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AVIFAUNA OF THE GRAN PAJONAL AND SOUTHERN CERROS DEL SIRA, PERU

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ABSTRACT.—Field surveys conducted between 4 September and 17 November 2008 resulted in the first comprehensive inventory of the avifauna of the outlying highlands of the Gran Pajonal and southern Cerros del Sira in central Peru. We report 462 bird species representing 52 families from above 900 m elevation. We describe the avian communities of humid montane habitats and savanna, and provide accounts for 22 species for which we obtained either new distributional data or information of taxonomic significance. We also discuss avian migration, reproduction, molt, and conservation in the region. Our results highlight the richness and uniqueness of the avifauna of the Cerros del Sira and Gran Pajonal, and reinforce the scientific and conservation importance of the eastern Andes and its outlying ridges. *Received 21 April 2010. Accepted 14 December 2010.*

The complex topography, geology, and climate of the Peruvian Andes have produced isolated patches of habitat with unique avian communities and distinct taxa (Terborgh and Weske 1975, Fitzpatrick 1977, O'Neill et al. 2000), many of which are only beginning to undergo ornithological exploration (Schulenberg and Awbrey 1997, Schulenberg et al. 2001). The Cerros del Sira (hereafter Sira) and Gran Pajonal in the departments of Huánuco, Pasco, Junín, and Ucayali in central Peru comprise a highland area of 12,000 km^2 to the east of the high Andes. The Sira and Gran Pajonal are notable for the presence of isolated patches of montane evergreen forest, defined as forest in areas where clouds regularly touch the mountains (Stotz et al. 1996), and savanna, or areas of grass and shrubs locally referred to as ''*pajonales*'' (Chrostowski and Denevan 1970). Montane evergreen forest in the upper elevations of the Sira is isolated from similar habitat in the main Andes by 100 km (Terborgh and Weske 1975). The savannas of the Gran Pajonal are isolated from the nearest large, contiguous block of savanna in Bolivia by >600 km, although small areas of savanna and seasonally dry forest occur in dry valleys of the eastern Andes of Peru and Bolivia (Scott 1977, Linares-Palomino 2006, Pennington et al. 2006).

Previous ornithological work conducted in the Sira was concentrated at its northern edge (Weske and Terborgh 1971, Terborgh and Weske 1975, Weske and Terborgh 1977, Terborgh 1985, Graves and Weske 1987, Mee et al. 2002). The only available information on the birds of the southern Sira and Gran Pajonal is from a small collection made near the village of Tsioventeni by personnel from Andrew's University (Thoresen 1974; T. S. Schulenberg, pers. comm.). The savannas of the Gran Pajonal have not received any ornithological attention, despite their status as a prominent example of a rare biotope in Peru.

We present the results of the first intensive ornithological inventory of the Gran Pajonal and southern Cerros del Sira. We provide descriptions of the bird communities in the savanna and humid montane habitats, as well as details on the status of select species of interest. We also comment on boreal and austral migratory species, reproductive behavior, molt, and the biogeographic and conservation implications of our results. A species list annotated with distribution, abundance, elevation, and habitat information and incorporating data from previous work in the region is presented in the Appendix.

STUDY AREA AND METHODS

Geography.—The Cerros del Sira and Gran Pajonal form an upland region bordered to the west and north by the valley of the Pachitea River, to the east by the valley of the Ucayali River, and

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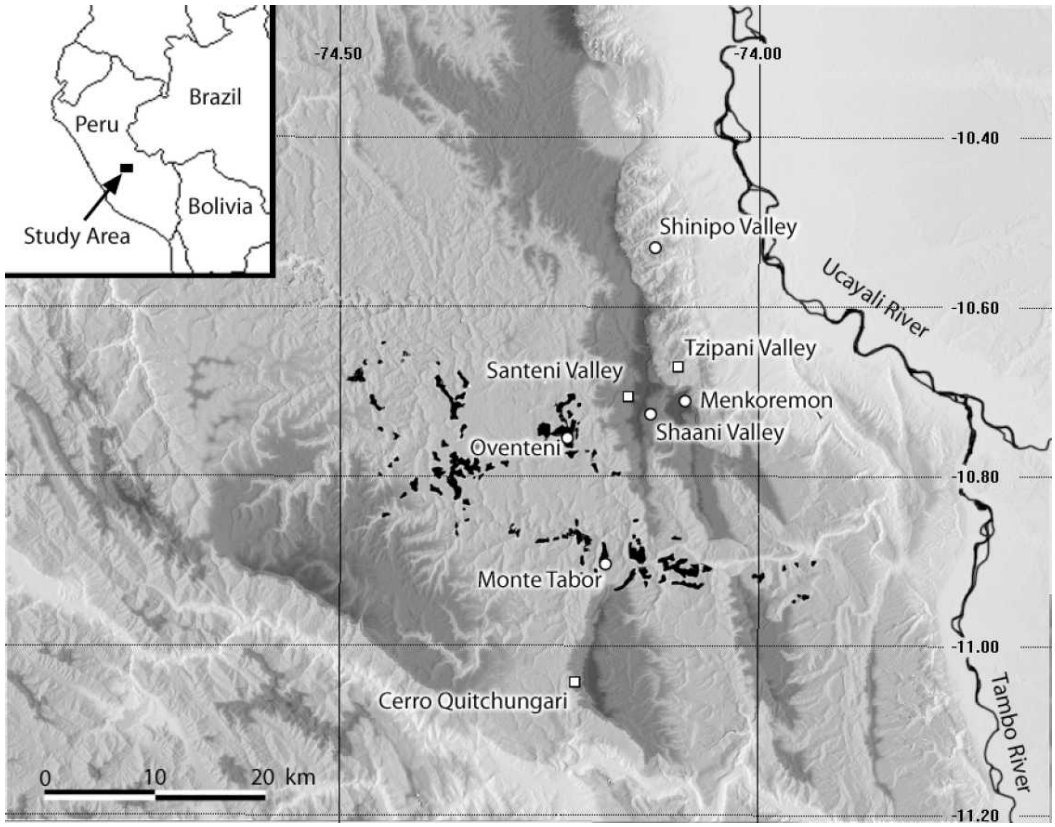

FIG. 1. Southern Cerros del Sira and Gran Pajonal, Peru and digital elevation model depicting study area and location of study sites. Circles indicate primary study sites and squares indicate secondary sites surveyed opportunistically. Black patches are *pajonales* (from Scott 1977).

to the south by the valleys of the Tambo and Peréne rivers (Fig. 1). The Cerros del Sira form a linear ridge extending 250 km roughly NNW to SSE, and located >100 km east of similar elevations in the Andes. The crest of the ridge is generally 1,300–1,700 m in elevation but in places exceeds 2,200 m. The ridge of the Sira is interrupted in two locations: a low (~1,000 m) saddle bisecting the range at 09° 45′ S, and the valley of the Unine River at 10° 54′ S. The spine of the Sira on the eastern slope is characterized for much of its length by a sheer cliff face intersected perpendicularly by steep ridges and valleys that descend east to the Ucayali River. The western slope of the Sira descends relatively gradually and, at the southern end, levels into a plateau that averages ~1,200 m in elevation and extends 50 km to the west at its widest. This plateau is locally referred to as the Gran Pajonal, after the patches of savanna (''*pajonales*'') scattered over its surface, and retains a tenuous connection to the foothills of the Andes through a series of articulated ridges dividing the Chanchamayo and Pachitea valleys. Human population densities are low in the region surveyed and consist almost entirely of titled Ashéninka indigenous communities, except for a colonist settlement at Oventeni (Hvalkof 1998).

Climate.—A government report (ONERN 1968) provides general climatological data for the region. The climate of the Cerros del Sira and Gran Pajonal is classified as humid subtropical. Monthly mean high temperatures at Oventeni in the Gran Pajonal range from 28.3° to 30.1° C, and monthly mean low temperatures from 11.2° to 17.8° C. Rainfall at Oventeni averages a moderate 2,166 mm annually and is concentrated between November and April. Weather data from the higher elevations of the Cerros del Sira are unavailable, but temperatures likely average lower

TABLE 1. Sampling effort in 2008 at primary study sites in the Gran Pajonal and southern Cerros del Sira, Peru. Habitat codes are in the Appendix.

	Habitats surveyed	Dates surveyed	Observer-hrs	Net-hrs	Species detected
Monte Tabor	S_p,F_t,F_l	6–11 Sep	303	92	186
Oventeni	S_p,F_t,F_l,M	4–6, 12–15, 17–19 Sep	307	12	193
Menkoremon	P,F_e	2, 4–6 Oct	194	0	42
Upper Shaani Valley	F_m	23 Sep–1 Oct, 3, 8–9 Oct	474	290	107
Upper Shinipo Valley	F_t	1–6 Nov	282	83	149

and precipitation higher due to the deposition of rain by warm, moist winds from the east. At least short periods of heavy rainfall occurred on a nearly daily basis during our study, and prolonged downpours were common. Atalaya, at the eastern foot of the southern Sira, averages 2,950 mm of precipitation annually.

Geology and Soils.—Soils in the region are largely derived from residual material from upland formations with some alluvial deposits. Most *pajonales* overlay calcareous shale bedrock with soils comprised of poorly draining red latosols or yellow podzolics (Scott 1978). The montane forests of the Sira ridge occur chiefly on lithosols derived from red Permian sandstones (Chrostowski and Denevan 1970, Scott 1978), which are relatively poor in nutrients and support a thin organic cap at higher elevations (ONERN 1968). Patches of fine, white substrates of unknown composition occur sporadically in humid forest in the highlands (pers. obs.). Rain water in these locations often collects at the surface, suggesting low internal drainage.

