

AVIAN DISTRIBUTION AND ABUNDANCE RECORDS FOR THE SIERRA DE LOS TUXTLAS, VERACRUZ, MEXICO

KEVIN WINKER,^{1,2} RICHARD J. OEHLenschLAGER,³ MARIO A. RAMOS,⁴
ROBERT M. ZINK,⁵ JOHN H. RAPPOLE,² AND DWAIN W. WARNER¹

ABSTRACT.—Between 1973 and 1987 we spent more than 36 months studying birds in the Sierra de Los Tuxtlas, on the Gulf coast of southern Veracruz, Mexico. This area contains the northernmost tropical rainforest in the western hemisphere, and has undergone relatively rapid deforestation in the past three decades. Its avifauna is diverse, consisting of both resident and migratory birds. We recorded 405 species, including 58 that have not been reported from the region before, as well as several that apparently have not been reported for Veracruz. Fully 350 species are documented by specimens; the remaining 55 consist of sight records only. We compare our results with past surveys of Los Tuxtlas and discuss 124 species whose status in the region is affected by our data. Of the 405 species we recorded in Los Tuxtlas, 96 (23.7%) appear on a list of bird species from the northern neotropics thought to be in danger due to tropical deforestation. *Received 9 Jan. 1992, accepted 29 April 1992.*

The Sierra de Los Tuxtlas (hence Los Tuxtlas) is a rugged, mountainous region of volcanic origin, isolated from the Sierra Madre Oriental range by extensive lowlands. It is near the Gulf of Mexico on the western side of the Isthmus of Tehuantepec in southern Veracruz, Mexico. Los Tuxtlas, approximately 4200 km² in areal extent, contains the northernmost tropical rainforest in the western hemisphere (Andrle 1964, Pennington and Sarukhan 1968, Dirzo and Garcia 1992). The recorded avifauna includes more than 400 species. Although only one of these 400+ species (Long-tailed Sabrewing [*Campylopterus excellens*]) is endemic to the region, Los Tuxtlas is known for its endemic subspecies (Binford 1989). These endemic subspecies are *Geotrygon lawrencii carrikeri*, *Empidonax flavescens imperturbatus*, *Myioborus miniatus molochinus*, *Atlapetes brunneinucha apertus*, and *Chlorospingus ophthalmicus wetmorei* (see Wetmore 1943: 225, Lowery et al. 1949:8, and Andrle 1967). In addition, a specimen from Los Tuxtlas has recently been designated the type of *Vireolanius pulchellus ramosi*, a subspecies endemic to the Isthmus of Tehuantepec region (Phillips 1991).

Previous ornithological surveys of Los Tuxtlas are encompassed or

¹ Bell Museum of Natural History, 10 Church St. SE, Univ. Minnesota, Minneapolis, Minnesota 55455.

² National Zoological Park, Conservation & Research Center, Front Royal, Virginia 22630.

³ The Science Museum of Minnesota, 30 East 10th Street, Saint Paul, Minnesota 55101.

⁴ Environmental Assessment & Programs Division, The World Bank, 1818 H Street NW, Washington, D.C. 20433.

⁵ Museum of Natural Science, Louisiana State Univ., Baton Rouge, Louisiana 70803.

summarized by Loetscher (1941, 1955), Wetmore (1943), Lowery et al. (1949), Lowery and Dalquest (1951), Edwards and Tashian (1959), and Andrlé (1964, 1966, 1967). This report summarizes the results of over 36 months of field effort in Los Tuxtlas between 1973 and 1987 and provides information on the occurrence and abundance of selected bird species. An 18-month, locally intensive ornithological survey (1973–1975) of the Gulf of Mexico lowlands and lower elevations of the area E and NE of Volcán San Martín (ca 28 km N of Catemaco, Veracruz) forms the basis of this paper. Later work, including areas on and near Volcán Santa Martha (see Winker et al. 1990a, b; Rappole et al. 1992) augments the original survey.

STUDY AREA AND METHODS

The primary study area E and NE of Volcán San Martín is bounded by a line from the Gulf coast directly west to the town of Balzapote, southwest to Laguna Escondida, southeast to the village of Sontecomapan, and eastward to the Gulf coast. This is a region of diverse physiographic features. Coastal beaches of volcanic sand are interrupted by weathered lava cliffs partially covered with dense vegetation. Brackish and freshwater marshes and swamps grade into lowland wet pastures, especially between the coast, the shores of the Laguna de Sontecomapan, and the flanks of the Volcán San Martín. Surveys of the avifauna on higher-elevation slopes were restricted to relatively short visits to Volcán Santa Martha in 1985 and 1986. As in many tropical lowland areas today, the region consists of a mosaic of habitats ranging from mature rainforest (diminishing rapidly) to pastures, with much agricultural and second-growth habitat, the latter ranging from sparse, low shrubs, to dense, tall *Cecropia-Ochroma* woodlands. Andrlé (1966) estimated that half of Los Tuxtlas was still forested in 1962; using Landsat images and air photos, we estimated that only 15% was still forested in 1986 (Winker et al. 1990a; cf Dirzo and Garcia 1992).

