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ALTITUDINAL DISTRIBUTION OF BIRDS IN THE SIERRA MADRE DEL SUR, GUERRERO, MEXICO[1]

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Abstract. Altitudinal patterns of distribution, diversity, and species turnover in the avifauna of the Sierra de Atoyac, Sierra Madre del Sur, Guerrero, México, were studied along a transect from the tropical coastal plain to high-altitude coniferous forests. Species richness is highest at low elevations and declines with increasing altitude. Richness is relatively uniform within habitat types, but high levels of species turnover are found at habitat ecotones. Altitudinal ranges of congener species pairs overlap more frequently than predicted by null models, suggesting that competition may not have played a dominant role in structuring the community. Patterns of diversity, endemism, and habitat destruction are discussed in terms of conservation priorities.

Key words: Altitudinal distribution; Guerrero; México; species turnover; competition; conservation.

Resumen. Se estudiaron los patrones de distribución altitudinal, diversidad y recambio de especies de la avifauna residente en la Sierra de Atoyac, Guerrero, México, a lo largo de un transecto altitudinal que abarca todos los tipos de vegetación presentes, desde la vegetación costera hasta los bosques altos de coníferas. La riqueza de especies es mayor en las partes bajas, decreciendo conforme aumenta la altitud. La riqueza es notablemente constante dentro de los hábitats, pero altos niveles de recambio de especies se encuentran en los ecotonos. Los intervalos altitudinales que ocupan pares y tríos de especies congenéricas muestran un mayor solapamiento que el predicho por modelos estadísticos nulos, sugiriendo que la competencia no ha jugado un papel dominante en la estructuración de las comunidades. Los patrones de diversidad, endemismo y los efectos de la destrucción de los hábitats son discutidos en términos de prioridades de conservación.

Palabras clave: Distribución altitudinal; Guerrero; México; recambio de especies; competencia; conservación.

INTRODUCTION

Analysis of altitudinal changes in diversity, abundance, and species composition of biotas can provide important information on such phenomena as aspects of the environment limiting the distribution of organisms, factors influencing the structure of communities, and aspects of biogeography. A theoretical framework by which to understand altitudinal distributions of communities was described by Terborgh (1971, 1977) and Terborgh and Weske (1975). These authors argued that the three principal factors influencing altitudinal structuring of communities are abrupt changes in habitats, gradual changes in environmental parameters, and competition.

The purpose of this study is to analyze altitudinal patterns in the avifauna of the Sierra Madre del Sur, Guerrero, Mexico, in an attempt to understand the relative importance of these three factors in structuring the community. The degree to which habitat boundaries and competition introduce structure into the community is statistically analyzed and variation not explained by those two factors is attributed to gradual changes in environmental parameters (Terborgh 1971).

Although the avifauna of the Sierra Madre del Sur of Guerrero has been studied since the late nineteenth century (Salvin and Godman 1879–1904; Nelson 1903; Griscom 1934, 1937; Martín del Campo 1948; Blake 1950; Goldman 1951), little is known about the composition of the avifauna of the humid coastal slope. Moreover, no information exists on altitudinal patterns of avian distribution for the region as a whole. Hence, a second purpose of this study is to provide baseline data on the distribution and ecological char-

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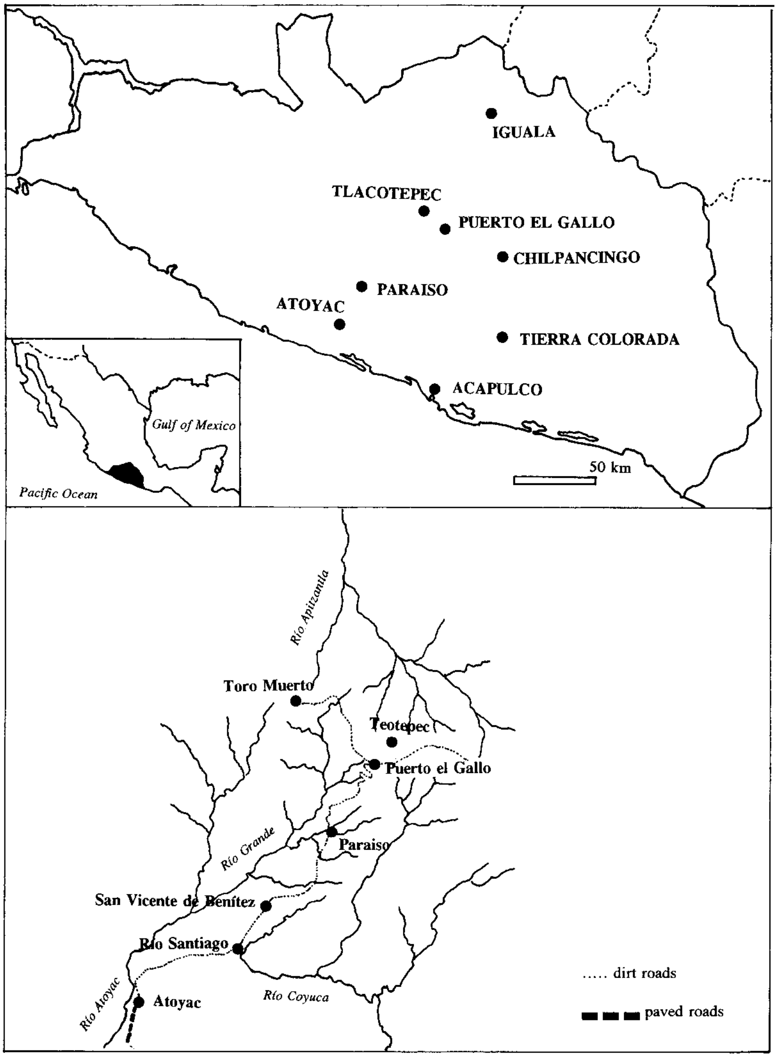

