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AVIFAUNAL SURVEY OF THE RÍO CHIPAOTA VALLEY IN THE CORDILLERA AZUL REGION, SAN MARTÍN, PERU

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Resumen. – Avifauna del Valle del Río Chipaota en la Región de la Cordillera Azul, San Martín, Perú. – Se presentan los resultados de estudios ornitológicos desde 2002 hasta 2007 en y alrededor del Valle del Río Chipaota en el sureste del departamento de San Martín, el Perú, un bosque húmedo moderadamente perturbada de tierras bajas y bosques montanos con bosque pequeño en el crecimiento de los cerros adyacentes. Encontramos un total de 355 especies. Nuestros registros representan extensiones de rango para *Heliodoxa branickii*, *Myiornis albiventris*, *Basileuterus chrysogaster*, y *Psarocolius viridis*, y nuevos sitios para algunas especies raras o con rangos restringidos, incluyendo *Heliangelus regalis*, *Platyrinchus flavigularis*, *Myiophobus roraimae*, *Contopus nigrescens*, y la población andina de *Machaeropterus regulus aureopectus*. La lista compuesta proporciona datos de referencia sobre las comunidades de aves en la zona de amortiguamiento del Parque Nacional Cordillera Azul, una zona que se ha recibido recientemente de altas tasas de crecimiento de la población humana, deforestación, y la caza. En comparación con áreas vecinas en el interior del parque, las especies grandes de Cracidae y Psittacidae ya brilla por su ausencia, mientras que en general la diversidad de aves sigue siendo alta.

Abstract. – We present the results of ornithological surveys from 2002 to 2007 in and around the Chipaota Valley in southeastern San Martín Department, Peru, a moderately disturbed humid lowland and lower montane forest with stunted forest on adjacent ridges. These surveys yielded a total of 355 species. Our records represent range extensions for *Heliodoxa branickii*, *Myiornis albiventris, Basileuterus chrysogaster,* and *Psarocolius viridis*, and additional sites for some rare or range-restricted species including *Heliangelus regalis*, *Platyrinchus flavigularis*, *Myiophobus roraimae*, *Contopus nigrescens*, and the Andean population of *Machaeropterus regulus aureopectus*. The composite list provides baseline data on the bird communities in the buffer zone of the Parque Nacional Cordillera Azul, an area recently subject to high rates of human population growth, deforestation, and hunting. Compared to neighboring areas inside the park, species of large Cracidae and Psittacidae were conspicuously absent while overall bird diversity remained high. *Accepted 25 September 2009.*

Key Words: Bird survey, buffer zone, Cordillera Azul, San Martín.

INTRODUCTION

The Cordillera Azul is one of a series of low mountain ranges in northern Peru that lie in the extreme western part of the Amazon basin but east of the main Andean cordillera.

These outlying Andean ranges are young and tectonically active, and they create gradients in elevation, rainfall, and soil types that contribute to habitat diversity in this biologically diverse region. A large section of the Cordillera Azul lies between the Huallaga and Ucayali rivers in the departments of San Martín and Loreto. This area is of great interest to avian biogeography because certain lowland taxa that are typically found north of the main Amazon tributaries extend their distributions southward along the margin of the Andes (see Haffer 1978). Furthermore, the region contains several recently described, rare, or narrowly distributed bird species (Fitzpatrick *et al.* 1977, O'Neill & Graves 1977, Fitzpatrick *et al.* 1979, O'Neill *et al.* 2000, Schulenberg *et al.* 2001). This area is also of great conservation interest because it includes large expanses of ecologically intact lowland and foothill forest. The Parque Nacional Cordillera Azul, established in 2001, seeks to protect a large expanse of wilderness in the northern Cordillera Azul. The flora and fauna of remote forested regions encompassed by the park were subject to extensive bird surveys in 1996 and 2000 by teams of researchers from the Field Museum of Natural History (FMNH) and the Louisiana State University Museum of Natural Science (LSUMZ) and Museo de Historia Natural de la Universidad Nacional Mayor de San Marcos (MUSM), the results of which were summarized by Alverson *et al.* (2001).

Here we present the results of an avifaunal survey of the Chipaota Valley, which lies near the eastern border of the Department of San Martín, about 35 km southeast of Tarapoto.

The objectives of this survey were (1) to provide a baseline list of resident birds in a valley not previously surveyed and neighboring ridges in the park's buffer zone; (2) to provide a snapshot of the avifauna at a time of accelerating colonization and deforestation; and (3) to provide a comparison with surveys of more pristine sites that lie within the park boundaries.

METHODS

Site description. The Chipaota Valley is defined by the Río Chipaota, a tributary of the east-flowing Río Huallaga, and two flanking ridges (Fig. 1). The lower eastern ridge approximately follows the boundary of the Parque Nacional Cordillera Azul, which lies to the east and southeast. The taller western ridge, called the Cordillera Vaquero, separates the Chipaota Valley from the Laguna Azul and the lakeside town of Sauce. The area between the Río Huallaga and the eastern ridge, including all of Sauce, the Cordillera Vaquero, and the Chipaota Valley, is part of the buffer zone for the national park. Access to the valley is on foot via the towns of Chasuta or Sauce.

The valley transitions from humid lowland forests along Río Huallaga (150 m a.s.l.) to montane forests and patches of stunted forest and scrub on ridges of the Cordillera Vaquero (1000–1700 m a.s.l.). Patches of selectively logged forest, second growth forest, and agricultural areas create a mosaic of habitats in some areas. At least two lakes provide additional habitat variability: the large Laguna Azul to the west of the Cordillera Vaquero, and a small lake in the Chipaota Valley (Fig. 1).