Vegetation.—The Gran Pajonal plateau (800–1,300 m) is covered in humid evergreen forest interrupted by *pajonales*; these are generally smaller (<100 ha) and total 9,000–10,000 ha region-wide, 3% of the total area of the Gran Pajonal (Hvalkof 2006). The historical and floristic relationships between the *pajonales* of the Gran Pajonal and other neotropical savannas and seasonally dry forest remain unclear (Linares-Palomino 2006). Climatic and edaphic factors may have contributed to their origins, but the *pajonales* have been deliberately maintained through fire management by the indigenous Ashéninka population for centuries (Chrostowski and Denevan 1970; Scott 1977, 1978; Hvalkof 1998, 2006). Several failed national cattle-raising efforts in the Gran Pajonal since the 18th century have augmented the extent of open areas and, in recent years, settlers have increased deforestation for pastoral and agricultural uses (Hvalkof 2006). Forest is much more widespread regionally, but its characterization is complicated by the slow transition between tropical lowland evergreen forest in the valleys and montane evergreen forest on the ridges of the Cerros del Sira. The crests of the highest ridges of the Sira support elfin forest, semi-humid/humid montane scrub, and a habitat resembling paramo grassland. Additional important avian habitats scattered throughout the region include *Chusquea* bamboo, small marshes, and rivers and streams. Our habitat descriptions generally follow Stotz et al. (1996); however we follow Grubb (1974) in distinguishing between lower montane evergreen forest, which is dominated by trees with mesophyll leaf types and vascular epiphytes, and upper montane forest with more microphyllous trees and bryophytic epiphytes. We also erect a separate category for the *pajonales*, although some may be within the broader category of semi-humid/humid montane scrubs.

Study Sites.—The authors surveyed the Gran Pajonal and southern Cerros del Sira during 38 days between 4 September and 17 November 2008, focusing on *pajonales* and montane evergreen forest at five sites (Table 1).

Monte Tabor (10° 53′ S, 74° 11′ W) is a sandstone cap at 1,350 m at the northern edge of Quitchungari Ridge with forested slopes and a 175 ha *pajonal* at its crest (Scott 1978). The vegetation of the Monte Tabor *pajonal* is a short, windswept community of grasses dominated by *Tricachne* spp., *Aristida* spp., and *Vernonia* spp. (Scott 1978) with occasional small islands of trees and shrubs, and sparse coverage in areas by bracken fern (*Pteridium* spp.). The *pajonal* boundary is characterized by an abrupt demarcation with surrounding forest. No agriculture or grazing currently occurs on the Monte Tabor *pajonal*, but local Ashéninka villagers regularly burn it, and it was historically the site of a mission

(Scott 1978). The forest at this site resembles tropical lowland evergreen forest, although forest along the ridge contains more moss and epiphytic plants and resembles lower montane evergreen forest.

Oventeni (10° 45′ S, 74° 13′ W; 1,000 m) is the largest colonist settlement in the Gran Pajonal and has experienced the greatest human impact. Originally within a large *pajonal*, it is now surrounded by a mosaic of forest, *pajonales* of several vegetative types, pastures, and swidden chacras in different stages of disturbance and succession (Scott 1978, Hvalkof 2006). Chrostowski and Denevan (1970) and Scott (1978) reviewed the plant communities associated with different land uses, succession patterns, and *pajonal* types around Oventeni. The nearby forest resembles tropical lowland evergreen forest with increasing moss and epiphyte loads on higher hills and the slopes east of town as the forest transitions to lower montane evergreen forest. Most forest patches around Oventeni are second growth, although some primary remnants may persist (Scott 1978).

The Shaani Valley site (10° 42′ S, 74° 07′ W) is on the upper slopes of the saddle between the Sira ridge and the isolated peak of Menkoremon. This site includes elevations between 1,800 and 1,900 m where the dominant habitat is upper montane evergreen forest. Patches of bamboo (*Chusquea* spp.) are frequent in this area, and mosses and epiphytes are abundant. Also present on patches of fine white substrates is a stunted forest containing numerous palms (Arecaceae) and other plants with thick, glossy leaves.

Menkoremon (10° 42′ S, 74° 06′ W) is the highest summit in the southern Cerros del Sira at 2,240 m and is covered in elfin forest transitioning to a plant community resembling paramo grasslands. The latter is dominated by grasses, but also includes scattered ground bromeliads (Bromeliaceae) and *Paepalanthus* spp., heather (*Bejaria aestuans*), orchids (Orchidaceae), ferns (*Jamesonia* spp., *Sticherus* spp., *Gleichenia* spp.), and club mosses (*Lycopodiella* spp.). We photographed *Drosera* spp. (Droseraceae), a scarce genus in Peru, and one that is indicative of nutrient depleted soil (Rodolfo Vásquez, pers. comm.).

The Shinipo Valley (10° 31′ S, 74° 07′ W) is on the eastern slope of the Cerros del Sira and includes elevations between 900 and 1,200 m. The habitat is lower montane evergreen forest with a canopy height of ~30 m on the slopes and as low as 10 m on ridge crests.

We also recorded observations briefly or opportunistically at three secondary localities: Santeni Valley (10° 42′ S, 74° 09′ W), Tzipani Valley (10° 40′ S, 74° 05′ W), and Cerro Quitchungari (11° 03′ S, 74° 11′ W; Fig. 1).

Field Methods.—We conducted surveys across all habitat types at each primary site (Table 1). Observational surveys were conducted along transects that followed trails or water courses between 0500 and 1200 hrs PET and again between 1400 and 1830 hrs. Observation data have been deposited in the Avian Knowledge Network through the eBird portal, Cornell Laboratory of Ornithology, Ithaca, New York, USA. We made extensive use of audio recording for identification and documentation, and our recordings have been archived at the Macaulay Library (ML), Cornell Laboratory of Ornithology, Ithaca, New York, USA. We mist-netted birds in focal habitats at each primary study site and obtained measurements and photographs of many species (Table 1, Appendix). We collected voucher specimens and tissue samples of select species (Appendix), which are deposited at the Centro de Ornitología y Biodiversidad (CORBIDI), Lima, Peru; the Cornell University Museum of Vertebrates (CUMV), Ithaca, New York; and the Kansas University Natural History Museum (KUNHM), Lawrence, Kansas. Common and scientific names of birds follow Gill and Donsker (2010).

RESULTS

We recorded 462 bird species representing 52 families above 900 m elevation in the study region. About 110 of the 462 species recorded above 900 m represent first records for the Department of Ucayali (T. S. Schulenberg, pers. comm.). Information on distribution among the study sites, relative abundance, habitat, documentation, and conservation status for each species is in the Appendix.

Pajonal Bird Community.—We recorded 106 bird species representing 30 families in the *pajonales*, and detected 61 species only in this habitat. Tyrannidae (22 species) and Thraupidae (17 species) were the most diverse families. More species were encountered in the shrub-dominated, marginal, and secondary *pajonales* than in the grass-dominated *pajonales* and pastures.

Montane Bird Community.—We detected 300 bird species representing 45 families across all humid montane habitats (i.e., paramo, elfin forest, and upper and lower montane evergreen forest).

Trochilidae (24 species), Furnariidae (26 species), Thamnophilidae (26 species), Tyrannidae (38 species), and Thraupidae (40 species) contributed most to species richness. Habitats at higher elevations were less diverse than those at lower elevations with elfin forest (35 species) and paramo grassland (5 species) having the lowest diversity. The stunted forest on fine white substrate was also depauperate with only Golden-olive Woodpecker (*Colaptes rubiginosus*), Rufous-vented Tapaculo (*Scytalopus femoralis*), and occasional canopy flocks.

Status.—We recorded 12 presumed Boreal and 15 presumed Austral migrant bird species during the inventory (Appendix), which straddled the time period of arrival of Boreal migrants and departure of Austral migrants. Two migrant species, Black-and-white Tanager (*Conothraupis speculigera*) and Black-and-white Seedeater (*Sporophila luctuosa*), do not fit into either the Boreal or Austral migrant category, and Red-eyed Vireo (*Vireo olivaceus*) was likely represented by migrants from both the north and south. Additional work in the region at other seasons is needed to confirm the migratory status of some species. Nesting activity in the form of an active nest or dependent young was documented only for Blue-fronted Lancebill (*Doryfera johannae*), Swallow-winged Puffbird (*Chelidoptera tenebrosa*), Golden-olive Woodpecker, Slaty-capped Flycatcher (*Leptopogon superciliaris*), Social Flycatcher (*Myiozetetes similis*), Great Kiskadee (*Pitangus sulphuratus*), Spotted Nightingale-Thrush (*Catharus dryas*), and Wedge-tailed Grass Finch (*Emberizoides herbicola*). We noted breeding condition (brood patch or cloacal protuberance) among an additional 15 species captured in mist nets (Appendix). Two mist-netted Large Elaenia (*Elaenia spectabilis*), almost certainly a migrant in the region, and a Mouse-colored Tyrannulet (*Phaeomyias murina*) had old brood patches. Representatives of 27 of the 89 species captured in mist nets were actively molting (Appendix).

Species Accounts.—We obtained new data for 22 species previously unknown from the region, of extremely local distribution, or of uncertain taxonomic status.

Brown Tinamou (*Crypturellus obsoletus*).—This species was detected in forested habitats at seven of eight study sites, including Monte Tabor and the upper Shaani Valley, where it was fairly common to common. Birds from south of the Unine River generally occurred at lower elevations and gave songs and calls (ML 138701, 140407, 140428, 140429) that differed from songs and calls given by birds north of the Unine River (ML 138807, 138862, 140539, 140546, 140582). Additional work on morphological and vocal variation is needed to clarify the taxonomic status of populations here and elsewhere in the range of this widespread species.

