamental to the direction of future research and the development of sound conservation practices. With the growing amount of data available on avian breeding in north-east Ecuador^{10,12,15,17,21}, we suggest that a review and synthesis, beyond the scope of this paper, would be a timely addition. In particular, it would be useful to analyse data on habitat use, mating systems, nest type, feeding guilds and foraging ecology of the many species for which we now have data. These data, though lacking for many species, may provide useful insights into the mechanisms driving reproductive seasonality, especially when compared to seasonal variation in the abundance of key resources such as insects, flowers and fruits.

Acknowledgements

We are greatly indebted to the owners and staff of the various lodges that offered us hospitality during our work. We also thank the many members of the Sani Isla, Pilche and Añangu communities who showed us nests and helped us in the field. The field work of HFG is supported in part by Field Guides Inc., the Maryland Audubon Society, and John V. & the late Ruth Ann Moore. We also thank Tom Walla, Jay Peltz, Tim Metz and the PBNHS for their ongoing support. Juan Freile, Brandt Ryder and an anonymous referee reviewed the manuscript and provided several insightful comments. Juan also provided the Spanish abstract. This is publication no. 116 of the Yanayacu Natural History Research Group.

References

- Athanas, N. & Davis, J. (2004) Breeding biology of the White-faced Nunbird *Hapaloptila castanea* in Ecuador. *Cotinga* 22: 42–45.
- Best, B. J., Checker, M., Thewlis, R. M., Broom, A. L. & Duckworth, W. (1996) New bird breeding data from southwestern Ecuador. *Orn. Neotrop.* 7: 69–73.
- Best, B. J., Clarke, C. T., Checker, M., Broom, A. L., Thewlis, R. M., Duckworth, W. & McNab, A. (1993) Distributional records, natural history notes, and conservation of some poorly known birds from southwestern Ecuador and northwestern Peru. *Bull. Brit. Orn. Club* 113: 108–119, 234–255.
- Bowles, I. A., Rice, R. E., Mittermeir, R. A. & da Fonseca, G. A. B. (1998) Logging and tropical forest conservation. *Science* 280: 1899–1900.
- Cherrie, G. K. (1916) A contribution to the ornithology of the Orinoco region. *Brooklyn Inst. Arts & Sci. Mus. Bull.* 2: 133–374.
- French, R. (1991) *A guide to the birds of Trinidad and Tobago*. Second edn. Ithaca, NY: Cornell University Press.
- Freile, J. F., Carrión, J. M., Prieto-Albuja, F., Suárez, L. & Ortiz-Crespo, F. (2006) La ornitología en Ecuador: un análisis del estado actual del conocimiento y sugerencias para prioridades de investigación. *Orn. Neotrop.* 17: 183–202.
- Freile, J. F. & Renjifo, L. M. (2003) First nesting records of the Moustached Antpitta (*Grallaria alleni*). *Wilson Bull.* 115: 11–15.
- Gelis, R. A., Greeney, H. F., Cooper, M. & Dingle, C. (2006) The nest, eggs, nestlings and fledglings of Fiery-throated Fruiteater *Pipreola chlorolepidota* in north-east Ecuador. *Cotinga* 26: 10–12.
- Greeney, H. F. (1999) Ecuadorian birds: some nesting records and egg descriptions. *Avicult. Mag.* 105: 127–129.
- Greeney, H. F. (2006) A Blue-crowned Manakin *Lepidothrix coronata* successfully defends its nest from *Labidus* army ants. *Cotinga* 25: 85–86.
- Greeney, H. F. (2007) Observations on the nesting of Spot-backed Antbird (*Hylophylax naevia*) in eastern Ecuador. *Orn. Neotrop.* 18: 301–303.
- Greeney, H. F. & Erazo M., S. L. (2005) A nest of the Sickie-winged Guan *Chamaepetes goudotii tschudii* in eastern Ecuador. *Bull. Cracid Spec. Group* 21: 38–46.
- Greeney, H. F. & Gelis, R. A. (2007) Breeding records from the north-east Andean foothills of Ecuador. *Bull. Brit. Orn. Club* 127: 236–241.
- Greeney, H. F., Gelis, R. A. & White, R. (2004) Notes on breeding birds from an Ecuadorian lowland forest. *Bull. Brit. Orn. Club* 124: 28–37.
- Greeney, H. F., McLean, A., Bucker, A. D. L., Gelis, R. A., Cabrera, D. & Sornoza, F. (2006) Nesting biology of the Long-wattled Umbrellabird (*Cephalopterus penduliger*). Part 1: incubation. *Orn. Neotrop.* 17: 395–401.
- Greeney, H. F. & Merino M., P. A. (2006) Notes on breeding birds from the Cuyabeno Faunistic