During the basic survey spanning Aug. through May, major effort (netting and observation) was concentrated at and adjacent to the Estación de Biología Los Tuxtlas of the Instituto de Biología, Univ. Nacional Autónoma de México (hereafter referred to as “the Station”), which is 0.5 km W of Cerro Balzapote and at another site 1.5 km E of Cerro Balzapote (Playa Escondida). At the Station, three sites within 1.5 km of one another were studied intensively: primary rainforest, 15-yr-old *Cecropia-Ochroma* forest, and a recently cleared field-rainforest edge.

A total of 62,742 mist net-h was obtained at the Station, 34,074 net-h at the primary rainforest site, 8946 net-h at the secondary forest site, and 19,722 net-h at the rainforest-field site. Also, nets were operated for 14,663 net-h in areas of dry second-growth, lowland swamp, and various forest habitats in and around the Station and at Agua Dulce behind the village of Jicacal (next beach SE of Playa Escondida); 6369 net-h were obtained in forest at the Station at night. Many hours were spent observing and collecting specimens near the Playa Escondida motel in areas of bamboo, riparian thickets, lowland pastures, ponds, and coastal beach (at and near Jicacal). The vegetation of the Station and surrounding area is described by Andrlé (1966, 1967), Ramos and Warner (1980) and Ramos (1983, and references therein).

Other study sites where intensive mist netting was conducted in the 1980s were in the Sierra de Santa Martha, low mountains around and near the Volcán Santa Martha. The La Peninsula site, approximately 5.5 km ENE of Coyame, was located in the Coxcoapan River

Valley (elev. ca 150 m), where over 38,600 net-h were obtained (1982–1986, primarily Oct. through Apr.). Work near the crater of Volcán Santa Martha, approx. 15 km ESE of the La Peninsula site, was conducted 4–21 Mar. 1985 (elev. 470–950 m; ca 830 net-h). Descriptions of the La Peninsula and the lower elevation Santa Martha sites can be found in Winker et al. (1990a). At El Bastonal we used another site in the Coxcoapan River Valley, about 5.5 km SSE of the La Peninsula site (elev. ca 400 m). This site was netted intensively Jan.–Mar. 1986 for a total of 10,067 net-h. The vegetation at this site did not differ greatly from that of the La Peninsula site. For maps of the areas studied, see Andrle (1967), Rappole and Warner (1980), and Winker et al. (1990a).

Andrle (1967) discussed 250 species of resident (or indigenous) birds known to have occurred in Los Tuxtlas. Because we compare our observations to his findings, we use his abundance categories: *abundant* (A)—over 150 recorded every day; *very common* (VC)—75 to 150 recorded every day; *common* (C)—15 to 75 recorded every day; *fairly common* (FC)—five to 15 recorded every day; *rather uncommon* (RU)—three to eight recorded but not every day; *uncommon* (U)—one to five recorded, but frequently not observed for one or a few days at a time; *very uncommon* (VU)—one to five recorded in one to three months and usually not observed for one to three weeks at a time; *rare* (R)—less than ten recorded per year and not recorded at all for varying, sometimes prolonged periods; *very rare* (VR)—recorded from one to three or four times in the region and likely to occur again. For brevity, where possible we give Andrle's abundance designation after a resident species name. If a species was not recorded by Andrle (1966, 1967), we denote it as NR, and thus report the first record for Los Tuxtlas (new records not supported by specimens are referred to as NR*). Andrle (1966) discussed 67 of the 131 migrant bird species previously recorded from Los Tuxtlas. He (1966) did not use the abundance categories of his 1967 paper, but provided more general descriptions, which we use. Migrants observed by us but not recorded by Andrle (1966) or other workers for Los Tuxtlas are also denoted as NR. Our records corroborate Andrle (1966, 1967) for the occurrence and abundance of the species that he discussed but which we do not.

Our work was documented by observation, capture, and/or collection. Most voucher specimens are housed in the Bell Museum of Natural History (Univ. of Minnesota, Minneapolis, Minnesota), but some were left in Mexico. We include specimen data where we think it is useful, but do not give exhaustive treatments. If desired, more data can be had by examining the specimens themselves or by requesting information from the authors or the Curator of Birds at the Bell Museum of Natural History.