The Chipaota Valley has been subject to considerably more anthropogenic disturbance and habitat conversion than more remote areas encompassed by the park. The areas close to the Río Huallaga have a long history of human occupation. For example, native peoples of the Lamista or Motilon tribe were "civilized" by Franciscan monks at Chasuta in the year 1676, but retained "the mode of life of the wild hunting Indians"

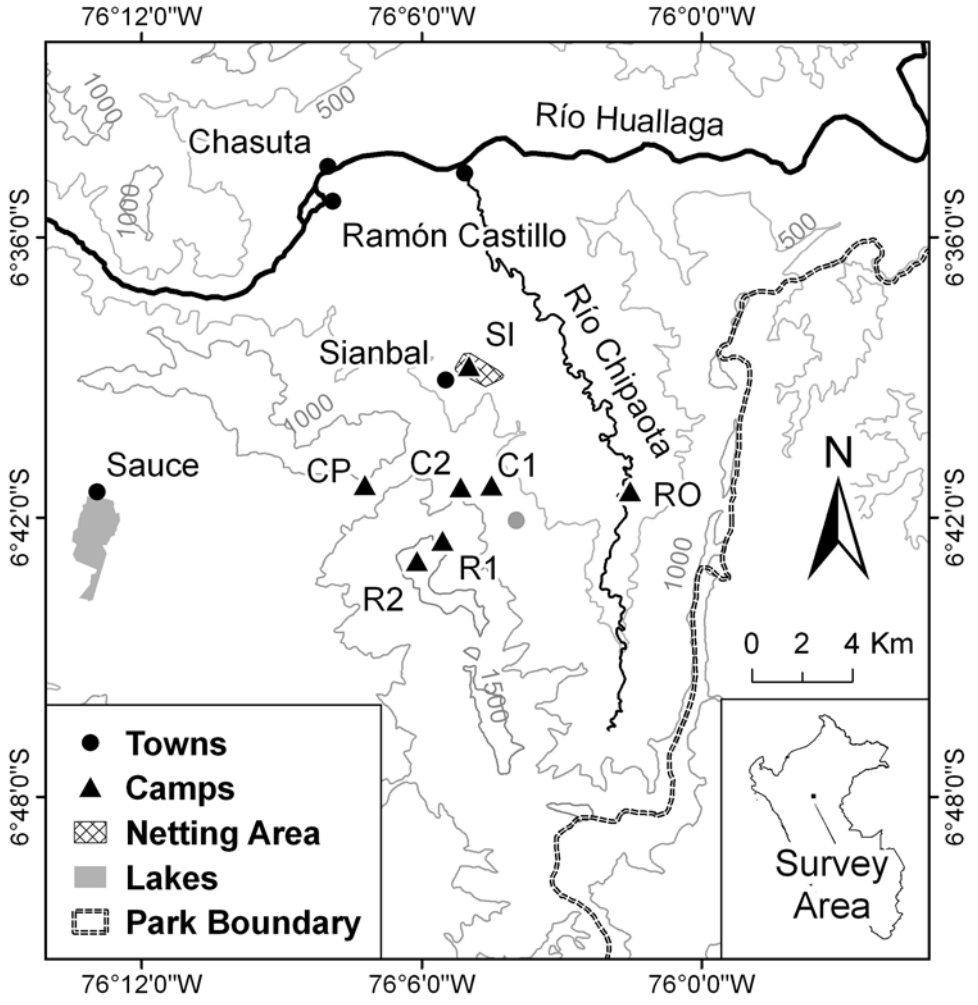

FIG. 1. Map of the survey area.

until at least the mid-19th century (Markham 1865). As early as 1851, the population of Chasuta was 1200 people, and the native peoples from this town had a reputation as "brave and hardy," and were feared by tribes from surrounding regions (Herndon & Gibbon 1854). On the south bank of the Río Huallaga, opposite Chasuta, the village of Ramón Castilla also has a long history of human occupancy. Local peoples informed us that the land within approximately 3 km of the Río Huallaga was cleared for agriculture and pasture land between the 1920's and 1950's. The only forested habitats that exist close to the Río Huallaga are strips and patches of second growth between clearings.

Colonization and clearing for subsistence farming gradually spread south from the Río Huallaga into the Chipaota Valley, reaching the Sianbal area as early as the 1970's, and the community of Sianbal was officially founded

in 2005. The area has a history of coca growing; however, *yuca*, corn, bananas, and other subsistence crops now predominate. Although the proportion of land cleared for agriculture decreases from north to south, only the southernmost reaches of the valley, and the steep sides of the Cordillera Vaquero, remain completely forested. The entire valley is currently part of a timber concession and is under continuous pressure from selective logging.

The western slope of the Cordillera Vaquero rises gently from the Río Huallaga. The area surrounding the Laguna Azul is predominantly agricultural, and the lower reaches of the cordillera include many shade-coffee plantations, *Heliconia* thickets, pasture, and sugar cane fields. The higher reaches of the cordillera, and steep eastern slope, with its numerous clear streams and waterfalls, are mostly undisturbed. The establishment of a military base in Sauce and a new road to the town have ushered in a wave of colonization. Recently coffee plantations around Caserio Primavera, once abandoned, have been reestablished, and the human population on the western slope of the Cordillera Vaquero has increased to the point that a new road is being built to connect Primavera with Sauce.