FIGURE 1. Geographic location of the study area: (a) State of Guerrero; (b) Sierra de Atoyac.

acteristics of the avifauna of the Sierra Madre del Sur.

STUDY AREA AND METHODS

The Sierra de Atoyac lies at the southwestern end of the Sierra Madre del Sur, which extends from western Guerrero east to south-central Oaxaca. The Sierra Madre del Sur consists largely of igneous and metamorphic rocks and apparently arose in the Precambrian independently from other mountain masses to the north (López-Ramos 1983). Climatically, the region is largely influenced by weather systems from the Pacific Ocean. Thus, the Pacific slopes are generally humid, whereas the interior slopes are xeric. This study was conducted along an altitudinal transect between the city of Atoyac de Alvarez and the peak of the highest mountain in the Sierra Madre del Sur, Cerro Teotepec (Fig. 1). (The higher localities on this transect have been often referred to as "Mount Teotepec" or just "Teotepec" in the literature.) Eleven stations were established in primary habitats, each separated by approximately 200 m of altitude (from 620 to 3,100 m; Table 1). These stations span the range of habitats along the transect (Fig. 2), including semi-

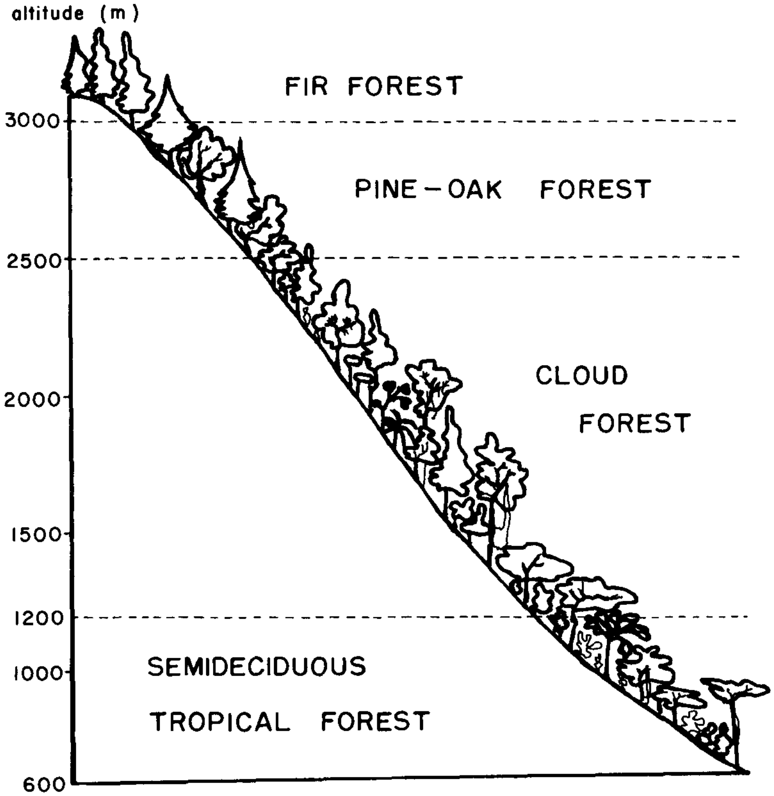

FIGURE 2. Vegetation profile of the humid slope of the Sierra de Atoyac. Broken lines indicate the approximate location of the ecotones.

deciduous tropical forest, cloud forest, pine-oak forest and high-altitude fir forest (see descriptions in Table 1).