SPECIES ACCOUNTS

We recorded 405 species of birds. At least one specimen was obtained of each of 350 species; the remaining species were documented by sight records only. The species and data discussed below were chosen because they represent new and significant information on the avifauna of the region. Unless noted (e.g., NR*, sightings), all species discussed here are documented by specimens.

Brown Booby (*Sula leucogaster*). NR*. One individual was seen offshore at Jicacal during a storm on 4 Sept. 1974.

Bare-throated Tiger-Heron (*Tigrisoma mexicanum*). NR. Occasionally seen perched in low trees in open, wet pasture near swamps in the lowlands surrounding the Laguna de Sontecomapan. An adult female in breeding

condition perched with another bird was collected on 7 May 1975. Stomach contents included common eel (*Anguilla anguilla*).

Cattle Egret (*Bubulcus ibis*). U. Since Andrlé's study, Cattle Egrets have increased in abundance in Los Tuxtlas; our estimate of their abundance is VC. We have seven specimens and thousands of sightings (17 Sept.–2 June); they seem to breed regularly near the edge of Lake Catemaco.

Fulvous Whistling-duck (*Dendrocygna bicolor*). NR*. A flock of 10–15 was observed 3 Oct. 1974 at Jicacal.

Greater White-fronted Goose (*Anser albifrons*). NR*. A flock of 35 was seen on 10 Dec. 1974.

American Wigeon (*Anas americana*). NR. A female in heavy body molt was taken on 11 Dec. 1974.

Lesser Yellow-headed Vulture (*Cathartes burrovianus*). NR. A female collected on 2 May 1975 (not in breeding condition) had recently eaten immature common eels. One was observed on 27 Apr. 1975. No evidence of wintering was detected; there may be migratory movement of this species through Los Tuxtlas (Apr.–May).

Hook-billed Kite (*Chondrohierax uncinatus*). VR. RJO observed an adult female in shrubby, wet lowlands near La Palma on 3 May 1974.

Snail Kite (*Rostrhamus sociabilis*). RU. Although individuals could be seen regularly in trees in and near low, wet pasture in the early 1980s (Dec.–Mar.), we had only one sighting in the same areas in the late 1980s, suggesting a decline in abundance (R).

Double-toothed Kite (*Harpagus bidentatus*). VR. We collected a male on 5 Jan. 1974 and an immature female 24 Oct. 1974 in primary rainforest near Playa Escondida; both stomachs contained orthopteran remains. Two individuals were perched in a tree on 6 Mar. 1974 at the Station, and other sightings occurred on 4 Jan. 1983 (rainforest edge) and 16 Mar. 1985 (deep within primary rainforest at 800 m). The only previous record is a bird seen at Dos Amates on 17 Mar. 1960 (Andrlé 1967).

Black-collared Hawk (*Busarellus nigricollis*). NR*. An individual was seen leaving a low perch near a pool on the Coxcoapan River (near La Peninsula) on 19 Jan. 1985.

Solitary Eagle (*Harpyhaliaetus solitarius*). NR*. A flying, calling immature was seen from above on a high ridge near Volcán Santa Martha on 4 Mar. 1985. There are other recent sight records for Los Tuxtlas (W. J. Schaldach, Jr., pers. comm.).

Broad-winged Hawk (*Buteo platypterus*). Andrlé (1966) considered this species a common migrant in Mar. and Apr. but his only autumn dates were from Oct. Our sightings were from 22 Sept., 15 Nov. (adult), 19 Dec., Jan. (6, 17, 27), and Feb. (10–11, 14, 21, 26–28), and indicate wintering in low numbers.

Short-tailed Hawk (*B. brachyurus*). Andrlé (1967) cited three records, and noted two more (1968) on 8 Oct. 1960 near Corral Nuevo on Hwy 180. We add observations of single birds at the edge of primary rainforest on 31 Dec. 1973, and 13 and 23 Feb., 23 Sept., 21 Oct., and 17 Dec. 1974, 4 Jan. 1983, and soaring over rainforest in Nov. and Dec. 1984.

White-tailed Hawk (*B. albicaudatus*). NR*. A species likely to have both resident and migrant individuals occurring in the state of Veracruz (Loetscher 1941), it nevertheless does not seem to have been previously recorded from Los Tuxtlas. A single bird in full adult plumage was seen by KSW soaring at low elevation near El Bastonal in the last week of Feb. 1986.

Zone-tailed Hawk (*B. albonotatus*). VR. We have more than 37 sightings from 21 Nov.–26 Apr. The bird observed on 26 Apr. was calling. These data suggest overwintering and a U status.