Northern/Southern Caracara (*Caracara* spp.).—We observed this species near the air strip in Oventeni on 13 September 2008. The caracara was seen well from below, but the brevity of this observation precluded specific identification. There have been scattered sight records of Southern Caracara (*C. plancus*) in the Peruvian Amazon, the northernmost at the Rio Cushabatay in Loreto (B. P. Walker, unpubl. data), and Yanachaga-Chemillen National Park in Pasco (J. J. Chalco and Thomas Arndt, unpubl. data). This constitutes the first record of the genus *Caracara* for Ucayali.

Russet-crowned Crake (*Laterallus viridis*).—This species was fairly common in tall grass savanna at Monte Tabor and in shrub-dominated savanna around Oventeni, where we collected a single male. Individuals were most often detected when a pair uttered a descending duet from dense vegetation, often counter-singing with pairs on adjacent territories. This species is patchily distributed in Peru with the nearest records from the Apurimac and Chanchamayo valleys (Taczanowski 1886, Bond 1955; pers. obs.). These constitute the first records for Ucayali.

Picui Ground-Dove (*Columbina picui*).—One individual was observed and photographed on 13 September 2008 in dense, recently burned shrub-dominated savanna in Oventeni. This austral migrant is known in Peru largely from the Madre de Dios drainage in the southern Amazon, and the only prior records in Ucayali are from Yarinacocha (Pearson 1975) and Balta (O'Neill 1969).

Spot-tailed Nightjar (*Caprimulgus maculicaudus*).—This species was fairly common in recently burned savanna and pasture at Oventeni. Both photographs and audio recordings were obtained. Patchily distributed in Peru, this species is known from savanna and dry inter-Andean valleys, the nearest records being 400 km to the north in the Mayo Valley (Begazo et al. 2001). These constitute the first records for Ucayali.

New barbet form (*Capito* taxon novum).—A form of *Capito* barbet allied to Scarlet-banded

Barbet (*Capito wallacei*) of the Cordillera Azul in Loreto, Peru was fairly common at the upper Shinipo Valley site and also detected in the upper Tzipani Valley. Four male and four female specimens as well as photographs and recordings were obtained. A more complete description of this taxon will be presented elsewhere.

Cinereous-breasted Spinetail (*Synallaxis hypospodia*).—We found this species fairly common both in grassy savanna at Monte Tabor and in shrub-dominated savanna at Oventeni. We obtained one male and one female specimen as well as photographs and audio recordings. *S. hypospodia* was previously known in Peru from only three isolated localities: the Mayo River drainage (D. F. Lane, unpubl. data), the Urubamba Valley (von Berlepsch and Stolzmann 1906, Chapman 1921), and Pampas del Heath (Louisiana State University Museum of Natural Science [LSUMNS] specimens). Our observations constitute the first records for Ucayali.

Rusty-backed Antwren (*Formicivora rufa*).—This species was fairly common in shrub-dominated savanna at Oventeni, but also present in taller graminaceous savanna at Monte Tabor. Single male and female specimens were obtained, as were photographs and audio recordings. This species is known in Peru only from three locations: the Huallaga Valley (Bond 1955), Urubamba Valley (von Berlepsch and Stolzmann 1906, Chapman 1921), and Pampas del Heath (LSUMNS specimens). These records are the first for Ucayali.

White-browed Antbird (*Myrmoborus leucophrys koenigorum*).—This species was uncommon to fairly common in more xeromorphic woodland with dense understory and forest patches bordering savanna at Monte Tabor and Oventeni, where we obtained photographs and audio recordings. Most birds observed appeared to represent the subspecies *koenigorum* based on their extensive white caps and relatively dark underparts. This recently-described subspecies is known previously only from the Huallaga Valley in Huánuco, San Martín, and adjacent Ucayali (D. F. Lane and B. P. Walker, unpubl. data; LSUMNS specimens). However, as noted for the Huallaga Valley (O'Neill and Parker 1997), we found that some individuals had relatively dark caps resembling the nominate subspecies of the Amazonian lowlands. Further research into the taxonomic status of these populations is needed.

Barred Antthrush (*Chamaeza mollissima*).—A single individual of this species was heard on 2 and 4 October 2008 in montane evergreen forest at 1,900 m along the ridge separating the Rio Tzipani and Rio Shaani watersheds. A recording was obtained on 2 October. Short-tailed Antthrush (*C. campanisona*) was common at lower elevations in transitional forest, but Barred Antthrush was the only *Chamaeza* detected in humid montane forest at high elevation. This locality is within what was thought to be a gap in the distribution of this species, previously known in Peru only from north of the Mayo Valley and southeast of the Apurimac Valley (Schulenberg et al. 2007).

Plain-backed Antpitta (*Grallaria haplonota*).—Two individuals were recorded in montane evergreen forest at 1,850–1,900 m in the upper Shaani Valley and later identified (D. F. Lane and T. S. Schulenberg, pers. comm.); this is a significant southward extension from the current range limit of this species in San Martín north of the Mayo Valley (Schulenberg et al. 2007).

Tapaculo species (*Scytalopus* spp.).—We found two taxa of *Scytalopus* that apparently replace each other elevationally in the southern Sira and Gran Pajonal. Birds with vocalizations consistent with the Peruvian endemic Rufous-vented Tapaculo were regularly heard and recorded, and rarely glimpsed between 1,700 and 2,200 m. The song of this taxon was a single note repeated at 1–4 notes/sec usually for 30 sec or longer. This species was one of the more common birds by voice both in the upper Shaani Valley and in elfin forest, and even patches of scrub up to just below the summit of Menkoremon. A faster-paced *Scytalopus* song was heard and recorded between 1,400 and 1,600 m in the upper Santeni Valley and at Cerro Quitchungari. This song consisted of a single note repeated at a rate of 7–9 notes/sec, often for 12 to 20 sec. Each phrase was frequently initiated with an excited rising-descending jumble of faster-paced notes. This song type is consistent with the songs of southern populations of Northern White-crowned Tapaculo (*Scytalopus atratus*) in the Cordillera Azul and Cuzco (Krabbe and Schulenberg 1997; D. F. Lane, pers. comm.).

Sooty-headed/Yungas Tyrannulet (*Phyllomyias griseiceps/weedeni*).—A tyrannulet species was fairly common in forest patches at Oventeni, and also recorded in the upper Santeni Valley, at Monte Tabor, and at Cerro Quitchungari. Photographs and audio recordings were obtained. Songs given by individuals appear to be intermediate between those of these similar species, containing

clear whistled notes reminiscent of Yungas followed by a chatter resembling that of Sooty-headed. Further research into morphological and vocal variation within and between these very similar taxa is warranted.

Sharpbill (*Oxyruncus cristatus*).—Three singing birds were in montane evergreen forest at 1,550 m in the Santeni Valley on the western side of the Sira cordillera. Photographs and audio recordings were obtained. These three birds sang in rotation from the tops of particular trees within 200 m of each other, behavior consistent with that observed at exploded leks in Costa Rica (Stiles and Whitney 1983). One individual was also heard lower down the same ridge at 1,200 m, also in the Santeni Valley. We did not detect this species at suitable elevations on the eastern side of the cordillera, where we focused much more effort. This species is spottily distributed on outlying ridges in Peru (Davis 1986). *O. cristatus* had not previously been recorded in the Cerros del Sira.

Wing-banded Wren (*Microcerculus bambla*).—One individual was observed and recorded at 1,000 m in the upper Shinipo Valley, and two birds were heard at 1,200 m near Huerto Eden west of Cerro Quitchungari. Two additional individuals were recorded at lower elevations (400–800 m) at Sapani in the Ucayali Valley. Curiously patchy in distribution, *M. bambla* has been recorded several times in the foothills of central Peru (Mee et al. 2002; LSUMNS specimens; M. J. Miller, unpubl. data).

Pipit species (*Anthus* spp.).—One individual was observed on 2, 5, and 6 October 2008 at 2,200 m elevation just below the summit of Menkoremon. We generally observed this individual in short, grassy paramo, particularly in wetter areas with muddy substrates. It typically flushed close underfoot before flying some distance, often 100 m or more, and dropping down into a taller patch of grass. We did not hear this bird call, nor were we able to secure a specimen or photographs. Our observations indicate the bird was relatively pale with contrasting white outer tail feathers, but are insufficient for specific identification.

Sira Tanager (*Tangara phillipsi*).—This species was uncommon in the elfin forest near treeline on Menkoremon, but locally common in montane evergreen forest in the upper Shaani Valley. We also recorded one individual in short forest at the edge of a landslide in the upper Santeni Valley. We obtained audio recordings and photographs of both males and females. This species appeared to favor open habitats or edges over forest interior. It was most frequently encountered in elfin forest, in the stunted forest on fine substrates, or along the openings over streams. We recorded this species between 1,600 and 2,200 m, higher than the previous records at between 1,300 and 1,570 m (Graves and Weske 1987, Mee et al. 2002). This species frequently occurred in groups of between two and 15 individuals that associated with mixed-species feeding flocks in the canopy or sub-canopy. Other species in these flocks included Montane (*Lepidocolaptes lacrymiger*) and Olive-backed (*Xiphorhynchus triangularis*) woodcreepers; Mottle-cheeked Tyrannulet (*Phylloscartes ventralis*); Blue-winged Mountain-Tanager (*Anisognathus somptuosus*); Flame-faced (*Tangara parzudakii*), Beryl-spangled (*T. nigroviridis*), Saffron-crowned (*T. xanthocephala*), Vermilion (*Calochaetes coccineus*), and Yellow-throated (*Iridosornis analis*) tanagers; Golden-collared Honeycreeper (*Iridophanes pulcherrimus*); and Bluish (*Diglossa caerulescens*) and Golden-eyed (*D. glauca*) flowerpiercers. This species was previously known only from the northern Cerros del Sira, 150 km north of our study sites (Graves and Weske 1987, Mee et al. 2002). Its presence in the southern Sira suggests a more or less continuous distribution at higher elevations along the Sira cordillera.