Surveys. Fieldwork was conducted during two expeditions. The first consisted of three self-funded trips led by T. Mark. In June 2002, T. Mark, G. M. Flieg, and L. Augustine spent one day exploring access to the Cordillera Vaquero by way of Sauce. In July 2003, T. Mark and L. Augustine spent 6 days conducting surveys from 850 to 1500 m a.s.l. near Caserio Primavera (06°41'19"S, 76°07'13"W; Fig. 1). Finally, in July–August 2005, T. Mark returned for a 20-day survey of the region. He briefly explored (3 days) the Chipaota River from its mouth on the Huallaga (180 m a.s.l.) to the ranger station at Robashcu (06°41'27"S, 76°01'32"W, 380 m a.s.l.; Fig. 1) ca. 15 km upstream. In the Cordillera Vaquero, he established camps at four sites (Fig. 1): Chacra 1 (06°41'20"S, 76°04'30"W, 575 m a.s.l.), Chacra 2 (06°41'22"S, 76°05'10"W, 950 m a.s.l.), Ridge 1 (06°42'30"S, 76°05'33"W, 1350 m a.s.l.), and Ridge 2 (06°42'56"S, 76°06'06"W, 1600 m a.s.l.). Additionally, he lodged with a local farmer at Caserio Primavera and in a hotel in Sauce. During the first expedition, observers located birds with binoculars while walking on trails and recorded ~8 h of bird vocalizations using a Sennheiser M-67 microphone with Marantz and Sony-TCM 5000 tape recorders. Two 6 m and four 8 m mist-nets were used at all four camps and in a coffee plantation at Caserio Primavera to help document findings. He logged a total of 629 net hours. Captured birds were photographed and released. Expert assistance in identification of recordings was later provided by D. Lane.

A second expedition was carried out between 31 May and 22 June 2007, by a research team from the University of New Mexico, the University of Missouri-Columbia, the Centro de Ornitologia y Biodiversidad (CORBIDI), and the University of California-Berkeley. This expedition focused on lowland sites between the Sauce ridge and the Río Chipaota. The team entered on foot along the west side of the Chipaota Valley via Chasuta and Ramón Castilla and established a base camp (06°38'46"S, 76°04'58"W, 350 m a.s.l.) east of the community of Sianbal (Fig. 1), which is on an alluvial plain along a clear-flowing stream, surrounded by small, mostly forested ridges, and traversed by an extensive system of foot trails. The flora and fauna are typical of humid Amazonian lowlands with moderate epiphyte densities, becoming higher on adjacent ridges. The weather was fairly dry with sunny mornings and brief afternoon storms approximately every third day. Humidity was low, and mosquitoes were generally scarce.

Team members searched for birds during several trips along the route by trail between Ramón Castilla and Sianbal, along the route by trail between Sianbal and the only lake in the valley, and extensively during daily activities within a 3 km radius around the base camp. When possible, unknown bird songs were recorded using an Edirol R-09 field recorder with its internal microphone and identified later, with the help of D. Lane, J. Jankowski, and M. Isler.

We carried out an extensive mist-netting effort between 7 June and 21 June, using 6 to 12 m long nets with 24–36 mm mesh size. Nets were placed in a variety of habitats either individually or in loose transects up to 12 nets long, sometimes along existing footpaths. We moved nets every 2 to 3 days and used a total of 96 net locations. Net locations, recorded with a Garmin GPS 76Cx, ranged from 06°38'31"–06°39'09"S latitude, 76°04'17"W – 76°05'15"W longitude, and 310–440 m a.s.l.. Nets were generally open from dawn to dusk, but were closed during rain. We totaled 3332.5 net hours of effort, primarily in remaining fragments of primary forest, but also in early successional forest, field, yards, and along streams (Table 1).

Voucher specimens, frozen tissues, and blood samples of as many species as possible were collected for three primary reasons: (1) to allow for definitive species and subspecies identification; (2) to provide a permanent archived record of the phenotypic and genotypic characteristics of populations present at this particular time and place; and (3) to assess blood respiratory and immune characteristics, the data for which will be published elsewhere. Selected species not captured in mist nets were collected by shotgun, or were acquired from local hunters. All specimens collected during this work will be permanently accessioned at the Museum of Southwestern Biology (Univ. of New Mexico, USA) or at CORBIDI (Peru). Full specimen data will be available online via the MSB Bird Division website (http://www.msb.unm.edu/birds), and specimen materials including frozen genetic samples will be made available for study by qualified researchers.

RESULTS

A total of 355 species of birds was observed during the two expeditions (Appendix 1). Of these, 97 species were documented with a specimen, and an additional 142 species were documented with a photograph or recording. Of the 116 remaining species, 7 were identified by voice alone but not tape-recorded.

Netting efforts during the first expedition resulted in the capture of 71 species. During the second expedition, we captured 87 species in a variety of habitats around Sianbal (Table 1). Forty-two species were captured in forest interior habitats, and an overlapping set of 73 were captured in habitats lacking a closed forest canopy, including stream, riparian scrub, forest edge and clearings. The species with the highest capture rates were *Phaethornis superciliosus*, *Mionectes oleagineus*, *Thalurania furcata*, *Lepidothrix coronata*, and *Pipra fasciicauda* (Fig. 2). Although they may provide some useful information, it is important to remember that relative capture rates are poor estimators of relative abundances (Remsen & Good 1996). Of the 42 species captured in forest interior habitat, 12 were captured only in that habitat: *Ancistrops strigilatus*, *Cercomacra cinerascens*, *Conopophaga peruviana*, *Cyanocompsa cyanoides*, *Dendrocincla fuliginosa*, *Glyphorynchus spirurus*, *Myiobius barbatus*, *Pipra chloromeros*, *Poecilotriccus latirostris*, *Thamnophilus murinus*, *Turdus albicollis*, and *Xenops minutus*.