Black Hawk-Eagle (*Spizaetus tyrannus*). VR. Andrlé (1967) noted three records for Los Tuxtlas. We found the species to occur regularly in the rainforest of the Coxcoapan River Valley (La Peninsula and El Bastonal sites), where individuals could be seen several times per week flying, soaring, and calling loudly overhead (Dec.–Mar.). Confined to rainforest, its status in this habitat could be considered RU.

Orange-breasted Falcon (*Falco deiroleucus*). NR*. Exceedingly rare; we have one sight record (4 Mar. 1985). W. J. Schaldach, Jr. (pers. comm.), has recorded breeding at El Faro (near La Perla del Golfo), 30 km east of La Barra, in July.

Peregrine Falcon (*Falco peregrinus*). Andrlé (1966) mentioned only four records of this species for Los Tuxtlas. We have over 50 records (21 Sept.–3 May), with at least one sighting for each month between these dates. RJO observed 13 birds on 25 Sept. 1974. Most individuals were seen along the coast near Playa Escondida, and all birds observed closely were adults.

Plain Chachalaca (*Ortalis vetula*). This species was considered VU in Andrlé (1966) but as C in Andrlé (1964); we agree with the latter designation. A female incubating four eggs was found on 5 May 1975; the nest was located 2 m above the ground in a bush located on a hillside covered by brush of variable density. Other breeding females were taken on 15 and 28 Apr.

Ruddy Crane (*Laterallus ruber*). VU. R. W. Dickerman (in Andrlé 1967) heard this species at Arroyo Agrio marsh from 22 July to 9 Aug., and on 3 Sept. 1963. RJO noted it regularly in substantial numbers in lowland marshes 5 km south of Cerro Balzapote and five specimens were collected (26–28 Apr., 2 May). Observations included an individual climbing about in brushy vegetation at 2.5–3 m. In addition, a juvenile (nearly adult-

sized) was collected at Dos Amates on 20 July 1964 by R. W. Dickerman (specimen in Bell Museum).

Yellow-breasted Crake (*Porzana flaviventer*). NR. A male with enlarged testes ($1 = 9 \times 3.5$ mm) was collected on 3 Feb. 1974 in a marshy pasture near La Palma. It had eaten small crabs. Also, R. W. Dickerman collected a male at Dos Amates on 2 May 1964 (specimen in Bell Museum).

Common Moorhen (*Gallinula chloropus*). Andrlé (1966) cited only spring records for Los Tuxtlas. Our specimen taken 20 Dec. 1974 is apparently the only winter record.

Limpkin (*Aramus guarauna*). U. Locally common in wet pastures and dense, shrubby swamps (one specimen and many sight records).

Semipalmated Plover (*Charadrius semipalmatus*). NR. Our five specimens, taken 21 Sept.–25 Feb. (four female, one “female?”), are the first records for Los Tuxtlas. The only other apparent record for Veracruz is a male taken by R. W. Dickerman near Tlacotalpan on 27 Apr. 1963 (specimen in Bell Museum).

Piping Plover (*C. melodus*). NR. Two females collected 10 Feb. and 4 Aug. 1974 were with small flocks of Wilson's (*C. wilsonia*) and Snowy (*C. alexandrinus*) plovers. These records of *C. melodus* are the first for Veracruz. We had one sighting on 24 Jan. 1983 (for more recent sightings in Veracruz, see Haig 1987).

American Avocet (*Recurvirostra americana*). NR. Two specimens were taken, one on 28 Sept. (female) and another 17 Oct. 1974 (male).

Greater Yellowlegs (*Tringa melanoleuca*). NR*. Present locally in small numbers, probably throughout the winter. Our sightings are 2–3 Oct., 12 Jan. (flock of five), and 30 Mar.

Solitary Sandpiper (*T. solitaria*). RU. Loetscher (1955) noted few Veracruz specimens, and Andrlé (1966) did not comment on the species. We encountered it regularly at Playa Escondida in low, wet pastures (many sightings Dec.–Feb.). Two specimens were taken on 30 Mar. and 23 Apr. 1975.

Upland Sandpiper (*Bartramia longicauda*). NR. An extremely fat female was collected on 16 Oct. 1973 near coastal beach. We had additional sightings on 5, 15 (two), and 20 Apr. 1974.

Long-billed Curlew (*Numenius americanus*). NR*. Sightings occurred on 5 (two) and 20 Sept., and on 7 Dec. 1974 (two).

Baird's Sandpiper (*Calidris bairdii*). NR. Three specimens were taken 3 Oct. (im. male), 5 and 6 Apr. 1974 (females), and one was seen on 7 May 1974.

Pectoral Sandpiper (*C. melanotos*). NR. Specimens were taken on 23 Oct. 1974 (male), and 18 May 1975 (one male, one female).