Wedge-tailed Grass Finch.—This species was common in grassy savanna at Monte Tabor and in primarily herbaceous savanna around Oventeni. We obtained photographs and audio recordings of individuals at both localities. We also mist-netted and measured a single juvenile at Monte Tabor. We located, measured, and photographed a nest with two eggs that was probably of this species in short grass at Monte Tabor on 7 September 2008. This species was previously known in Peru from only the Marañon and Mayo drainages to the north (LSUMNS 88734; D. F. Lane, unpubl. data; Todd Mark, unpubl. data) and the Pampas del Heath to the southeast (Graham et al. 1980). These records constitute a range extension of 600 km and the first records for Ucayali.

Grassland Sparrow (*Ammodramus humeralis*).—This species was common but secretive in short grassy savanna at Monte Tabor. At least six individuals were observed at Monte Tabor, including one juvenile on 7 September 2008. Four individuals were observed in fields west of

the town of Oventeni, where syntopic with Yellow-browed Sparrow (*A. aurifrons*), one of the most common birds in this area. We obtained photographs and audio recordings of several individuals. Birds sang regularly early and late in the day, at which time they could at times be observed at length as they perched in an exposed location. Widespread in grasslands in more open parts of South America, the nearest known populations of Grassland Sparrow to the Gran Pajonal are at Pampas del Heath and in cleared lands around Puerto Maldonado, 600 km southeast (Graham et al. 1980; B. P. Walker, unpubl. data). Our records constitute the first for Ucayali and the first from isolated patches of savanna in the eastern Andes.

Plumbeous Seedeater (*Sporophila plumbea*).—This species was uncommon in short graminaceous savanna at Monte Tabor and fairly common in pasture and recently burned savanna at Oventeni. We obtained two male specimens as well as photographs and audio recordings. The birds were generally observed in small groups containing both male and female-plumage individuals, but occasionally alone or in flocks of up to 10 individuals. They often associated in Oventeni with large groups of primarily Blue-black Grassquit (*Volatinia jacarina*) in grassy or recently burned areas. Plumbeous Seedeater has a similar global distribution to Grassland Sparrow, and in Peru is known only from the Pampas del Heath (Graham et al. 1980). This species may be a non-breeding visitor to the Gran Pajonal from breeding areas further south; neither male collected was in breeding condition (testes $\leq 1 \times 1$ mm).

Black-billed Seed Finch (*Oryzoborus atrirostris*).—A male singing from a marsh of tall reeds bordering dry savanna in Oventeni throughout the day on 19 September 2008 was photographed and recorded. We did not detect this bird despite coverage of this area prior to 19 September, but its near-continuous song and strong response to audio playback appeared to be territorial behavior. It is possible this bird's arrival was related to the appearance of large roosting aggregations of Black-and-white and Yellow-bellied (*Sporophila nigricollis*) seedeaters in this marsh beginning about 17 September. Rare and patchily distributed in eastern Peru, most records of Black-billed Seed-Finch come from near the base of the Andes. The only previous record from Ucayali was along the Abujao River well to the east (LSUMNS specimens).

DISCUSSION

Biogeography.—In addition to the 462 bird species we recorded, 57 species are known from above 900 m only in the northern Cerros del Sira (J. S. Weske and J. W. Terborgh, unpubl. data; Mee et al. 2002), bringing the regional species total to 519. These totals are preliminary and there are few equivalent surveys for comparison, but it is clear the Gran Pajonal and southern Cerros del Sira support high levels of avian diversity.

The majority of the birds we found in the *pajonales* are widespread in disturbed areas, anthropogenic or otherwise, in lowland Amazonia or the lower slopes of the Andes. Other species are restricted to regions with better-developed neotropical savannas (e.g., the Venezuelan llanos or Bolivian pampas) but occur patchily in isolated dry valleys of the eastern Andes (Chapman 1921, Robbins et al. 1999, Aleixo and Poletto 2007). This list includes Tataupa Tinamou (*Crypturellus tataupa*), Russet-crowned Crake, Spot-tailed Nightjar, Cinereous-breasted Spinetail, Rusty-backed Antwren, Yellow-bellied Elaenia (*Elaenia flavogaster*), Black-faced Tanager (*Schistochlamys melanopis*), and Wedge-tailed Grass Finch. Plumbeous Seedeater and Grassland Sparrow are unique as they are widespread in neotropical savannas elsewhere, but were not previously known from isolated savannas in the eastern Andes (Graham et al. 1980). It is not obvious whether the above species have maintained relictual populations in this region or whether colonization has occurred more recently. Resolving this question may provide insight into origins of the *pajonales*.

The majority of the avifauna of humid montane habitats represents a subset of that found in these habitats on the eastern slopes of the Andes that are closest to the Cerros del Sira in the departments of Junín, Pasco, and Huánuco (Schulenberg et al. 1984; pers. obs.). Some species detected, however, occur on multiple isolated Andean ridges, but not on the principal cordillera of the Andes. Of these, Subtropical Pygmy Owl (*Glaucidium parkeri*), Koepcke's Hermit (*Phaethornis koepckeae*), Rufous-webbed Brilliant (*Heliodoxa branickii*), Rough-legged Tyrannulet (*Phyllomyias burmeisteri*), Sooty-headed/Yungas Tyrannulet, Buff-throated Tody-Tyrant (*Hemitriccus rufigularis*), Brazilian Laniisoma (*Laniisoma elegans*), Sharpbill, and Gray-tailed Piha (*Snowornis subalaris*) were recorded. Two other species of isolated

Andean ridges detected in the northern Sira (J. S. Weske and J. W. Terborgh, unpubl. data), Rufous-brown Solitaire (*Cichlopsis leucogenys*) and Roraiman Flycatcher (*Myiophobus roraimae*), were not found during our surveys. These ''outlying ridge species'' are hypothesized to be relictual taxa that became extinct along the main Andean chain but persist due to lack of competition in the relatively depauperate avian communities on outlying ridges (Terborgh and Weske 1975, Fitzpatrick et al. 1977). Further investigation of this peculiar biogeographic pattern is warranted.

CONSERVATION IMPLICATIONS

The new barbet form and Sira Tanager are of particular conservation concern because their global distributions are restricted to the Sira. Large cracids such as Wattled Guan (*Aburria aburri*) and Spix's Guan (*Penelope jacquacu*), appear to maintain healthy populations in the southern Cerros del Sira and Gran Pajonal, but deserve special consideration because they are threatened by hunting in many areas (Strahl et al. 1994). The endemic *koepckeae* subspecies of Horned Curassow (*Pauxi unicornis*) was not detected during our inventory, but it may well be present at low densities and merits urgent conservation action because of its small range and apparent susceptibility to hunting pressure (Gastañaga et al. 2007, Graham 2009).

Both lower montane forest and savanna are habitats of conservation priority in South America (Silva 1995, Stotz et al. 1996, Renjifo et al. 1997). The patches of these habitats within the study region deserve special attention because of their isolation and unique avian communities. The montane evergreen forests of the Sira have received some protection since a portion of the range was designated a communal reserve in 2001 (Benavides 2005). The *pajonales* of the Gran Pajonal receive no official protection and are particularly susceptible to changes in land use by humans. Conservation of bird habitat in the Gran Pajonal by outside interests would be a complex task; the *pajonales* are maintained by the Ashéninka for spiritual and agricultural reasons (Hvalkof 2006), but exist in a mosaic of disturbed habitats impacted by both traditional Ashéninka practices as well as land use by colonists. Our fieldwork indicates the region supports several bird species of open habitats that are rare or range-restricted in Peru. There are currently few protected areas of savanna or seasonally dry forest in inter-Andean valleys of Peru where these species are found (Linares-Palomino 2006, Angulo et al. 2008). Any conservation strategy will depend on the support of the local Ashéninka and should incorporate their interests.