DISCUSSION

We recorded 355 species over about two months of surveys, including both the 2002–

TABLE 1. Netting effort in each of eight habitat types near Sianbal in June 2007. Habitat types are classified as Stream (directly over or adjacent to a stream), Riparian (within thick stream-side vegetation), Early successional (forest consisting of shrubs or small trees, canopy height 4 to 15 m, sometimes with larger remnant trees interspersed), Forest interior (forest consisting of large trees with height of closed canopy generally > 10 m above ground), Forest edge (same as previous but within 50 m of another habitat type), Field (grass with a few interspersed trees), and Yard (open floor with within 50 m of a house, with large flowering trees and regular disturbance from humans and domestic animals).

Habitat type	Netting effort (net hours)	Capture rate (birds/100 h)	No. of species
Stream	193	8.4	18
Riparian	425	24.2	20
Early successional	322	8.0	27
Forest interior	1229	14.4	42
Forest edge	562	22.1	34
Field	182	10.9	12
Yard	421	17.1	22
Total	3332.5	14.9	87

2005 and 2007 expeditions. Considering the length of time and number of sites we surveyed, this species total compares similarly to published avifaunal surveys of sites in the same region with similar topography, climate, and vegetation. In 1983 Davis (1986) surveyed two sites approx. 37 km northwest of Chasuta, recording 155 species at one site (1050 m a.s.l.), 176 at the other (750 m a.s.l.), and 193 species at the two sites combined. More extensive surveys within the Parque Nacional Cordillera Azul generally recorded more species than our survey. In 1996 the LSUMZ/MUSM led a collecting expedition to sites on the upper Río Cushabatay (300–1528 m a.s.l., ~77 km southeast of Chasuta), reporting 386 species. Another LSUMZ/MUSM expedition in 2000 to the upper Río Pauya (360–1450 m a.s.l., ~111 km south of Chasuta) registered almost 400 species. Also in 2000, a FMNH rapid biological inventory team surveyed the same Pauya sites, plus sites on the upper Río Pisqui (200–1220 m a.s.l., ~210 km south of Chasuta), tallying 227 and 328 species, respectively. The results of the LSUMZ/MUSM expeditions and FMNH inventories yield a list of 520 species known from the Parque Nacional Cordillera Azul (Schulenberg *et al.* 2001; sampling sites described in Alverson *et al.* 2001). Various factors could account for the lower species richness we encountered compared to those within the park, including narrower elevational scope, less habitat heterogeneity, lack of undisturbed lowland forest, and differences in observer skill and effort.

We found 15 bird species not listed by Schulenberg *et al.* (2001) or Davis (1986). Of these, *Buteo brachyurus*, *Micrastur buckleyi*, *Aramus guarauna*, *Heliornis fulica*, *Phaethornis hispidus*, *Anthracothorax nigricollis*, *Amazilia lactea*, *Tyrannopsis sulphurea*, and *Polioptila plumbea* are all widely distributed, although sometimes rare, species whose occurrence is unsurprising given suitable habitat. *Anurolimnas viridis*, although not widespread, occurs throughout San Martín in appropriate habitat. *Epinecrophylla spodionota*, *Myrmotherula longicauda*, *Myiobius villosus*, and *Tachyphonus rufus* all occur in foothills northeast of the Chipaota Valley, and their presence here represent minor range