Semipalmated Sandpiper (*C. pusilla*). NR. Our 13 specimens, taken on

22 Aug., 21 Sept. (two), 14 Oct., 5 Apr. (seven), and 6 Apr. (two) suggest that this species is regular along the coast in migration (see Thompson 1958). Individuals were collected along the beach near Jicacal. Specimen records for this species do not seem to have been previously reported from Veracruz. From specimens in the Bell Museum we note one other for Los Tuxtlas (Laguna de Sontecomapan, 13 May 1962, Abraham Ramírez V.), one from near Lerdo de Tejada (16 Sept. 1963, R. W. Dickerman), and four from near Tlacotalpan (9 Aug. 1961 [three], and 7 Apr. 1962, R. W. Dickerman).

Western Sandpiper (*C. mauri*). NR. We have many sightings and 11 specimens, taken 22 Aug.–15 Apr., showing that this species is a regular migrant along the Gulf coast of Mexico and probably winters in low numbers in the Los Tuxtlas area.

Dowitcher species (*Limnodromus* sp.). NR*. Two dowitchers seen at a pond edge in low, wet pasture on 27 Dec. 1986 were identified as probably *griseus* by vocalizations given upon flushing. Another sighting of an unidentified dowitcher occurred on 13 Feb. 1983.

Common Snipe (*Gallinago gallinago*). NR. A female was taken on 3 Feb. 1974 in a wet, swampy pasture.

Wilson's Phalarope (*Phalaropus tricolor*). NR. A lone female was taken on the beach near Jicacal on 22 Aug. 1974. Andrle (1968) noted two near Alvarado on 3 May 1952.

Franklin's Gull (*Larus pipixcan*). Andrle (1966) noted that this species is a fairly common spring migrant in Los Tuxtlas, but his only autumn date was 17 Sept. 1962. On 9 Dec. 1974, RJO saw two flocks totalling 15–20 birds. Our other observations corroborate Andrle's spring dates.

Sooty Tern (*Sterna fuscata*). NR. The first records for Veracruz are an immature observed offshore from Jicacal on 8 Dec. 1973 and the remains of two adults (27 Feb. and 1 Mar. 1974) found on the beach at Jicacal.

White-winged Dove (*Zenaida asiatica*). Loetscher (1955) found this species only in the most arid parts of Veracruz, and Andrle (1967) considered it rare in Los Tuxtlas. Our observations suggest a strong migratory presence in spring and autumn near the coast. In autumn we have sighting and specimen records from 21 Oct. to 6 Nov. (600–700 seen in flocks of 5–100 on 6 Nov.), and in spring from 6 to 28 Apr.

Common Ground-Dove (*Columbina passerina*). VR. Previously reported only by Sclater in 1857 (in Andrle 1967). Our seven specimens (from Nov., Apr., and May) and several sightings indicate that this species is now more common, probably as a result of deforestation and the subsequent availability of more open habitats. A gap in our observations between Nov. and Apr. suggests a winter movement out of Los Tuxtlas.

Plain-breasted Ground-Dove (*C. minuta*). VR. Nine were collected (20

Dec.; 25 Jan.; 12 [two], 25 [two], 30 [two] Apr.; 23 May) and others were seen in wet, shrubby lowland pastures, often bordering swampy areas. Females taken in Apr. were in breeding condition.

Brown-hooded Parrot (*Pionopsitta haematotis*). VR. Reported only from Lake Catemaco (Davis 1972, Edwards and Tashian 1959). Our four male specimens, some from small flocks, were taken 11 Dec. and 17 and 22 Jan. Sightings include (date and number of individuals): 7 (one), 17 (eighteen), 22 (four), and 24 (four) Aug.; 22 (three) and 23 (three) Nov.; 12 (13) Jan.; 4 (16), 5 (four), 16 (two) Feb.; 12 (six), 25 (two) Mar.; 13 (three), 15 (one), 25 (two), 26 (two–three) Apr.; 5 (two), 6 (two), 23 (seven), and 27 (two) May. These sightings may represent a small (ca 15) resident population. This species was most frequently encountered in tall, dense, mature secondary forest, and at the edge of primary rainforest.

Mangrove Cuckoo (*Coccyzus minor*). Andrlé (1967) cited one record. Four specimens (10, 14, 27 Jan. and 13 Apr.) were collected along the edge of disturbed primary rainforest remnants, in 6 m tall *Solanum* sp. with sparse trees, and in or near coastal dune vegetation. Additional sightings occurred 27 Nov. and 25 Dec.