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APPENDIX. Status of birds above 900 m elevation in the Gran Pajonal and southern Cerros del Sira, Peru, 2008.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Tinamus tao					F		X		X	900–1,200	F_t		A
T. major	F								X	1,100–1,200	F_l		A
T. guttatus	R									L-1,100	F_l		A
Crypturellus cinereus	R								X	L-1,200	F_l		
C. soui	F	U			R	X			X	L-1,200	S_p, F_l		A
C. obsoletus	C		U	F	R	X	X	X	X	1,000–2,100	F_l, F_t, F_m, F_e		A
C. atrocapillus	F	F				X				L-1,200	F_l		A
C. variegatus	F	R			F	X		X	X	L-1,400	F_l, F_t		A
C. tataupa	R	F						X		L-1,200	S_p		A
Ortalis guttata		R						X	X	L-1,400	S_p		A
Penelope jacquacu	U				U				X	900–1,250	F_l, F_t		A
Aburria aburri			U	F	U	X				1,000–2,000	F_m	n	A
Chamaepetes goudotii									X	-	-		
Mitu tuberosum									X	-	-		
Pauxi unicornis									X	-	-	e, p	
Odontophorus speciosus				U	F	X	X		X	900–1,850	F_t, F_m		A
O. gujanensis/stellatus	F									L-1,300	F_l, F_t		A
Cairina moschata		R								1,050	M		
Tachybaptus dominicus		R							X	1,050	M		P
Butorides striata		U								L-1,050	M		
Cathartes aura	F	F				X		X	X	L-1,350	S_p, F_t, F_l		
C. melambrotus									X	-	-		
Sarcoramphus papa									X	-	-		
Elanoides forficatus	U	F		U		X		X	X	L-2,000	F_l, F_t, F_m		
Harpagus bidentatus	U	R							X	L-1,350	F_l, F_t		P
Ictinia plumbea		F				X		X	X	L-1,200	S_p		
Accipiter striatus									X	-	-		
A. bicolor	R									L-1,100	F_l		P
Leucopternis kuhli									X	-	-		
L. albicollis									X	-	-		
Harpyhaliaetus solitarius									X	-	-		
Buteo magnirostris	U	F				X			X	L-1,400	S_p		A
B. leucorrhous			U	R						1,850–2,200	F_m, F_e, P		
B. brachyurus								X	X	L-1,500	F_t		
B. albonotatus		R								1,050	F_l		P

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Morphnus guianensis							X			1,600	F_t	n	
Spizaetus tyrannus									X	-	-		
S. melanoleucus			U						X	2,100	F_m, F_e		
S. ornatus	R								X	1,000	F_l		
Ibycter americanus	U			F		X		X	X	L-1,850	F_l, F_t, F_m		A
Caracara spp.		R								1,050	S_p		
Micrastur ruficollis	U			U					X	L-1,850	F_l, F_t, F_m		A
M. gilvicollis					U				X	1,000	F_t		A
M. semitorquatus	R				R				X	L-1,250	F_l		
Falco rufigularis	R		U		R				X	L-2,100	F_l, F_t, F_m, F_e		
Laterallus viridis	F	F								1,050–1,350	S_p		S_1, A
L. melanophaius		C								L-1,050	M		A
Aramides cajanea		F								L-1,050	M, S_p		
Pardirallus nigricans		C								1,050	M		A
Gallinula chloropus		U								1,050	M		
Tringa solitaria		R								L-1,050	R	b	
Actitis macularius		R							X	L-1,050	R	b	P
Patagioenas speciosa	U	U							X	1,050–1,350	F_l, F_t		A
P. fasciata			F			X		X	X	1,550–2,100	F_m, F_e		A
P. cayennensis		R								L-1,050	F_l		
P. plumbea	F	C		C	F	X	X	X	X	L-1,850	F_l, F_t, F_m		A
P. subvinacea		R		R	R		X		X	L-1,850	F_t, F_m		A
Columbina talpacoti		C								L-1,050	S_p	m	M, P
C. picui		R								1,050	S_p	a	P
Claravis pretiosa		U								1,050	S_p		A
Leptotila verreauxi		F								L-1,050	S_p	m	S_1, A
Geotrygon frenata				U		X		X	X	1,400–1,850	F_m		A
G. montana	U				R	X			X	L-1,400	F_l, F_t		A
Aratinga leucophthalma	F	F	U		U	X	X	X	X	L-1,500	F_l, F_t		A
A. weddellii		R							X	L-1,050	F_l		P
Pyrrhura roseifrons	U					X			X	L-1,550	F_l, F_t		P, A
Bolborhynchus lineola			C	C			X			1,800–2,150	F_m, F_e		A
Pionites leucogaster									X	-	-		
Pionus menstruus	F	F				X		X	X	L-1,500	F_l, F_t, S_p		A
Amazona farinosa									X	-	-		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Crotophaga ani	U	C						X	X	L-1,400	S_p		
Tapera naevia		F								L-1,050	S_p		
Neomorphus geoffroyi					R					900	F_t		P
Piaya cayana	C	F			U	X	X		X	L-1,300	F_l, F_t, S_p		A
Coccyzus melacoryphus	U	R								1,050–1,200	F_l, S_p	a	
Megascops choliba		U							X	L-1,050	S_p		
M. ingens				F		X			X	1,600–1,850	F_m		A
M. watsonii	U								X	L-1,200	F_l		A
M. guatemalae	F				R				X	1,000–1,300	F_t		A
Strix albitarsus			U	R					X	1,850–2,100	F_m, F_e		A
S. huhula	U									1,200	F_t		A
Pulsatrix perspicillata									X	-	-		A
P. melanota	U				F					1,000–1,200	F_t		A
Glaucidium parkeri					F				X	900–1,200	F_t		A
G. brasilianum		F							X	1,050	S_p		
Pseudoscops clamator		R								1,050	M, S_p		P
Steatornis caripensis				R						1,850	F_m		
Nyctibius grandis	F									1,200	F_t		A
N. griseus	F								X	1,200	F_t		A
Lurocalis rufiventris				U		X				1,600–1,850	F_m		
Chordeiles rupestris									X	-	-		
Nyctiphrynus ocellatus	F								X	1,200	F_t		A
Caprimulgus maculicaudus		F								1,050	S_p		P, A
C. parvulus		R								L-1,050	S_p	a	A
C. nigrescens	U									1,350	S_p		P
Uropsalis segmentata			F							2,050–2,100	F_e		P, A
U. lyra									X	-	-		
Streptoprocne rutila			U			X			X	L-2,200	Throughout		
S. zonaris	C	C	U		R	X	X		X	L-2,200	Throughout		
Chaetura egregia		R							X	L-1,050	S_p		
C. brachyura		R			R				X	L-1,050	F_l, S_p		
Aeronautes montivagus							X			1,300	F_t		
A. spp.									X	-	-		
Tachornis squamata		U								L-1,050	S_p		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oven-teni	Menk-oremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitch-ungari					
Eutoxeres condamini				U	R	X	X		X	1,000–1,850	F_t, F_m		P
Glaucis hirsutus		U							X	L-1,050	F_l		
Threnetes leucurus					R				X	L-1,000	F_l, F_t		P, A
Phaethornis guy					F	X	X		X	900–1,600	F_t	m	P
P. superciliosus	U	R			U				X	L-1,300	F_l, F_t	m	M, P, A
P. koepckeae					R				X	L-1,000	F_t	n, p	
P. stuarti	R	R				X				1,050–1,100	F_l, S_p		
Doryfera ludovicae				U					X	1,850	F_m		
D. johannae					F		X		X	L-1,200	F_t	r	A
Campylopterus largipennis		R							X	L-1,050	F_l		
Florisuga mellivora	F	U			C		X		X	L-1,300	F_l, F_t		
Colibri delphinae									X	-	-		
C. thalassinus	F		F						X	1,100–2,150	F_l, F_t, F_e		A
C. coruscans							X		X	1,800	F_m		
Anthracothorax nigricollis		R								1,050	S_p		
Klais guimeti					U	X				L-1,950	F_t, F_m	m	P
Lophornis delattrei	U				R				X	1,050–1,200	F_t		
Discosura spp.	R									1,150	F_l		
Chlorestes notata	R									1,175	F_l		
Chlorostilbon mellisugus		R							X	L-1,050	F_l, S_p		P
Thalurania furcata	C	U			F	X		X	X	L-1,400	F_l, F_t	m	M, P
Chrysuronia oenone	U	R			U	X			X	L-1,200	F_l, S_p		M, P, A
Amazilia lactea	U	U				X				1,050–1,200	F_l		
Adelomyia melanogenys			U	C	R	X	X		X	1,000–2,050	F_t, F_m, F_e		
Phlogophilus harterti					U				X	1,000	F_t	n, p	
Heliodoxa branickii					F	X			X	900–1,250	F_t		S_l, A
H. schreibersii					U					900–1,200	F_t		S_l
H. aurescens					U				X	L-1,050	F_l, F_t		
H. leadbeateri				U		X	X		X	1,700–1,850	F_m		M, P
Coeligena coeligena			F	C		X			X	1,800–2,100	F_m, F_e	m	M, P, A
Haplophaedia aureliae			U	C			X		X	1,700–2,050	F_m, F_e	m	S_l, M, P, A
Ocreatus underwoodii				U					X	1,850	F_m		
Aglaiocercus kingi			F	C			X		X	1,850–2,150	F_m, F_e	m	M, P
Schistes geoffroyi									X	-	-		
Heliothryx auritus		R							X	1,050	S_p		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Chaetocercus mulsant								X		1,450	F_t		
Pharomachrus auriceps			U	C		X			X	1,600–2,050	F_m, F_e		A
P. antisianus			U	C		X	X		X	1,100–2,100	F_t, F_m, F_e		A
Trogon melanurus	R								X	L-1,100	F_l		A
T. viridis									X	-	-		A
T. violaceus	R								X	L-1,150	F_l		A
T. curucui	F	U			F	X			X	L-1,250	F_l, F_t		A
T. collaris	F	R			U		X	X	X	900–1,450	F_l, F_t		A
T. personatus				R		X			X	1,850–1,950	F_m		A
Chloroceryle amazona		R							X	L-1,050	R, M		
Megaceryle torquata		R							X	L-1,050	R, M		
Momotus momota									X	-	-		A
M. aequatorialis				F		X			X	1,500–1,850	F_m		P, A
Baryphthengus martii	R	R			F				X	L-1,200	F_l, F_t		A
Electron platyrhynchum	R				U				X	L-1,200	F_l, F_t		
Galbula cyanescens		U			F		X	X		900–1,200	F_t		A
Notharchus tectus									X	-	-		
Nystalus striolatus		U							X	L-1,050	F_l, S_p		A
Malacoptila fusca									X	-	-		
M. fulvogularis									X	-	-		
Micromonacha lanceolata					R					1,000	F_t		
Monasa morphoeus	R				U				X	900–1,200	F_t		A
Chelidoptera tenebrosa	F					X				L-1,400	S_p	r	P
Capito taxon novum					F		X			950–1,225	F_t	v, p	S_1, P, A
C. auratus	F	U			F	X	X	X	X	L-1,500	F_l, F_t		A
Eubucco richardsoni		U							X	L-1,050	F_l		A
E. versicolor				U	U	X	X	X	X	900–2,000	F_t, F_m		A
Aulacorhynchus prasinus	F			U		X			X	1,100–1,850	F_l, F_t, F_m		A
A. derbianus				R	F			X	X	900–1,850	Ft, F_m		A
Pteroglossus azara	U								X	L-1,300	F_l, F_t		
P. beauharnaesii								X	X	L-1,450	F_l, F_t		
Selenidera reinwardtii	R								X	L-1,100	F_l		
Ramphastos tucanus	F				U			X	X	L-1,200	F_l		A
Picumnus lafresnayi		F				X		X	X	L-1,500	F_l, F_t		
Melanerpes cruentatus	C					X		X	X	L-1,500	S_p		A