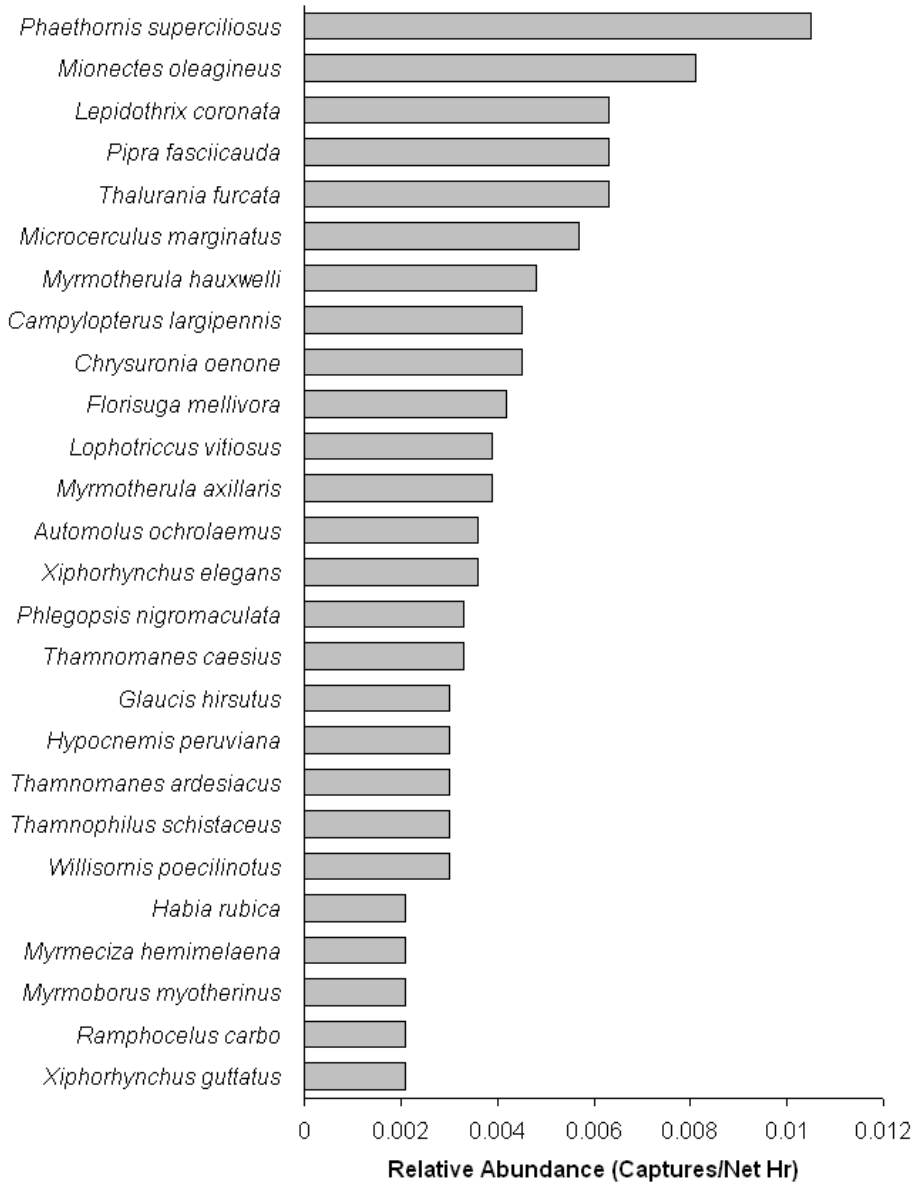

FIG. 2. Capture rates of the 25 species of birds most commonly captured in mist nets at our primary netting location.

extensions along the same ridge that comprises the Cordillera Vaquero.

Observations of four other species represent first published records for San Martín, to our knowledge. Two sight records of *Psarocolius viridis* extend the known range of that species south from neighboring Loreto. A pair was observed perched on a *Cecropia* on the slope above our Sianbal base camp, and another bird was observed nearby in a large

nest tree with *P. bifasciatus* and *P. decumanus*. We captured and photographed 2 female *Heliodoxa branickii*, one each at our Ridge 1 and Ridge 2 camps, and observed a lone *Basileuterus chrysogaster* near the Ridge 1 camp, although we were unable to obtain documentation. These observations extend the range of each species northwest from the Pauya and Cushabatay sites of Schulenberg *et al.* (2001). We also recorded *Myiornis albiventris* near Caserio Primavera. Although there are sight records of the species from San Martín and a recording by H. Lloyd from south of Tarapoto (http://www.xeno-canto.org), none of these observations appear to have made it into the published literature.

Records of three poorly known species of Tyrannidae also are also worth noting. *Contopus nigrescens* was seen and recorded at three separate sites (850–900 m a.s.l.), always by a stream course. In each instance, the individual was active and vocal. Near the Ridge 1 camp we captured and photographed single individuals of *Platyrinchus flavigularis* and *Myiophobus roraimae*. They were otherwise undetected by sight or voice. All three species are known from relatively few locations, mostly on outlying ridges on the eastern slope of the Andes.

We found *Machaeropterus regulus* at three sites (575–950 m a.s.l.). All individuals were of the undescribed central Andean population which appears to be most closely related to *M. r. aureopectus* of southern Venezuela and northern Brazil (Schulenberg *et al.* 2001). We also found *M. pyrocephalus* to be fairly common around Sianbal (350–370 m a.s.l., three individuals netted), suggesting that the two species may overlap locally.

The Río Huallaga valley and the zone between the Huallaga and the Ucayali are known to be an area of intergradation between lowland Amazonian bird communities from north and south of the Amazon (Haffer 1978). Like the previous Cordillera Azul surveys, we found *Pipra fasciicauda* and *Thamnomanes ardesiacus* rather than their respective allopatric counterparts, *P. filicauda* and *T. saturninus*. Also like previous surveys, we found *T. caesius*, unlike at Sarayacu, a site on the Ucayali floodplain c. 100 km east of Sianbal, and the Pisqui valley of the Cordillera Azul, where *T. schistogynus* has been found.

One individual of *Celeus spectabilis* was netted near a stream in an area of early successional forest and forest edge. In the southern portion of its range, this species is restricted to *Guadua* bamboo thickets (Kratter 1997), whereas in the northern portion of its range it has only been found along large rivers (Ridgely and Greenfield 2001). Interestingly, the LSU-led expedition observed two birds in 'transitional forest' on their Upper Río Cushabatay survey (Schulenberg *et al.* 2001), one of which was collected. Our record, combined with those of Schulenberg *et al.*, suggests that birds in the central portion of the species' range, like northern birds, are not restricted to *Guadua* bamboo.

A single specimen of *Tangara chilensis* showed the entirely red rump typical of the widespread nominate subspecies *chilensis*. Specimens from the Río Cushabatay were also assigned to *T. c. chilensis*, whereas specimens from the Río Pauya included individuals with plumage characters of both *T. c. chilensis* and *T. c. chlorocorys*, the yellow-rumped subspecies found in the upper Huallaga valley, as well as intermediate birds (Alverson *et al.* 2001).

Species that require large tracts of primary forest, that are sensitive to human hunting pressure, or that are averse to crossing nonforested areas were poorly represented in our surveys. These species seem to have already been negatively affected by the degree of disturbance and fragmentation that is present in the Chipaota Valley. Overall species richness and richness of large-bodied psittacids, cracids, and accipitrids was lower than we expected. We found one of six species of

macaws and two of five species of cracids found on the previous surveys undertaken in more pristine habitat, although locals suggested that additional species are present in more inaccessible parts of the valley. We encountered hunters in the field and observed extensive use of trip-wire shotgun-traps as a method of indiscriminately hunting terrestrial game. A dearth of large mammals and birds provided further evidence of intense hunting pressure in the valley.