Pheasant Cuckoo (*Dromococcyx phasianellus*). NR. Two males were collected near Cerro Balzapote in dense, wet, brushy areas: one (skull unossified, heavy molt) on 29 Oct. 1973, and another (skull 50% oss., wing molt) on 11 Oct. 1974. Bruce A. Fall and MAR observed a displaying male near Playa Escondida in Mar. Several males were heard and seen displaying at 500–800 m on Volcán Santa Martha in Mar. 1985, and one was heard singing on 13 Mar. 1986 near El Bastonal in oak-sweet gum forest.

Crested Owl (*Lophotrix cristata*). NR*. One individual was heard and seen on 14 Mar. 1985 at 800 m on Santa Martha; another was heard on 9 Mar. 1986 at La Peninsula (ca 150 m).

Spectacled Owl (*Pulsatrix perspicillata*). VR. Previously reported only by Sclater (1857 in Andrlé 1967) at Sontecomapan. A male (610 g, with body and secondary molt) was found dead on the road at the Station on 25 Aug. 1974; the stomach contained a small crab. Individuals were seen repeatedly (once two simultaneously) in Jan. and Feb. 1985 at La Peninsula.

Least Pygmy-Owl (*Glaucidium minutissimum*). NR*. Very rare. Probably the same individual was seen repeatedly in early Jan. 1984 in rainforest at La Peninsula.

Black-and-white Owl (*Ciccaba nigrolineata*). NR*. Calls attributed to this species were heard in Mar. 1985 on Volcán Santa Martha and repeatedly in Feb. and Mar. 1986 near El Bastonal.

Common Nighthawk (*Chordeiles minor*). The status of this species is

poorly documented for Los Tuxtlas and Veracruz in general. Our experiences were limited to seeing birds and hearing calls given in flight. The following records (date, number of individuals) are based on calling individuals: 26 (one), 27 (one) Mar.; 15 (11), 17 (11), 24 (ten), and 25 (10+) Apr. 1974; 15 (one), 16 (five), 20 (two), 21 (one), 22 (two), 25 (one), 26 (two), and 29 (one) Apr. 1975; 7 (one) May. Autumn dates were 29 (one) Sept. 1974; 20 (nine) and 29 (nine) Oct. 1974; 24 (one) Nov. 1973. Silent individuals seen at considerable heights on 22 Aug. 1973, 1 Apr. 1975, and 1 May 1975 were probably this species.

Tawny-collared Nightjar (*Caprimulgus salvini*). NR. Frequently heard singing on pasture-rainforest edge at El Bastonal (late Jan.–mid-Mar. 1986), and at La Peninsula (6, 20, and 26 Feb., and 5 Mar.). A road kill was found near El Bastonal on 22 Feb. 1986.

White-necked Jacobin (*Florisuga mellivora*). NR. Four females were taken on 6 Jan. (wing molt), 25 Feb., 14 Mar., and 16 Apr. (immature plumage) at the clearing edge near the Station.

Blue-throated Goldentail (*Hylocharis eliciae*). NR. We collected a female on 16 Apr. in one-year-old second-growth and a male (?) on 13 Apr. in primary forest adjacent to the Station.

Tawny-winged Woodcreeper (*Dendrocincla anabatina*). We handled 69 individuals at the Station and 42 at La Peninsula. Andrle (1967) listed this species as VU; we consider it RU.

Wedge-billed Woodcreeper (*Glyphorhynchus spirurus*). NR. This species was not mentioned by Andrle (1967). We examined 63 individuals at the Station and 14 were banded at La Peninsula, most from primary rainforest (Aug.–May). Females in mid-Aug. had old brood patches. They are permanent residents, and should be considered U to RU.

Great Antshrike (*Taraba major*). VR. Andrle (1967) knew of two records from near Sontecomapan. Two specimens were obtained in wet, dense second-growth, 4.5 km ESE of Cerro Balzapote on 2 and 24 Apr. 1975.

Dusky Antbird (*Cercomacra tyrannina*). NR*. A female was captured and banded at La Peninsula on 6 May 1985. Another female, probably of this species, was captured on 26 Oct. 1983 and briefly handled, but escaped.

Eastern Phoebe (*Sayornis phoebe*). Andrle (1966) reported one record for Los Tuxtlas. We collected five birds (13 and 27 Nov., 10 Dec. and 9 Feb.) and saw several in pastures with open shrub growth, often near ponds. Our specimens plus sightings in Dec. and Jan. suggest that the species is an uncommon winter resident.

Say's Phoebe (*S. saya*). NR. A male was collected on 21 Dec. 1974 in an open pasture (closely grazed) with exposed rocks.