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Picoides fumigatus				R		X			X	1,850–1,950	F_m		
Veniliornis passerinus		U								L-1,050	F_l		A
V. affinis					R				X	1,000	F_t		
Piculus leucolaemus	R								X	1,150	F_l		
P. chrysochloros									X	-	-		
Colaptes rubiginosus			U	F	U		X	X	X	900–2,100	F_t, F_m, F_e	r	A
Dryocopus lineatus	F	U							X	L-1,200	F_l		
Campephilus haematogaster				R		X				1,600–1,850	F_m		A
C. rubricollis	R							X	X	L-1,400	F_l, F_t		
C. melanoleucos		R							X	L-1,050	F_l		
Synallaxis albigularis		U								L-1,050	M		A
S. hypospodia	F	F								1,050–1,375	S_p	r	S_1, P, A
S. cabanisi	U	U				X				1,000–1,200	F_l		A
S. gujanensis	C	C				X		X		L-1,350	S_p		A
Cranioleuca curtata				R	U	X			X	900–1,850	F_t, F_m		A
Premnornis guttuligera				F					X	1,850	F_m	r	M, P
Premnoplex brunnescens				F		X			X	1,700–1,850	F_m	r	M, P, A
Margarornis squamiger									X	-	-		
Pseudocolaptes biossonneautii				R		X			X	1,850–1,900	F_m		
Anabacerthia striaticollis				U		X	X	X		1,400–2,000	F_t, F_m		A
Syndactyla subalaris				U		X	X	X	X	1,400–1,850	F_t, F_m		A
S. rufosuperciliata			U	F			X		X	1,200–2,050	F_t, F_m, F_e	r	A
Ancistrops strigilatus									X	-	-		
Hyloctistes subulatus					R				X	1,000	F_t		A
Philydor ruficaudatum	U								X	1,100–1,150	F_l		A
P. erythrocercum					F	X	X		X	L-1,550	F_t		
P. rufum									X	-	-		
Anabazenops dorsalis		F								1,050	F_l, S_p		M, P, A
Thripadectes melanorhynchus				U					X	1,850	F_m		A
Automolus ochrolaemus	F				F				X	L-1,300	F_l, F_t	m	P, A
A. rubiginosus					R				X	1,000	F_t		A
Sclerurus mexicanus									X	-	-		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oven-teni	Menk-oremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitch-ungari					
S. albigularis					R					1,000	F_t		A
S. caudacutus					U				X	1,000	F_t		A
Lochmias nematura									X	-	-		
Xenops minutus	F	U			U	X			X	L-1,300	F_l, F_t		A
X. rutilans				U	X		X	X	X	1,100–1,850	F_t, F_m		
Dendrocincla tyrannina				U			X		X	1,700–1,850	F_m	m	M, P
D. fuliginosa	U	R							X	L-1,100	F_l		A
Deconychura longicauda	R								X	L-1,050	F_l		
Sittasomus griseicapillus	F	R			F	X		X	X	L-1,500	F_l, F_t		A
Glyphorynchus spirurus	U						X		X	L-1,300	F_l, F_t		
Dendrexetastes rufigula		U				X				L-1,100	F_l		
Xiphocolaptes promeropirhynchus				U	U	X			X	L-1,850	F_l, F_t,F_m		A
Dendrocolaptes certhia									X	-	-		
D. picumnus	U	U			U	X	X	X	X	L-1,500	F_l, F_t		A
Xiphorhynchus ocellatus	U				U			X	X	L-1,500	F_l, F_t	m	P, A
X. elegans					R				X	L-1,000	F_l, F_t		A
X. guttatus	R	R			U	X			X	L-1,200	F_l, F_t		A
X. triangularis				U		X	X		X	1,600–1,850	F_m	m	
Lepidocolaptes lacrymiger				R						1,850	F_m		
L. albolineatus	R	R							X	L-1,100	F_l		A
Campylorhamphus trochilirostris									X	-	-		
Cymbilaimus lineatus	C				F			X	X	L-1,400	F_l, F_t		A
Taraba major		U				X			X	L-1,150	S_p		A
Thamnophilus doliatus	U	C								L-1,200	S_p		A
T. doliatus/palliatus						X				1,500	F_t		
T. palliatus									X	-	-		
T. aethiops					F			X	X	L-1,400	F_l, F_t		A
T. schistaceus	C	F				X			X	L-1,250	F_l, F_t		A
T. murinus					C				X	L-1,200	F_l, F_t		A
T. caerulescens				C		X	X		X	1,600–1,850	F_m	m	M, P, A
Thamnistes anabatinus				R			X	X	X	1,400–1,850	F_t, F_m		A
Dysithamnus mentalis	F	R			F	X		X	X	900–1,500	F_l, F_t	m	A
Thamnomanes ardesiacus									X	-	-		A

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Epinecrophylla spodionota					F				X	L-1,200	F_t		A
E. erythrura							X		X	-	-		
Myrmotherula brachyura	C	F				X			X	L-1,450	F_l, F_t		A
M. longicauda								X		1,500	F_t		
M. schisticolor						X		X	X	1,500–1,800	F_t, F_m		A
M. menetriesii	F				U				X	L-1,300	F_l, F_t		A
Herpsilochmus motacilloides				U		X	X		X	1,100–1,850	F_t, F_m	p	A
H. rufimarginatus					F				X	L-1,100	F_l, F_t		A
Microrhopias quixensis	R									1,000	F_l		A
Formicivora rufa	U	F								1,050–1,300	S_p	r, m	S_1, M, P, A
Drymophila caudata						X	X		X	1,600–1,800	F_m		A
Terenura callinota							X	X	X	1,200–1,500	F_t		A
Cercomacra cinerascens	F				U			X	X	L-1,500	F_l, F_t		A
C. nigrescens		R		U	R	X	X	X	X	1,050–1,850	F_t, F_m		A
C. serva						X	X	X	X	L-1,450	F_l, F_t		A
Pyriglena leuconota				R						L-1,850	F_t, F_m		A
Myrmoborus leucophrys	U	F				X				1,000–1,100	F_l		P, A
M. myotherinus	C				F			X	X	L-1,400	F_l, F_t		A
Hypocnemis subflava	C	U				X			X	L-1,200	F_l		A
Schistocichla leucostigma									X	-	-		
Myrmeciza hemimelaena	F	U			F	X		X	X	L-1,450	F_l, F_t		A
Pithys albifrons					R				X	L-1,000	F_l, F_t		
Rhegmatorhina melanosticta					R				X	1,000	F_t		
Hylophylax naevius	U					X			X	1,100–1,200	F_l		A
Willisornis poecilinotus	U				F				X	L-1,300	F_l, F_t	r	A
Formicarius analis	C	R						X	X	L-1,400	F_l, F_t		A
Chamaeza campanisona					C	X	X	X	X	L-1,800	F_t		A
C. mollissima				R			X			1,850–1,900	F_m		A
Grallaria guatimalensis					C					L-1,200	F_t		A
G. haplonota			R	R						1,850–1,950	F_m		A
Myrmothera campanisona	F	U				X		X	X	L-1,400	F_l, F_t		A

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Grallaricula flavirostris				F		X			X	1,800–1,900	F_m		M, P, A
Conopophaga castaneiceps							X		X	1,200	F_t		A
Liosceles thoracicus									X	-	-		
Scytalopus femoralis			C	C		X	X		X	1,700–2,200	F_m, F_e	p	A
S. atratus						X		X	X	1,400–1,600	F_t		A
S. parvirostris									X	-	-		
Piprites chloris	F	F			U		X		X	L-1,300	F_t		A
Phyllomyias burmeisteri								X		1,500	F_t		
P. griseiceps/weedeni	R	F				X		X		L-1,450	F_l, F_t		P, A
P. cinereiceps				R						1,850	F_m		A
Tyrannulus elatus	F	F								L-1,200	F_l		A
Myiopagis gaimardii	C	U								L-1,300	F_l, F_t		A
Elaenia flavogaster	F	C				X				L-1,375	S_p		S_1, A
E. spectabilis		C								1,050	S_p, F_t	a, m	M, P, A
E. albiceps					R				X	L-900	F_t, F	a	
E. gigas		R								L-1,050	S_p		A
E. chiriquensis	U	F								1,050–1,375	S_p		A
Ornithion inerme	F	F								L-1,200	F_l		A
Camptostoma obsoletum		R								1,050	S_p	a	
Mecocerculus poecilocercus									X	-	-		
Phaeomyias murina	U	C								L-1,100	S_p		M, P, A
Pseudocolopteryx acutipennis		U								1,050	M, S_p	a	M, P
Pseudotriccus pelzelni				F		X			X	1,600–1,850	F_m		A
Corythopis torquatus	U	R							X	L-1,200	F_l		A
Zimmerius cinereicapilla	R									L-1,150	F_l, F_t		A
Z. viridiflavus	U	R		C	U	X	X	X	X	900–1,800	F_t, F_m, S_p		P, A
Pogonotriccus poecilotis				F		X				1,700–1,850	F_m		A
P. ophthalmicus					U	X	X	X		900–1,550	F_t		A
Phylloscartes ventralis			U	C		X	X		X	1,400–2,050	F_t, F_m, F_e		P, A
P. parkeri	U	R				X				1,050–1,200	F_l, F_t		A
Mionectes striaticollis				F		X	X	X	X	1,400–2,000	F_t, F_m		M, P, A
M. olivaceus	F				F		X	X	X	900–1,500	F_t		M, P