A total of 90 days was spent working along the study transect between March 1983 and May 1985, supplemented by occasional visits during 1989. Between 4 and 16 days were spent at each site, with field time distributed in ten of the months of the year. At each site, lines of mist-nets were set in each habitat, and experienced observers made additional observations. Voucher specimens were obtained for as many species as possible, using both mist-nets and a shotgun. These are deposited in the Museo de Zoología,

TABLE 1. Sampling stations along the altitudinal gradient in the Sierra de Atoyac, Guerrero.

Locality	Altitude (m)	Habitat
1. Río Santiago, 14 km SW Paraiso	680	Semideciduous Tropical Forest
2. Puente Lugardo, 3.5 km W Paraiso	820	Semideciduous Tropical Forest
3. El Faisanal, 7.5 km NNE Paraiso	1,200	Ecotone Cloud-Semideciduous Forest
4. Nueva Delhi, 8.5 km NNE Paraiso	1,400	Cloud Forest
5. Retrocesos, 5.5 km S Puerto El Gallo	1,600	Cloud Forest
6. La Golondrina, 13 km NNE Paraiso	1,800	Cloud Forest
7. El Descanso, 2 km SW Puerto El Gallo	2,000	Cloud Forest
8. El Iris, 3 km NE Puerto El Gallo	2,200	Cloud-Pine-Oak Forest
9. Puerto El Gallo, 15.5 km NNE Paraiso	2,500	Pine-Oak-Cloud Forest
10. Toro Muerto, 10 km NW Puerto El Gallo	2,600	Pine-Oak Forest
11. Teotepec, 4 km E Puerto El Gallo	3,100	Fir Forest

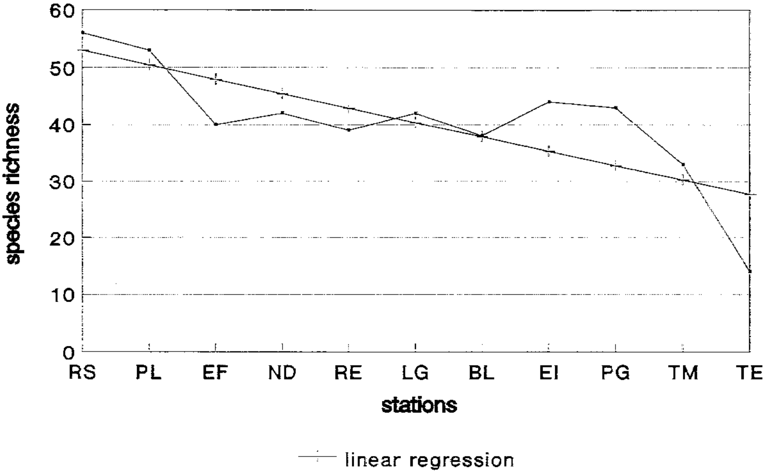

FIGURE 3. Resident species richness along the altitudinal transect.

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Cumulative plots of resident species vs. field days were inspected to assure that field effort at each site was sufficient to understand the composition of the avifauna of that site. Eight of 11 of these plots were asymptotic by the final day of field work, indicating that few species remained undiscovered. When gaps were present in a species' altitudinal distribution, we assumed that these represented inadequate sampling, and not actual gaps, and thus used adjusted species lists for each locality in the analyses that follow. In addition, these analyses do not include highly aerial species (e.g., Apodidae, certain Falconiformes) and species of uncertain seasonal status in the area (e.g., *Selasphorus platycercus, Pheucticus melanocephalus, Caprimulgus vociferus*). Because it was difficult to distinguish seasonal movements from actual residency of several uncommon species, altitudinal ranges may have been overestimated for some species. (Complete avifaunal information is given in Navarro [1986] and Navarro et al. [in prep.].) Altitudinal patterns of species turnover were summarized in two ways: (1) the proportion of species present at one station reaching their upper or lower altitudinal limit before the next station above or below, and (2) using the decay curves of species presence in successively more distant sites proposed by Terborgh (1971). To test whether competition among resident congeners is a dominant factor in limiting altitudinal distributions, we made the following two tests for non-randomness of altitudinal distributions of congeners. Altitudinal distributions were assumed to be continuous, with gaps filled as described above, and, for the purposes of this test, altitudinal range width was assumed to be insensitive of the presence of other species (see Discussion). Two definitions of "non-overlap" were used: (1) completely exclusive distributions, in which the congener species pair never occurred at the same station, and (2) adjacent distributions, in which overlap at one station that constitutes an altitudinal limit for both species was counted as non-overlap. Under both overlap definitions, probabilities of distributional overlap were calculated for all possible combinations of altitudinal range widths of two species (i.e., one to eleven stations) of species pairs. For the eight congener pairs and six congener trios resident in the Sierra de Atoyac, predicted overlap frequencies were calculated as the weighted mean probability of overlap over all possible congener species-pairs. Overlap probabilities were weighted by devaluing probabilities from congener trios so that each genus contributed equally to the overall mean. Actual overlap frequencies (also a mean weighted so that each genus contributed equally) were compared to the predicted frequencies using a one-sample, one-tailed Student's t-test. This test is conservative because the assumption of continuity of altitudinal distributions leads to higher levels of overlap than were actually observed.