Our observations are concordant with the findings in the central Amazon basin that forest fragmentation rapidly reduces bird diversity concomitantly with overall ecological decline (Ferraz *et al.* 2003). Even in the more distant, unfragmented corners of the valley, a cascade of effects caused by hunting of large vertebrates will likely result in plant species compositional change and loss of plant diversity over time (Terborgh *et al.* 2008), which may in turn reduce avian species diversity. Given that disturbance and development are recent and ongoing, the full effects in terms of reduction of avian diversity will probably not be realized for decades. Documentation of the bird community provided here provides a baseline for future comparison.

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APPENDIX 1. List of 355 bird species observed in the Chipaota Valley, Cordillera Vaquero, and Sauce area, in southeastern Dpto. San Martín, Peru, during 4 trips, May-August, 2002–2007. Species occurrence is presented for nine areas: RH = Río Huallaga, RC = Río Chipaota, SI = Sianbal, SA = Sauce, CP = Caserio Primavera, C1 = Chacra 1, C2 = Chacra 2, R1 = Ridge 1, R2= Ridge 2. The form of documentation is shown for each species: R = recording, P = photograph, Sp = Specimen. Taxonomy follows Remsen *et al.* (2009).

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Tinamus tao					X					R
Tinamus major			X		X					R
Crypturellus cinereus			X			X				R
Crypturellus soui			X		X					R
Crypturellus variegatus			X							
Crypturellus bartletti					X					R
Aburria aburri					X					R
Ortalis guttata					X			X		R
Odontophorus speciosus										R, P
Odontophorus stellatus		X				X	X		X	R
Butorides striata	X									
Bubulcus ibis	X			X						
Egretta thula	X			X						
Cathartes aura				X	X					
Cathartes melambrotus			X							
Coragyps atratus			X	X	X					
Sarcoramphus papa		X	X							Sp
Elanoides forficatus			X					X		
Ictinia plumbea			X							

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Leucopternis albicollis					X					
Buteo magnirostris			X	X	X					R
Buteo brachyurus							X			
Spizaetus ornatus					X					R
Micrastur ruficollis			X					X	X	R
Micrastur gilvicollis						X	X			R, P
Micrastur mirandollei										R
Micrastur semitorquatus			X		X					
Micrastur buckleyi						X				R
Ibycter americanus			X					X		R
Daptrius ater			X							R
Milvago chimachima	X									
Falco rufigularis			X							
Aramus guarauna	X									
Aramides cajanea		X								R
Anurolimnas castaneiceps			X							R
Anurolimnas viridis				X						R
Heliornis fulica			X							
Eurypyga helias						X				
Sternula superciliaris	X									
Columbina talpacoti		X	X	X	X					Sp
Claravis pretiosa			X	X	X					R, Sp
Patagioenas speciosa					X					R
Patagioenas cayennensis			X	X	X					
Patagioenas plumbea			X		X					R, Sp
Patagioenas subvinacea			X							R
Leptotila verreauxi		X	X							R
Leptotila rufaxilla			X	X	X					Sp
Geotrygon frenata									X	R
Geotrygon montana					X					P
Ara chloropterus			X							
Pyrrhura roseifrons							X	X		R, P
Forpus xanthopterygius					X					R
Brotogeris cyanoptera			X			X				Sp
Pionus menstruus			X	X	X					
Amazona farinosa			X							
Piaya cayana			X	X	X					
Coccyzus melacoryphus			X							
Crotophaga ani			X	X	X					
Dromococcyx phasianellus			X							R
Megascops choliba					X					R
Megascops watsonii			X			X				R
Megascops guatemalae									X	R
Lophostrix cristata			X							
Pulsatrix perspicillata		X	X							R

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Pulsatrix melanota					X					
Ciccaba huhula			X							R
Glaucidium brasilianum			X		X					R
Nyctidromus albicollis					X					P
Caprimulgus nigrescens			X							
Streptoprocne zonaris			X							
Chaetura cinereiventris					X					
Chaetura egregia				X						
Aeronautes montivagus					X					
Florisuga mellivora		X	X							Sp
Eutoxeres aquila							X			P
Eutoxeres condamini			X							Sp
Glaucis hirsutus			X							Sp
Threnetes leucurus			X			X	X			P, Sp
Phaethornis atrimentalis			X		X		X			R, P
Phaethornis ruber			X							Sp
Phaethornis hispidus			X				X			P, Sp
Phaethornis guy								X		
Phaethornis superciliosus			X		X	X	X			R, P, Sp
Doryfera johannae					X					
Heliothryx auritus					X					
Anthracothorax nigricollis			X							R, Sp
Heliangelus regalis									X	P
Coeligena coeligena									X	P
Heliodoxa branickii								X	X	P
Heliodoxa aurescens					X	X				P
Heliomaster longirostris			X							
Chaetocercus mulsant			X		X					Sp
Klais guimeti					X					
Campylopterus largipennis			X		X		X			P, Sp
Thalurania furcata			X		X					P, Sp
Amazilia lactea			X							Sp
Chrysuronia oenone			X		X					P, Sp
Pharomachrus antisianus									X	R
Trogon melanurus					X					
Trogon viridis			X		X					R, Sp
Trogon violaceus					X					R
Trogon curucui			X							
Trogon rufus					X					R
Trogon collaris							X			R
Megaceryle torquata	X			X						
Chloroceryle amazona	X									
Chloroceryle americana			X							Sp
Electron platyrhynchum			X			X				R, P, Sp
Baryphthengus martii		X	X							R, Sp