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
M. oleagineus									X	-	-		
Leptopogon amaurocephalus		R							X	-	-		A
L. superciliaris					C		X	X	X	L-1,500	F_l, F_t	r	A
Myiophobus flavicans				F		X			X	1,850–1,900	F_m	m	A
M. roraimae									X	-	-		
M. fasciatus	R	F							X	1,050	S_p	a	M, P, A
Myiotriccus ornatus				C	F	X	X	X	X	900–1,900	F_t, F_m		A
Hemitriccus rufigularis					F				X	900–1,200	F_t	n	A
Myiornis albiventris	U	R								L-1,100	F_l, F_t		A
M. ecaudatus									X	-	-		
Lophotriccus pileatus				F		X	X	X	X	1,100–1,850	F_t, F_m		A
Poecilotriccus latirostris	C	F				X				L-1,200	F_l, S_p		A
Todirostrum cinereum		U								1,050	S_p		
T. chrysocrotaphum	R	U							X	L-1,050	F_l		A
Rhynchocyclus fulvipectus						X	X		X	1,500–1,800	F_t, F_m		
Tolmomyias assimilis									X	-	-		
T. poliocephalus		R								L-1,050	F_l, S_p		A
T. flaviventris	F	F								L-1,200	S_p		A
Platyrinchus mystaceus							X		X	1,200	F_t		A
P. platyrhynchos	U								X	L-1,300	F_l, F_t	m	M, P, A
Pyrrhomyias cinnamomeus				C		X			X	1,700–1,850	F_m		P, A
Hirundinea ferruginea									X	-	-		
Lathrotriccus euleri	U					X		X	X	1,000–1,500	F_l, F_t	a*?	A
Sayornis nigricans	R							X	X	900–1,100	R		
Mitrephanes olivaceus								X		1,500	F_t		
Contopus cooperi						X		X		L-1,550	F_t	b	
C. fumigatus				F			X		X	1,850	F_m		A
C. sordidulus					C		X	X		900–1,500	F_t	b	A
Empidonax alnorum		R								L-1,050	F_l, S_p	b	A
Pyrocephalus rubinus		R								L-1,050	S_p	a	
Knipolegus poecilurus			F			X			X	1,600–2,150	F_e		A
Muscisaxicola fluviatilis		U								L-1,050	S_p		P
Myiotheretes striaticollis			F							2,050–2,150	F_e		A
M. fumigatus									X	-	-		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Ochthoeca pulchella									X	-	-		
Colonia colonus		U				X				L-1,550	S_p		
Legatus leucophaius	F	C			R	X		X		L-1,400	S_p		A
Myiozetetes similis		F							X	L-1,050	S_p	r	
Pitangus sulphuratus		F							X	L-1,050	F_l, S_p	r	A
Philohydor lictor		R								1,050	R		
Conopias cinchoneti		R								1,100	F_t		A
Myiodynastes chrysocephalus							X		X	1,400	F_t		
M. maculatus	F	C				X	X	X	X	L-1,500	F_l, S_p, F_t	a*?	A
Empidonomus varius	R									L-1,050	F_l	a	
Griseotyrannus aurantioatrocristatus	R									L-1,050	F_l	a	P
Tyrannus melancholicus	C	C				X			X	L-1,550	S_p		A
Rhytipterna simplex	F				F		X	X	X	L-1,400	F_l, F_t		A
Myiarchus tuberculifer									X	-	-		A
M. cephalotes				U		X	X		X	1,400–1,900	F_t, F_m		A
Attila spadiceus	R								X	L-1,000	F_l		A
Ampelion rufaxilla				F						1,850	F_m		A
Pipreola riefferii									X	-	-		
P. pulchra				C		X	X			1,800–2,000	F_m	r, p	M, P, A
P. frontalis					U				X	900–1,100	F_t		
P. chlorolepidota	U					X			X	1,000–1,250	F_t	n	A
Ampelioides tschudii					F		X	X		900–1,500	F_t		A
Rupicola peruvianus					F	X	X	X	X	900–1,800	F_t, F_m		P
Lipaugus vociferans	U				U				X	L-1,000	F_l		A
Snowornis subalaris					R	X	X		X	1,100–1,400	F_t		S_2
S. cryptolophus				F		X			X	1,850–1,900	F_m		
Querula purpurata	U				R				X	L-1,100	F_l		A
Machaeropterus pyrocephalus		C								L-1,050	F_l, Sp		M, P, A
Lepidothrix coronata									X	-	-		
L. coeruleocapilla					F	X	X	X	X	900–1,350	F_t	p	A
Xenopipo holochlora							X		X	1,250	F_t		A
X. unicolor				U	R				X	1,000–1,850	F_t, F_m		M, P

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Dixiphia pipra						X			X	L-1,400	F_l, F_t		
D. chloromeros	C	F			C	X	X	X	X	L-1,500	F_l, F_t	r	M, P, A
Oxyruncus cristatus						X				1,200–1,550	F_t		P, A
Myiobius villosus					U				X	1,000	F_t		A
Terenotriccus erythrurus	R								X	L-1,100	F_l		
Tityra inquisitor		U								L-1,050	S_p		
T. semifasciata	F				R	X		X	X	L-1,500	F_l, F_t		
Schiffornis turdina						X			X	1,350	F_t		
Laniocera hypopyrra									X	-	-		
Iodopleura isabellae	U	R								L-1,100	F_l		P, A
Laniisoma elegans[g]										-	-		S_2
Pachyramphus viridis		F				X				1,050–1,250	S_p, F_l, F_t		A
P. versicolor				U					X	1,850	F_m		
P. polychopterus	F	F						X	X	L-1,200	F_l, S_p		A
P. marginatus	U	R							X	L-1,150	F_l		A
P. albogriseus									X	-	-		
Cyclarhis gujanensis	F	F			F		X		X	L-1,350	S_p, F_l, F_t		A
Vireolanius leucotis	C				F	X	X	X	X	L-1,500	F_l, F_t		A
Vireo leucophrys				U		X		X	X	1,500–1,850	F_m		A
V. olivaceus	C	U			C	X	X	X	X	L-1,500	F_l, F_t, S_p	b*, a*	A
Hylophilus hypoxanthus	C							X	X	L-1,300	F_l, F_t		A
H. ochraceiceps	R				R				X	L-1,000	F_l, F_t		A
Cyanocorax yncas			U	F		X			X	1,400–2,050	F_t, F_m, F_e		A
Progne chalybea	R									L-1,350	S_p		
Notiochelidon cyanoleuca		F	F						X	L-2,200	P, F_e, S_p	a*	
Atticora fasciata	U	R							X	L-1,050	R		
Neochelidon tibialis	R									L-1,300	S_p		
Stelgidopteryx ruficollis	F	F				X				L-1,375	S_p, S		
Hirundo rustica		R	U							L-2,200	P, S_p, F_e	b	
Petrochelidon pyrrhonota	R	R	U							L-2,200	P, S_p, F_e	b	P
Campylorhynchus turdinus		F				X	X	X		L-1,500	F_l, F_t, S_p		A
Odontorchilus branickii		R				X	X			1,050–1,750	F_t		A
Pheugopedius coraya		C				X				L-1,600	F_l, F_t, S_p		A
P. spp.	C							X		1,000–1,500	F_t		A
Troglodytes aedon	R	C				X			X	L-1,400	S_p		A