Western Kingbird (*Tyrannus verticalis*). The first reported records for Veracruz noted by Andrle (1966) and Amadon and Eckleberry (1953) were misidentified and were actually "Tropical" Kingbirds (*T. melancholicus/couchii*) (RJO, *in litt.* from J. Farrand, Jr., and Allan R. Phillips, pers. comm., respectively). A very fat female with insects and fruit pits in its stomach was collected on a shrubby hillside on 8 May 1975, 4.5 km SEE of Cerro Balzapote.

Couch's Kingbird (*T. couchii*) and Tropical Kingbird (*T. melancholicus*). Traylor (1979) concluded that Tropical and Couch's kingbirds are distinct species. Based on vocalizations, both forms occur in the lowland areas we surveyed, and both species are represented in our specimen sample. The local breeding status of *T. couchii* is uncertain; calling birds were heard from 19 Apr. to 2 May. *T. melancholicus* is a local permanent resident and breeder.

Acadian Flycatcher (*Empidonax virescens*). Andrle (1966) noted a single specimen for Los Tuxtlas (Catemaco, 13 Oct. 1950), and Loetscher (1955) reported the only other apparent record for Veracruz (10 May 1901 at Jalapa, by Nelson and Goldman). We captured or collected a total of 59 specimens near the Station and handled an additional 15 at La Peninsula 11 Sept.–1 Nov., and 30 Mar.–28 May. Based on netted and collected specimens, approximate peaks in migration were late Sept.–early Oct., and late Apr.–early May. Habitats ranged from primary rainforest to brushy slopes. These specimens clearly show that the species has been overlooked in past surveys, both as a spring and autumn migrant. There was no evidence of wintering.

Alder Flycatcher (*E. alnorum*) and Willow Flycatcher (*E. trailii*). The migration of these two species through Los Tuxtlas is unclear because Andrle's studies predated their separation (A.O.U. 1973), and field identification is difficult. Andrle (1966) noted that "Traill's" Flycatchers were common autumn migrants, but he had no definite spring records. We handled approximately 350 Willow/Alder Flycatchers (specimens and banding), both in autumn (16 Aug.–8 Nov.) and spring (1–28 May). More than 90 of these birds occurred in spring. Voucher specimens from both seasons include both *trailii* and *alnorum* (*vide* Allan R. Phillips).

White-throated Flycatcher (*E. albigularis*). NR. A male was collected on 10 Apr. and a female on 13 May 1975, in dry, brushy second-growth; neither was in breeding condition.

Yellowish Flycatcher (*E. flavescens imperturbatus*). Both Andrle (1967) and Johnson (1980) cited the elevational range of this species as above 900 m. Our eight specimens (9, 21, 30 Oct., 14 Nov., 9, 23 Dec., and 16 Jan.) were taken near the Station at about 100 m in primary forest. Many of these occurrences coincided with autumn and winter storms, which

drive some species to lower elevations. One bird was seen perched in an *Astrocaryum* palm in disturbed primary rainforest on 22 Nov. 1974, and individuals were observed occasionally in similar habitat at the El Bastonal site in Feb.–Mar. 1986.

Olive-sided Flycatcher (*Contopus borealis*). Andrle (1966) cited it only as a fairly common autumn migrant in Los Tuxtlas. We have numerous sight and specimen records: 17, 24, 25 (two), 26, 27, 28, 29 (three), 30, and 31 Aug., 11, 21, 24, 28, and 30 Sept., 1 (three) 2, 3, 7, 9, 11, 12, 14, 17, 21, 24, 25, 27, 30 and 31 Oct., 2, 20, 22, 23, and 28 Nov., 2 Dec., 20, 27, and 30 Jan., 19 and 23 Feb., 6 Mar., 17 Apr. (in heavy molt), 6 (three), 7, 9, 10, 11, 12, 18, 20, 21, 23 (three), 25 and 31 May. These records suggest wintering in low numbers, but we have only one nominal wintering period specimen (23 Feb.). Most birds were in pastures with isolated remnant forest trees, or in open woodlands and sparse groves. A. R. Phillips (pers. comm.) found the species to be regular in pines above Ocotac Chico in Dec.

Sulphur-rumped Flycatcher (*Myiobius sulphureipygius*). We netted over 180 from Aug. to May, mostly in primary rainforest, where its dense forest haunts make detection difficult. Listed by Andrle (1966) as VU, we suggest FC as its status.

Sepia-capped Flycatcher (*Leptopogon amaurocephalus*). Andrle (1967) noted only one record for Los Tuxtlas and listed its status as VR. Most of the 45 individuals collected or banded were netted from Aug. to May in primary rainforest or adjoining mature secondary forest (RU).

Ochre-bellied Flycatcher (*Mionectes oleagineus*). We handled over 380 individuals from Aug. to May (inclusive), mostly in primary rainforest. We suggest that its status is FC, rather than RU, as considered by Andrle (1967). Females taken 20 Apr. and 28 May were in breeding condition.