RESULTS

A total of 162 species was recorded along the transect in this study (Appendix). (Additional species are reported for the region by Friedmann

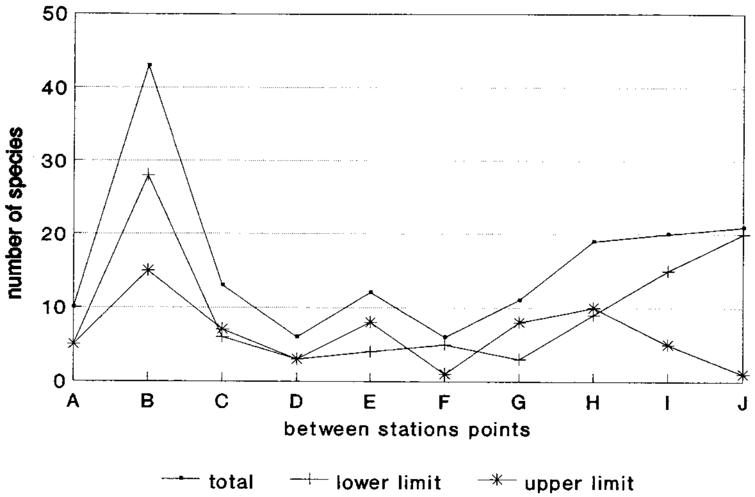

FIGURE 4. Patterns of altitudinal limits in the study transect. Letters indicate areas separating adjacent stations in the altitudinal sequence (ascending).

et al. [1950] and Miller et al. [1957], but due to ambiguity in locality descriptions it is impossible to know whether these records are from the humid Pacific slopes included in this study.) Of the species recorded during this study, 31 (19.13%) are migrants or vagrants; the remaining 131 (80.86%) are assumed to be resident based on presence during reproductive season, observations of reproductive behavior, and information from the literature.

Species richness of residents declined significantly with altitude (Fig. 3; $R^2 = 0.65$, $P < 0.0051$). Richness was greatest at the two lowest stations, lower and more or less constant at the succeeding nine, and lowest at the highest station.

Semideciduous tropical forest held more resident species (53–57) than higher elevation habitats. Species richness in cloud forest (38–44) and humid pine-oak forest (37–43) was remarkably constant through 1,350 m of altitude, but was considerably reduced in the high altitude fir forest (14).

Both lower and upper range limits are concentrated between the second and third stations (ascending) along the transect (Fig. 4) coincident with a drastic change in habitats (from semideciduous tropical forest to cloud forest). Upper range limits were reached with increasing frequency ascending the transect. Lower range limits showed two peaks: one between stations five and six, and the other between stations eight and nine. The former peak corresponds to the upper limit of coffee cultivation, and seemingly sensitive species such as *Aphelocoma unicolor* and *Cyanolyca mirabilis* are limited to the better-preserved forests at higher altitudes. The latter corresponds to the lower limit of pine-oak forest, at which point many of the high-elevation species drop out (e.g., *Strix varia, Picoides villosus, Empidonax affinis,* and *Cyanocitta stelleri*). The decay-curve approach of Terborgh (1971; Fig. 5) shows for the most part the same patterns, although the turnover between stations eight and nine is less obvious, and that between stations nine and ten is quite marked.

Patterns of altitudinal replacement by closely related species suggest that competitive interactions may limit altitudinal distributions in some groups (Terborgh and Weske 1975). For example, in the six species of jays that occur in the area, *Cyanocorax sanblasianus* is found exclusively on the coastal plain in low scrub and mangroves, *Calocitta formosa* ranges from the coastal scrub up to the second station on the transect, where it is replaced by *Cyanocorax yncas.* At the sixth station, two species of cloud forest jays (*A. unicolor* and *C. mirabilis*) are present; *C. yncas* reaches its upper limit at the seventh station; the two cloud forest jays drop out at the eighth and ninth stations, respectively; and *C. stelleri* is found from the ninth station to the peak of Cerro Teotepec. Similar patterns of altitudinal replacement are found in the genera *Empidonax* and *Basileuterus,* among others.