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
T. solstitialis				F					X	1,850	F_m		A
Henicorhina leucophrys			C	C		X			X	1,600–2,150	F_t, F_m, F_e	r, m	M, P, A
Microcerculus marginatus	F	U			F	X	X	X	X	L-1,400	F_l, F_t		A
M. bambla					U			X	X	L-1,200	F_l, F_t		A
Cyphorhinus thoracicus	R						X	X		1,200–1,500	F_t		A
Microbates cinereiventris					U				X	900–1,000	F_t		
Myadestes ralloides			U	F			X			1,800–2,100	F_m, F_e	r	M, P, A
Cichlopsis leucogenys									X	-	-		
Catharus fuscater						X				1,600	F_t		A
C. dryas				U		X			X	1,600–1,850	F_t, F_m	r	
C. ustulatus					C				X	L-1,200	F_t, F_l	b	S_l, A
Entomodestes leucotis			F	C		X	X		X	1,300–2,100	F_t, F_m, F_e		M, P, A
Turdus leucops				F	F	X			X	900–1,950	F_t, F_m		A
T. serranus			F	F		X			X	1,600–2,150	F_t, F_m, F_e		A
T. nigriceps									X	-	-	a	
T. ignobilis		C				X				L-1,100	S_p		
T. hauxwelli					R					1,000	F_t		A
T. albicollis					R			X	X	1,000–1,450	F_t		A
Anthus spp.			U							2,200	P		
Euphonia laniirostris		U							X	L-1,050	S_p, F_l		
E. chrysopasta		F							X	L-1,050	F_l		
E. mesochrysa	U	R		F	F	X	X		X	900–1,850	F_l, F_t, F_m		P, A
E. minuta	U	U							X	1,000–1,200	F_l		
E. xanthogaster	F			F	F	X	X	X	X	L-1,900	F_l, F_t, F_m	m	P, A
E. rufiventris	F				U	X			X	L-1,300	F_l, F_t		A
Chlorophonia cyanea				R	F	X		X	X	900–1,450	F_t		A
Carduelis magellanica	U	R		F		X				1,000–1,850	F_t, F_m		A
C. olivacea				R		X				1,850–1,900	F_m		A
C. spp.									X	-	-		
Parula pitiayumi					F	X	X	X	X	L-1,650	F_l, F_t		A
Wilsonia canadensis					R			X	X	1,000–1,450	F_t	b	
Myioborus miniatus				F	C	X	X	X	X	900–2,000	F_t, F_m		
Basileuterus chrysogaster	F	R			C	X			X	900–1,850	F_t, F_m		A
B. coronatus	R		F	C		X	X		X	1,100–2,050	F_t, F_m, F_e	r, m	M, P, A
B. tristriatus				F		X	X	X	X	1,100–1,900	F_t, F_m		A

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
Phaeothlypis fulvicauda		U				X		X	X	L-1,200	R		A
Psarocolius decumanus	U								X	L-1,200	F_l		
P. angustifrons	U	U				X		X	X	L-1,400	F_l, S_p, F_t		A
Cacicus cela	R	C				X		X	X	L-1,200	S_p, F_l, F_t		A
C. uropygialis				R		X	X		X	1,400–1,900	F_t, F_m		A
C. solitarius		R				X				1,050–1,100	F_l		
Icterus cayanensis	R				U				X	L-1,200	F_l, F_t		A
Molothrus oryzivorus		U						X	X	L-1,200	S_p		
Coereba flaveola		C							X	L-1,050	F_l, S_p	m	
Zonotrichia capensis		C				X				L-1,400	S_p	r	A
Ammodramus humeralis	F	U								1,050–1,375	S_p		P, A
A. aurifrons		C				X		X		L-1,450	S_p		A
Arremon brunneinucha				U			X		X	1,200–1,850	F_t, F_m		A
Atlapetes tricolor			F						X	2,050–2,150	F_e		A
Schistochlamys melanopis	F	C								1,050–1,375	S_p		S_1, A
Cissopis leverianus	F	F				X		X	X	L-1,450	F_l, S_p		
Conothraupis speculigera		R								1,050	S_p	o, n	
Creurgops verticalis						X				1,950	F_m		
Chlorothraupis carmioli					F				X	L-1,200	F_t		A
Hemispingus frontalis				U					X	1,850	F_m	r, m	M, P, A
Thlypopsis ornata				R						1,850	F_m		
Trichothraupis melanops							X	X	X	1,100–1,500	F_t		A
Tachyphonus rufiventer	F	U			U				X	L-1,200	F_l, F_t		
Lanio versicolor					U				X	L-1,100	F_l, F_t		
Ramphocelus carbo	F	C						X	X	L-1,450	S_p	r	M, P, A
Thraupis episcopus	F	C				X			X	L-1,400	S_p		
T. palmarum		F			U	X		X	X	L-1,400	S_p		
Calochaetes coccineus				U		X			X	1,550–1,850	F_t, F_m		A
Anisognathus somptuosus				C			X		X	1,100–1,850	F_t, F_m		
Iridosornis analis			F	C		X	X	X	X	1,450–2,200	F_t, F_m, F_e		M, P, A
Pipraeidea melanonota	U									1,100–1,200	F_l		
Chlorochrysa calliparaea						X	X		X	1,100–1,550	F_t		
Tangara mexicana	R	U							X	L-1,100	F_l		
T. chilensis	C	C			C	X	X	X	X	L-1,600	F_l, F_t		A
T. schrankii	F	F			F	X	X	X	X	L-1,500	F_l, F_t		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
T. arthus					U	X	X	X	X	900–1,500	F_t		
T. xanthocephala				C		X	X		X	1,700–2,000	F_m		M, P
T. chrysotis							X	X		1,200–1,500	F_t		
T. parzudakii				C		X	X		X	1,700–2,000	F_m		
T. xanthogastra	U							X	X	L-1,200	F_l		
T. punctata					R	X				1,100	F_t		
T. gyrola		F			F	X	X	X	X	L-1,600	F_l, F_t		
T. ruficervix				U	R			X	X	1,100–1,850	F_t, F_m		
T. cyanotis						X			X	1,600	F_m		
T. cyanicollis		C				X		X	X	1,050–1,200	F_t, S_p		
T. nigrocincta	F				U	X		X	X	L-1,600	F_l, F_t		
T. nigroviridis				C		X			X	1,850–2,000	F_m		
T. vassorii									X	-	-		
T. phillipsi			U	C		X			X	1,600–2,200	F_e, F_m	n, p	P, A
T. viridicollis									X	-	-		
T. velia	R								X	L-1,100	F_l		
Tersina viridis	C	R			F					L-1,375	S_p, F_t, F_l		
Dacnis lineata	F	U			F				X	L-1,200	F_l, F_t		
D. cayana	F	F			F	X		X	X	L-1,200	F_l, F_t		
Cyanerpes caeruleus	U				F		X	X	X	L-1,200	F_l, F_t		
Chlorophanes spiza	U	R			U			X	X	L-1,500	F_l, F_t		
Iridophanes pulcherrimus				U					X	1,850	F_m		
Hemithraupis guira	F							X		L-1,200	F_l		
H. flavicollis									X	-	-		
Conirostrum speciosum		R								L-1,050	F_l		
C. albifrons				F		X			X	1,700–1,900	F_m		
Diglossa glauca			F	C		X			X	1,850–2,150	F_m, F_e	r	M, P, A
D. caerulescens			C	R					X	1,850–2,200	F_e, F_m		A
Haplospiza rustica									X	-	-		
Emberizoides herbicola	C	C								1,050–1,375	S_p	r, m	M, P, A
Volatinia jacarina	C	C								L-1,375	S_p	m	M, P
Sporophila plumbea	U	F								1,050–1,375	S_p		S_1, P, A
S. murallae		R								L-1,050	M, S_p		P
S. luctuosa		U							X	1,050	S_p, M	o	
S. nigricollis		F								1,050	S_p, M		

APPENDIX. Continued.

Scientific name	Study Sites[a]								Northern Sira[b]	Elevation (m)[c]	Habitat[d]	Status[e]	Documentation[f]
	Monte Tabor	Oventeni	Menkoremon	Shaani Valley	Shinipo Valley	Santeni Valley	Tzipani Valley	Quitchungari					
S. castaneiventris		R								L-1,050	S_p		
Oryzoborus angolensis	F	F								L-1,375	S_p	m	M, P
O. atrirostris		R								1,050	M, S_p	n	P, A
Chlorospingus ophthalmicus									X	-	-		
C. flavigularis					C	X	X	X	X	900–1,800	F_t, F_m		A
Piranga flava					U			X	X	900–1,500	F_t	b	A
P. rubra					F				X	L-1,200	F_l, F_t		
P. olivacea					C				X	L-1,200	F_l, F_t	b	
P. leucoptera					U		X	X	X	900–1,500	F_t		
Habia rubica	F	R				X			X	L-1,300	F_l, F_t		A
Pheucticus chrysogaster				R						1,850	F_m		A
Parkerthraustes humeralis	F								X	L-1,200	F_l		P
Saltator grossus	R				F	X			X	L-1,200	F_l, F_t		P
S. maximus	U	F			U				X	L-1,100	S_p, F_l		A
S. coerulescens		C							X	L-1,050	S_p		A
Cyanocompsa cyanoides		R							X	L-1,050	F_l, F_t		A

[a] C = common (more than 10 individuals per observer per day), F = fairly common (1–10 individuals per observer per day), U = uncommon (recorded less than daily but on at least 25% of days per observer), R = rare (recorded on less than 25% of days per observer), X = present (coverage at site insufficient to estimate abundance).

[b] This column includes species recorded above 900 m in the northern Cerros del Sira (S. J. Socolar, J. S. Weske, and J. W. Terborgh, unpubl. data; Mee et al. 2001).

[c] L = Lowlands.

[d] P = Paramo, F_e = elfin forest, F_m = upper montane evergreen forest, F_t = lower montane evergreen forest, F_l = tropical lowland evergreen forest, S_p = pajonal, M = marsh, R = rivers and streams.

[e] b = Boreal migrant, a = Austral migrant, o = other migration strategy, * = in part (resident individuals also occur), r = reproductive activity noted, m = active molt noted, e = endangered, v = vulnerable, n = near-threatened, p = Peruvian endemic (Stotz et al. 1996, IUCN 2009).

[f] S_1 = specimen collected by authors, S_2 = specimen collected by Andrews University (deposited in the American Museum of Natural History, New York, USA), P = photographs in the field or hand, A = audio recordings (deposited in ML), M = measurements of mist-netted bird.

[g] recorded at Tsioventeni in the Gran Pajonal (Thoresen 1974).