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Galbula cyanescens			X		X		X			R, Sp
Jacamerops aureus			X			X				R
Bucco macrodactylus			X							Sp
Nystalus striolatus					X				X	R
Malacoptila fusca					X					P
Monasa nigrifrons			X	X						R, Sp
Monasa morphoeus			X							Sp
Monasa flavirostris			X		X	X				P, Sp
Chelidoptera tenebrosa			X	X						
Capito auratus			X		X	X		X		R, P, Sp
Eubucco versicolor								X		
Ramphastos tucanus		X	X							R
Ramphastos vitellinus			X		X					
Aulacorhynchus derbianus							X		X	R, P
Selenidera reinwardtii			X			X				R
Pteroglossus inscriptus			X							Sp
Pteroglossus azara			X							
Pteroglossus castanotis			X		X					Sp
Pteroglossus beauharnaesii			X							
Melanerpes cruentatus			X	X	X					R
Piculus leucolaemus							X			
Colaptes rubiginosus					X			X		
Celeus grammicus		X				X				
Celeus elegans			X							Sp
Celeus flavus		X	X							R
Celeus spectabilis			X							R, Sp
Dryocopus lineatus		X	X							R
Campephilus rubricollis					X					R
Campephilus melanoleucos			X		X					R
Sclerurus mexicanus			X		X					R, Sp
Furnarius leucopus			X	X						R, Sp
Synallaxis gujanensis		X	X							R
Premnoplex brunnescens									X	P
Syndactyla subalaris									X	R, P
Ancistrops strigilatus			X							Sp
Philydor erythropterum						X				P
Philydor rufum								X	X	
Automolus ochrolaemus			X			X	X			R, P, Sp
Xenops minutus			X			X				P, Sp
Xenops rutilans					X			X		P
Dendrocincla fuliginosa			X			X				P, Sp
Dendrocincla merula			X				X			P, Sp
Deconychura longicauda						X	X			R, P
Sittasomus griseicapillus					X					
Glyphorhynchus spirurus			X		X		X			P, Sp

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Dendrexetastes rufigula			X		X					R, Sp
Dendrocolaptes certhia			X							Sp
Xiphorhynchus ocellatus					X	X	X			P
Xiphorhynchus elegans			X			X				P, Sp
Xiphorhynchus guttatus		X	X							R, Sp
Lepidocolaptes albolineatus					X					R
Campylorhamphus trochilirostris					X					
Cymbilaimus lineatus			X		X					R
Taraba major			X		X					R
Thamnophilus doliatus					X					R
Thamnophilus schistaceus			X		X					R, Sp
Thamnophilus murinus			X			X				R, Sp
Thamnophilus aethiops			X				X			P
Thamnistes anabatinus								X		R
Dysithamnus mentalis								X	X	R, P
Thamnomanes ardesiacus			X		X					R, Sp
Thamnomanes caesius			X							R, Sp
Epinecrophylla spodionota								X		R, P
Epinecrophylla erythrura			X							Sp
Myrmotherula brachyura			X				X			R
Myrmotherula ignota							X			R
Myrmotherula longicauda					X					R
Myrmotherula hauxwelli			X							Sp
Myrmotherula axillaris			X		X					R, Sp
Myrmotherula schisticolor								X	X	R, P
Herpsilochmus rufimarginatus							X			R
Hypocnemis peruviana			X							Sp
Cercomacra cinerascens			X		X		X			R, Sp
Cercomacra nigrescens								X		R, P
Cercomacra serva					X					
Myrmoborus myotherinus			X		X	X	X			R, P, Sp
Schistocichla leucostigma			X				X			R, Sp
Myrmeciza hemimelaena			X			X				R, Sp
Myrmeciza fortis			X							R, Sp
Pithys albifrons					X					P
Hylophylax naevius					X		X			P
Willisornis poecilinotus			X		X					P, Sp
Phlegopsis nigromaculata			X							Sp
Formicarius colma		X								R
Formicarius analis			X			X				R, Sp
Chamaeza campanisona								X	X	R
Conopophaga peruviana			X							Sp
Scytalopus atratus									X	R
Tyrannulus elatus			X		X					R
Myiopagis gaimardii			X							R

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Elaenia flavogaster				X						
Ornithion inerme					X					R
Corythopis torquatus					X					P
Zimmerius viridiflavus					X					R
Phylloscartes ventralis									X	R
Mionectes striaticollis									X	P
Mionectes olivaceus					X					P
Mionectes oleagineus			X			X	X			P, Sp
Leptopogon superciliaris					X					R
Myiornis albiventris					X					R
Myiornis ecaudatus			X		X					R
Lophotriccus vitiosus			X		X	X				R, Sp
Hemitriccus zosterops		X				X				R
Hemitriccus rufigularis								X		R
Poecilotriccus latirostris			X							Sp
Todirostrum maculatum			X							
Todirostrum cinereum				X						
Todirostrum chrysocrotaphum			X	X						
Rhynchocyclus olivaceus						X				P
Tolmomyias poliocephalus			X							R
Tolmomyias flaviventris					X					R
Platyrinchus flavigularis								X		P
Myiophobus roraimae									X	P
Myiobius villosus					X					
Myiobius barbatus			X							Sp
Terenotriccus erythrurus			X			X				P, Sp
Lathrotriccus euleri			X				X	X		R, P
Contopus nigrescens					X					R
Sayornis nigricans		X	X							
Ochthornis littoralis	X									
Muscisaxicola fluviatilis	X									
Legatus leucophaius			X							
Myiozetetes similis			X	X	X					
Myiozetetes granadensis			X							Sp
Myiozetetes luteiventris			X					X		R
Pitangus sulphuratus			X	X	X					
Myiodynastes maculatus			X					X		
Megarynchus pitangua			X		X					R
Tyrannopsis sulphurea			X							
Empidonomus aurantioatrocristatus			X							
Tyrannus melancholicus			X	X	X					
Rhytipterna simplex					X		X			R
Myiarchus tuberculifer			X		X					R
Myiarchus ferox					X					R
Myiarchus cephalotes									X	R