However, more general tests for non-random-

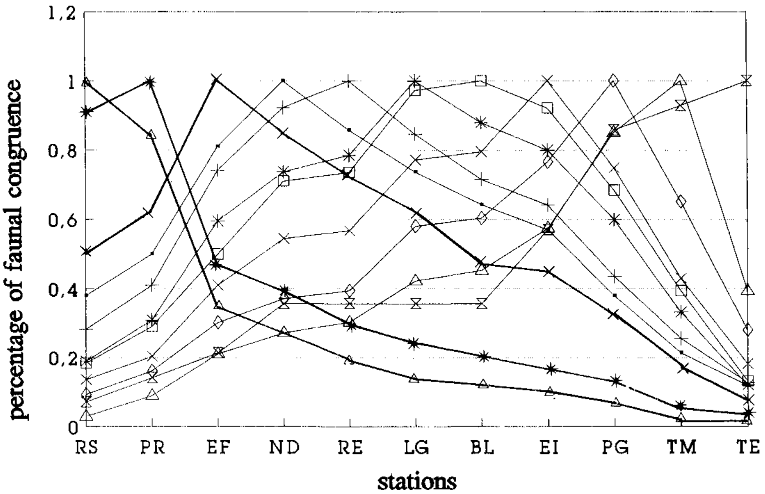

FIGURE 5. Faunal congruence curves for resident species along the altitudinal transect (Terborgh 1971).

ness of altitudinal distributions of resident congener species do not indicate that abrupt replacements are the rule in the avifauna of the study tract. If competition among congeners acts to structure the avifauna, observed levels of overlap should be lower than those predicted by random assortment of species' altitudinal ranges. For the eight resident congener pairs and six congener trios found along the study transect, random assortment of altitudinal ranges predicts that 56.5% of congeneric species pairs should show completely exclusive altitudinal distributions, and 43.1% should show adjacent or non-overlapping altitudinal distributions. Observed levels of overlap were 61.8% (exclusive distributions) and 44.1% (adjacent distributions), actually higher than predicted levels, and hence levels of overlap were not significantly lower than predicted at random ($P > 0.5$, in both cases).

DISCUSSION

Three species encountered in this study had not been recorded previously for the state of Guerrero, and hence represent range extensions: *Rhynchocyclus brevirostris, Sittasomus griseicapillus,* and *Basileuterus culicivorus.* Distributional and taxonomic implications of these records are discussed elsewhere (Navarro et al., in prep.). The effects of habitat on the distribution of the avifauna are striking. Along the transect, zones of high species turnover are largely coincident with ecotones among habitats. Between adjacent stations located on either side of an ecotone, species turnover was as high as 30%. Therefore, a strong influence of habitats on species distributions is indicated. The tests for non-randomness of congener distributions suggest that competition has not led to a preponderance of non-overlapping altitudinal distributions. However, these tests assume that competition has not influenced altitudinal range amplitudes. If the altitudinal distributions used in constructing the null distributions were themselves affected by competition, these tests are more likely to fail to reject the null hypothesis of no competitive interactions. Thus, further analyses of this type must await more detailed information on altitudinal distributions of each species in areas lacking its congener species.

Although these tests are restricted to congener species, it is likely that they underestimate the effects of competition because several of the genera include species with divergent habitat use and foraging behavior that are unlikely to compete. To evaluate this possibility, I considered only those genera in which the species are found in the same habitat using the same general foraging modes (i.e., *Amazilia, Trogon, Thryothorus, Piranga, Saltator*). In these genera, where species are ecologically similar, reduced altitudinal overlap would be expected. However, four of the five genera show complete altitudinal overlap, and it appears that the conclusion of low importance of competition is not simply a function of the diverse array of genera analyzed.

In general, however, given the striking species turnover between and uniformity within habitat types, it appears that the most important factor in structuring the avifauna of the Sierra de Atoyac is the zonation of habitats. In the analyses presented here, competition among closely related species appears not to have had a strong effect on the distribution of the avifauna, as was found in Peru by Terborgh and Weske (1975), although this conclusion is contingent on a restrictive assumption. Environmental factors that change gradually along the transect probably also have an effect, but the importance of this set of factors is difficult to distinguish due to intercorrelation with habitat types.

Although sample points were located in the least disturbed vegetation available, modification of the habitat by humans also appears to play a role in structuring avian altitudinal distributions in the Sierra Madre del Sur. A number of species seem completely restricted to undisturbed habitats. Examples include the jays *A. unicolor* and *C. mirabilis,* the wood-partridge *Dendrortyx macroura,* and the nightingale-thrush *Catharus frantzii.* The altitudinal ranges of species such as these have certainly changed as humans have modified the habitats in the region.