- Reserve in north eastern Ecuador. *Bol. Soc. Antioqueña Orn.* 16: 46–54.
18. Greeney, H. F. & Nunnery, T. (2006) Notes on the breeding of north-west Ecuadorian birds. *Bull. Brit. Orn. Club* 126: 38–45.
 19. Greeney, H. F. & Wetherwax, P. B. (2005) Brooding behaviour and nestling growth of the Lyre-tailed Nightjar *Uropsalis lyra*. *Cotinga* 23: 44–47.
 20. Haftorn, S. (1994) The act of tremble-thrusting in tit nests, performance and possible functions. *Fauna Norv. Ser. C, Cinclus* 17: 55–74.
 21. Hill, R. & Greeney, H. F. (2000) Ecuadorian birds: nesting records and egg descriptions from a lowland rainforest. *Avicult. Mag.* 106: 49–53.
 22. Hilty, S. L. & Brown, W. L. (1986) *A guide to the birds of Colombia*. Princeton, NJ: Princeton University Press.
 23. Karubian, J., Castañeda, G., Freile, J. F., Salazar, R. T., Santander, T. & Smith, T. B. (2003) Nesting biology of a female Long-wattled Umbrellabird *Cephalopterus penduliger* in northwestern Ecuador. *Bird Conserv. Intern.* 13: 351–360.
 24. Kiff, L. F., Marín, A. M., Sibley, F. C., Matheus, J. C. & Schmitt, N. J. (1989) Notes on the nests and eggs of some Ecuadorian birds. *Bull. Brit. Orn. Club* 109: 25–31.
 25. Maillard Z., O. & Herrera, M. (2007) El nido y huevos del tortolito (*Lamprosar tanagrinus*) en el noreste de Bolivia. *Kempffiana* 3: 25–27.
 26. Marchant, S. (1959) The breeding season in S. W. Ecuador. *Ibis* 101: 137–187.
 27. Marchant, S. (1960) The breeding of some south-western Ecuadorian birds. *Ibis* 102: 349–382, 584–599.
 28. Marín, M. & Carrión B., J. M. (1991) Nests and eggs of some Ecuadorian birds. *Orn. Neotrop.* 2: 44–46.
 29. Marín, M. & Carrión B., J. M. (1994) Additional notes on nests and eggs of some Ecuadorian birds. *Orn. Neotrop.* 5: 121–124.
 30. Ramo, C. & Busto, B. (1984) La Chenchena (*Opisthocomus hoazin*): algunos datos sobre su nidificación en Venezuela. *Biotropica* 16: 330–331.
 31. Ridgely, R. S. & Greenfield, P. J. (2001) *The birds of Ecuador*. Ithaca, NY: Cornell University Press.
 32. Ruschi, A. (1973) *Beija-flores*. Santa Teresa: Museu Biol. Prof. Mello Leitão.
 33. Schuchmann, K.-L. (1999) Family Trochilidae (hummingbirds). In: del Hoyo, J., Elliott, A. & Sargatal, J. (eds.) *Handbook of the birds of the world*, 5. Barcelona: Lynx Edicions.
 34. Skutch, A. F. (1960) *Life histories of Central American birds*, 2. Pacific Coast Avifauna 34. Berkeley, CA: Cooper Orn. Soc.
 35. Skutch, A. F. (1966) Life history notes on three tropical American cuckoos. *Wilson Bull.* 78: 139–165.
 36. Skutch, A. F. (1981) *New studies of tropical American birds*. Publ. Nuttall Orn. Club 19. Cambridge, MA: Nuttall Orn. Club.
 37. Snyder, D. E. (1966) *The birds of Guyana*. Salem, MA: Peabody Museum.
 38. Wetmore, A. (1968) *Birds of the Republic of Panama*, 2. Washington DC: Smithsonian Institution Press.
 39. Willis, E. O. & Eisenmann, E. (1979) A revised list of birds of Barro Colorado Island, Panama. *Smiths. Contrib. Zool.* 291: 1–31.
 40. Young, C. G. (1925) Notes on the nests and eggs of some British Guiana birds. *Ibis* 67: 465–475.

Harold F. Greeney and Rudolphe A. Gelis

Yanayacu Biological Station & Center for Creative Studies, Cosanga, Napo, Ecuador; c/o 721 Foch y Amazonas, Quito, Ecuador. E-mail: revmoss@yahoo.com.