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Attila spadiceus			X		X					R, Sp
Oxyruncus cristatus								X		R
Pipreola frontalis								X		
Pipreola chlorolepidota					X					R
Lipaugus vociferans			X		X					R
Snowornis subalaris								X	X	R, P
Querula purpurata			X			X				R, Sp
Cephalopterus ornatus					X					
Machaeropterus regulus					X	X	X			R, P
Machaeropterus pyrocephalus			X							Sp
Lepidothrix coronata			X		X	X		X		P, Sp
Xenopipo holochlora					X					P
Xenopipo unicolor									X	P
Pipra fasciicauda			X							Sp
Pipra chloromeros			X		X	X	X	X		R, P, Sp
Tityra inquisitor			X							
Tityra semifasciata					X		X			
Schiffornis turdina								X	X	R, P
Laniocera hypopyrra							X			R
Pachyramphus polychopterus			X		X					R, Sp
Pachyramphus minor			X				X			R, Sp
Piprites chloris					X					R
Cyclarhis gujanensis							X			
Vireolanius leucotis					X			X		R
Vireo leucophrys								X		R
Vireo olivaceus			X				X			Sp
Hylophilus hypoxanthus			X		X			X		R
Hylophilus ochraceiceps								X		
Cyanocorax violaceus		X	X							
Cyanocorax yncas									X	R
Atticora fasciata	X			X						
Atticora tibialis			X							Sp
Stelgidopteryx ruficollis			X	X	X					Sp
Progne tapera					X					
Progne chalybea			X							
Tachycineta albiventer			X	X						
Microcerculus marginatus			X		X	X	X			R, P, Sp
Troglodytes aedon			X	X						Sp
Campylorhynchus turdinus			X							R
Thryothorus coraya			X		X					R
Thryothorus leucotis				X						R
Henicorhina leucophrys									X	R, P
Cyphorhinus arada			X							Sp
Microbates cinereiventris					X					P
Ramphocaenus melanurus			X							Sp

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Polioptila plumbea					X					R
Catharus dryas								X	X	R, P
Turdus ignobilis					X					
Turdus albicollis			X		X	X	X			P, Sp
Paroaria gularis				X						
Schistochlamys melanopis					X					
Cissopis leverianus			X		X					
Tachyphonus rufiventer					X					
Tachyphonus luctuosus				X						
Tachyphonus rufus				X	X					
Lanio versicolor					X			X		R, P
Ramphocelus nigrogularis			X							Sp
Ramphocelus carbo			X	X	X					R, Sp
Thraupis episcopus			X	X	X					
Thraupis palmarum			X	X	X					R, Sp
Anisognathus somptuosus								X	X	
Iridosornis analis								X	X	P
Tangara nigrocincta			X			X				
Tangara mexicana			X				X			
Tangara chilensis			X		X	X	X			R, Sp
Tangara velia					X					
Tangara callophrys			X		X					
Tangara gyrola					X					
Tangara parzudakii									X	
Tangara schrankii					X					P
Tangara arthus								X		
Tersina viridis			X							
Dacnis lineata			X							
Dacnis cayana			X		X					
Cyanerpes caeruleus			X							
Chlorophanes spiza			X		X					
Saltator grossus			X		X					R
Saltator maximus			X		X					R, Sp
Saltator coerulescens					X					
Ammodramus aurifrons			X		X					
Volatinia jacarina			X							
Sporophila castaneiventris			X		X					Sp
Oryzoborus angolensis					X					R
Arremon aurantiirostris							X			R, P
Arremon brunneinucha									X	P
Piranga leucoptera								X		
Habia rubica			X		X					R, Sp
Chlorothraupis carmioli					X			X		R, P
Cyanocompsa cyanoides			X							Sp
Parula pitiayumi					X					

APPENDIX 1. Continuation.

Species	RH	RC	SI	SA	CP	C1	C2	R1	R2	Doc.
Basileuterus chrysogaster								X		
Basileuterus tristriatus								X	X	R
Phaeothlypis fulvicauda			X		X	X				P, Sp
Psarocolius angustifrons			X					X		R
Psarocolius viridis			X							
Psarocolius decumanus		X	X		X					R
Psarocolius bifasciatus			X							
Clypicterus oseryi			X							R
Cacicus solitarius			X							Sp
Cacicus cela		X	X	X	X					R, Sp
Icterus icterus			X							Sp
Icterus chrysocephalus					X					
Gymnomystax mexicanus	X									
Molothrus oryzivorus			X		X					
Euphonia chlorotica			X							
Euphonia laniirostris			X							Sp
Euphonia chrysopasta					X					
Euphonia minuta			X		X					
Euphonia xanthogaster					X					
Euphonia rufiventris			X		X					R
Chlorophonia cyanea			X							