Terborgh (1971) and Terborgh and Weske (1975) suggested a series of analyses designed to understand the roles of competition, physical factors, and ecotones in altitudinal structuring of communities. I have employed some of their approaches in the analyses of the effect of habitat changes on avian communities; unfortunately, their tests of the role of competition are based on population densities, data unavailable in the present study. Further analyses of these types, and especially comparisons among transects (Terborgh and Weske 1975), will be possible only when more detailed studies in other localities are completed (M. Torres, in prep.).

The influence of competition on the altitudinal distribution of organisms has been tested a number of times by other authors. Several authors argue that competition is the main factor influencing altitudinal ranges, for example in closely related species in the genus *Catharus* (Noon 1981), and in the structuring of bird communities in the Andes (Terborgh 1985). Other studies have shown that physical environmental factors that vary with altitude limit their altitudinal ranges (Berven 1982, Lawton et al. 1987, Zammuto and Milliard 1985). However, most studies have stressed the importance of habitat structure in determining altitudinal structure of animal communities (Fuentes and Jaksic 1980; Graham 1983; Lawton et al. 1987; M. Torres, in prep.).

Considering the patterns of distribution and abundance encountered in this study, it is desirable to identify particular zones or habitats as conservation priorities. In this particular region, however, it appears that all of the zones are in danger of complete destruction and also contain unique avifaunal elements. The semideciduous tropical forest at the base of the range contains the only known populations of the Short-crested coquette *Lophornis brachylopha* (Ornelas 1987, Banks 1990), as well as the highest species diversity in the transect. This forest, however, is rapidly being cleared for cultivation of corn, fruit, and coffee. The cloud forest zone contains two endemic species (the hummingbird *Eupherusa poliocerca* and the jay *C. mirabilis*) as well as a number of well-marked geographic differentiates (e.g., *Geotrygon albifacies rubida, Dendrortyx macroura striatus, Aulacorhynchus prasinus wagleri, Automolus rubiginosus guerrerensis*). Cloud forests below 1,800 m in this area are almost completely under cultivation for coffee, with undisturbed forest existing only on the most vertical slopes. The higher altitude forests of pine, oak, and fir, although having lower species diversities, contain a number of endemic forms (e.g., *C. mirabilis, Cyanocitta stelleri teotepecensis, Cathurus frantzii omiltemensis*). These forests are being cut for lumber at an alarming rate. Thus, to the extent that the flora and fauna of the Sierra Madre del Sur are a conservation priority, all altitudinal zones must be represented in an attempt to preserve this area.

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APPENDIX. Altitudinal distributions, status, abundance and habitat use of bird species encountered along the altitudinal transect in the Sierra de Atoyac. Sampling stations numbers are referred as in Table 1. Status is given as ? (doubtful), R (breeding), M (migrants), or W (winter resident). Abundance is given as A (abundant: seen in numbers on every visit), C (common: recorded on most visits), and R (rare: seen only one or twice in the entire study). Habitat use is indicated as F (fir forest), P (pine-oak forest), C (cloud forest), T (semideciduous tropical forest); * after the name of the taxon indicates that was not used in the analysis of altitudinal patterns because of its seasonal status (migrant or uncertain) or lack of detailed altitudinal range data (highly aerial species).

	Station													
Species	1	2	3	4	5	6	7	8	9	10	11	St	Ab	HU
Crypturellus cinnamomeus	x											R	R	T
Butorides striatus	x											R	C	T
*Cathartes aura**	x	x	x	x	x							R	A	TC
Buteogallus anthracinus	x											R	C	T
*Buteo platypterus**				x	x							M	R	C
*Buteo swainsoni**			x	x								M	R	C
*Buteo jamaicensis**					x	x	x	x	x	x	x	R?	C	CP
Micrastur semitorquatus		x	x	x	x							R	R	TC
Falco sparverius	x	x										R	C	T
Ortalis poliocephala	x	x										R	C	T
Dendrortyx macroura				x	x	x	x	x				R	A	C
Dactylortyx thoracicus									x	x	x	R	R	PF
*Actitus macularia**	x	x										W	C	T
Columba fasciata										x		R	C	P
Columbina inca	x	x										R	A	T
Leptotila verreauxi	x	x										R	C	TC
Geotrygon albifacies			x	x	x	x	x	x				R	A	C
Aratinga canicularis	x	x	x	x								R	A	TC
Amazona oratryx	x	x	x	x								R	C	TC
Piaya cayana	x	x	x	x	x	x	x					R	C	TC
Geococcyx velox	x	x										R	R	T
Crotophaga sulcirostris	x	x										R	A	T
*Otus flammeolus**										x		W	R	P
Glaucidium brasilianum	x	x										R	C	T
Strix varia										x		R	R	P
Nyctydromus albicollis	x	x										R	C	T
*Caprimulgus vociferus**									x	x	x	R?	A	P
Cypseloides sp. nov.*									x			R	R	C
*Chaetura vauxi**	x	x	x	x	x	x	x	x	x	x		R	C	TCP
Phaethornis superciliosus	x	x	x	x	x	x	x	x				R	A	TC
Campylopterus hemileucurus			x	x	x	x						R	C	C
Colibri thalassinus										x	x	R	C	P
Chlorostilbon canivetii	x											R	R	T
Hylocharis leucotis					x	x	x	x	x	x		R	A	CP
Amazilia beryllina	x	x	x	x	x	x						R	A	TC
Amazilia rutila	x	x										R	A	T
Eupherusa poliocerca			x	x	x	x	x	x				R	C	C
Lampornis amethystinus						x	x	x	x	x	x	R	A	CPF
Lamprolaima rhami									x	x		R	R	CP
Eugenes fulgens									x	x		R	C	CP
Heliomaster longirostris	x	x	x									R	C	TC
Atthis heloisa			x	x	x	x	x	x	x	x		R	C	CP
*Selasphorus platycercus**									x	x		R?	C	P
*Selasphorus rufus**								x	x	x		W	A	CP
Trogon mexicanus			x	x	x	x	x	x	x	x	x	R	A	CPF
Trogon elegans				x	x							R	R	C
Trogon collaris		x	x	x	x	x	x	x	x	x		R	C	TCP
Momotus mexicanus	x	x										R	R	T
Chloroceryle americana	x	x										R	A	T
Aulacorhynchus prasinus	x	x	x	x	x	x	x	x	x			R	A	TCP
Melanerpes formicivorus	x	x	x	x	x	x	x	x	x	x	x	R	C	TCPF
Melanerpes chrysogenys	x											R	R	T

APPENDIX. Continued.

Species	Station											St	Ab	HU
	1	2	3	4	5	6	7	8	9	10	11			
Picoides villosus											x	R	R	F
Veniliornis fumigatus				x	x	x	x	x				R	R	C
Piculus auricularis	x	x	x	x	x	x	x	x	x			R	C	TCP
Colaptes auratus			x	x	x	x	x	x	x			R	R	CP
Dryocopus lineatus	x	x	x	x								R	R	TC
Campephilus guatemalensis		x	x	x	x	x	x	x				R	R	TC
Anabacerthia variegaticeps			x	x	x	x	x	x				R	C	C
Automolus rubiginosus				x	x	x	x	x				R	C	C
Sittasomus griseicapillus			x									R	R	C
Xiphorhynchus flavigaster	x	x	x									R	R	TC
Xiphorhynchus erythropygius								x				R	C	C
Lepidocolaptes souleyetii			x									R	R	TC
Lepidocolaptes affinis						x	x	x	x			R	A	CP
Grallaria guatimalensis				x	x	x	x	x	x	x	x	R	R	CPF
Camptostoma imberbe	x											R	R	T
Myiopagis viridicata		x	x	x	x	x	x					R	C	TC
Rhynchocyclus brevirostris			x	x	x							R	R	C
Mitrephanes phaeocercus						x	x	x	x			R	C	CP
Contopus pertinax						x	x	x	x	x		R	A	CP
*Empidonax minimus**	x	x	x	x	x							W	C	TC
*Empidonax hammondii**						x	x	x	x			W	C	CP
Empidonax affinis										x	x	R	R	PF
Empidonax difficilis	x	x	x	x	x	x	x	x	x			R	A	TCP
Empidonax fulvifrons										x		R	C	P
Myiarchus tuberculifer	x	x	x	x	x							R	A	TC
Pitangus sulphuratus	x	x										R	A	T
Megarhynchus pitangua	x	x	x	x	x							R	A	TC
Myiozetetes similis	x	x										R	A	T
Myiodynastes luteiventris	x	x										R	C	T
*Tyrannus melancholicus**	x											R?	R	T
Pachyramphus aglaiae	x	x	x									R	R	TC
Tityra semifasciata	x	x	x	x	x	x						R	C	TC
*Tachycineta thalassina**									x	x		W	C	P
*Stelgidopteryx serripennis**	x											W	C	T
Cyanocitta stelleri									x	x	x	R	A	PF
Calocitta formosa	x	x										R	A	T
Cyanocorax yncas			x	x	x	x	x					R	C	C
Cyanolyca mirabilis						x	x	x	x			R	R	CP
Aphelocoma unicolor						x	x	x				R	R	C
Parus sclateri								x	x	x	x	R	R	CPF
Certhia americana									x	x	x	R	C	CPF
Thryothorus sinaloa	x	x										R	A	T
Thryothorus felix	x	x										R	A	T
Troglodytes aedon								x	x	x	x	R	C	CPF
Henicorhina leucophrys			x	x	x	x	x	x	x	x		R	C	CP
Cinclus mexicanus			x	x	x	x						R	R	C
*Regulus calendula**								x	x	x		W	A	CPF
Sialia sialis										x		W	C	P
Myadestes occidentalis		x	x	x	x	x	x	x	x	x	x	R	A	TCPF
Catharus aurantiirostris	x	x										R	C	T
Catharus occidentalis								x	x	x		R	A	PF
Catharus frantzii						x	x	x	x			R	C	C
*Catharus ustulatus**	x	x	x	x	x							W	C	TC
*Catharus guttatus**											x	W	C	F
Turdus assimilis	x	x	x	x	x	x	x	x	x			R	A	TC
Turdus rufopalliatus	x	x										R	A	T
Turdus migratorius									x	x	x	R	A	CPF
Ridgwayia pinicola									x			R	R	C
Melanotis caerulescens						x	x	x	x	x		R	C	C

APPENDIX. Continued.

Species	Station											St	Ab	HU
	1	2	3	4	5	6	7	8	9	10	11			
*Bombycilla cedrorum**		x	x	x	x	x	x	x	x	x	x	W	C	TCPF
Pitologonys cinereus									x	x		R	A	CP
Vireo solitarius	x	x	x	x								R	C	TC
Vireo hypochryseus	x	x										R	C	T
*Vireo gilvus**	x	x										W	R	T
Vireo olivaceus	x	x										R	C	T
*Vermivora celata**				x	x	x	x	x	x	x		W	A	CP
*Vermivora ruficapilla**		x	x	x								W	A	T
Parula superciliosa								x	x			R	R	C
*Dendroica petechia**	x											W	R	T
*Dendroica coronata**									x	x		W	C	P
*Dendroica occidentalis**								x	x	x		W	C	CP
*Mniotilta varia**	x	x	x	x	x	x	x	x				W	C	TC
*Seiurus motacilla**		x	x	x	x	x	x	x	x			W	C	CP
*Oporornis tolmiei**		x	x	x	x	x	x	x	x	x	x	W	C	TCPF
*Wilsonia pusilla**	x	x	x	x	x	x	x	x	x	x		W	A	TCP
Ergaticus ruber				x	x	x	x	x	x	x	x	R	C	CPF
Peucedramus taeniatus								x				R	R	C
Myioborus miniatus			x	x	x	x	x	x	x	x		R	C	CP
Euthlypis lachrymosa				x								R	C	C
Basileuterus culicivorus	x	x	x	x								R	R	TC
Basileuterus rufifrons	x	x										R	C	T
Basileuterus belli						x	x	x	x	x		R	A	CP
*Icteria virens**	x	x										W	C	T
Habia rubica	x											R	R	T
Piranga flava									x	x		R	C	P
*Piranga rubra**	x											?	C	T
*Piranga ludoviciana**	x	x	x	x	x							W	C	TC
Piranga bidentata					x							R	R	C
Chlorospingus ophthalmicus				x	x	x	x	x	x			R	A	C
Saltator coerulescens	x	x										R	C	T
Saltator atriceps	x	x										R	C	T
*Pheucticus ludovicianus**				x	x	x	x	x				W	R	C
*Pheucticus melanocephalus**									x	x		R?	C	P
*Passerina cyanea**	x	x	x	x	x	x	x	x	x			W	C	TCP
*Passerina versicolor**		x	x	x	x							R?	R	TC
*Passerina ciris**		x										W	C	T
Atlapetes pileatus									x	x		R	C	P
Atlapetes brunneinucha			x	x	x	x	x	x	x			R	A	C
Pipilo ocai								x	x	x		R	R	CP
Volatinia jacarina	x	x										R	C	T
Sporophila torqueola	x	x										R	A	T
Diglossa baritula							x	x	x	x		R	A	CP
Aimophila rufescens	x											R	R	T
*Melospiza lincolnii**									x	x	x	W	C	PF
Junco phaeonotus									x	x	x	R	C	PF
Molothrus aeneus	x	x										R	C	T
Icterus graduacauda	x	x	x									R	C	TC
Cacicus melanicterus	x	x										R	A	T
*Loxia curvirostra**										x		R?	R	P
Carduelis notata					x	x						R	C	C