Lovely Cotinga (*Cotinga amabilis*). VR. Andrle (1967) reported two birds collected near Dos Amates. We netted a female near the Station in primary rainforest on 5 Feb. 1974. We have other sight records from Dec. through Mar. These records suggest that the species is U rather than VR; it is easily overlooked in the high canopy of dense primary rainforest.

Thrush-like Manakin (*Schiffornis turdinus*). NR. A male was taken on 12 Oct. 1974 at the Station, in primary rainforest.

Violet-green Swallow (*Tachycineta thalassina*). NR*. Loetscher (1941) noted a general absence of authentic Veracruz records, and did not consider the species later (1955). Andrle (1966, 1967) also did not comment on the species. Several flocks were observed at El Bastonal on 15 Mar. 1986.

Bank Swallow (*Riparia riparia*). Andrle (1966) observed this species on only one autumn date (16 Sept.). We have at least 22 records (including

five specimens) between 22 Aug. and 24 Oct., indicating a more common autumn migratory status.

Barn Swallow (*Hirundo rustica*). We found this species to be RU to FC during Jan.–Mar. at El Bastonal; Andrie (1966) noted that there were no winter records.

Cliff Swallow (*H. pyrrhonota*). Although Andrie (1966) reported this species as uncommon, we observed them regularly from 27 Aug. to 7 Oct., including observations of 200+ from 20 Sept. to 4 Oct. 1974. Spring dates were from 2 Apr. to 12 May, and “hundreds” were seen on 10 Apr. 1975.

Marsh Wren (*Cistothorus palustris*). NR. Apparently the first record from Los Tuxtlas, a female in general body molt, was collected on 25 Apr. 1975, 7 km ESE of Cerro Balzapote.

Ruby-crowned Kinglet (*Regulus calendula*). To Andrie’s (1966) single record for Los Tuxtlas (30 Oct. 1962 near Ocotál Grande) we add four specimen records (one on 18 Oct. and three on 13 Nov. 1974), and eight records on 28 Dec. 1974 and 3 and 6 Mar. 1986. All were encountered in lowland and highland pastures with shrubby growth.

Tropical Gnatcatcher (*Polioptila plumbea*). NR. Our specimens from 4 Aug., 28 Dec., 20 Mar. (male with enlarged testes), 20 and 21 May are apparently the first for Los Tuxtlas. Additional observations were made on 6, 12 and 30 Oct., 4 Nov., 27 Dec., 25 Mar., and 9 Apr. This species was found in or at the edge of mature rainforest and in tall swamp forest.

Wood Thrush (*Hylocichla mustelina*). Andrie (1966) did not comment on the presence of the Wood Thrush in Los Tuxtlas, and Loetscher (1955) reported the species as uncommon in Veracruz. We found it to be among the most common of forest birds during the winter (see Winker et al. 1990a, b).

Hermit Thrush (*Catharus guttatus*). NR. A first-year male was collected on 11 Jan. 1975 near Playa Escondida; it was identified by A. R. Phillips as *C. g. nanus*. Two others were seen in disturbed primary rainforest on 1 Jan. 1975. Loetscher (1941) mentioned that the only Veracruz specimen from below 1300 m (4000 ft) was a female from Jesús Carranza (24 Jan. 1904); our records corroborate the scarcity of this species in the lowlands.

Veery (*C. fuscescens*). NR. This species seems to have been overlooked by previous investigators. We collected 42 individuals between 22 Sept. and 11 Oct. (all immatures) and 11 between 21 Apr. and 13 May. The spring specimens were mostly not fat. Most birds were netted adjacent to the Station, either in primary rainforest or mature secondary forest.

Northern Mockingbird (*Mimus polyglottos*). To Andrie’s (1967) one previous record (2 Apr., Lake Catemaco) we report three birds collected

in lowland thickets and shrubby pastures on 3 Nov. 1973, 27 Jan. and 3 Mar. 1974.

Long-billed Thrasher (*Toxostoma longirostre*). NR*. A calling individual was observed on 11 Dec. 1974 in a pasture with dry clumps of *Solanum* sp.

American Pipit (*Anthus spinoletta*). NR. Three individuals were collected on wet beach sands at Jicacal on 17 Oct. 1974. Phillips (1991) identified two as *A. s. pacificus* and one as *A. s. geophilus*.

Loggerhead Shrike (*Lanius ludovicianus*). NR*. One was seen perched on a roadside utility wire over open agricultural lands near Santiago Tuxtla on 18 Oct. 1973. This is the only report from Los Tuxtlas.

European Starling (*Sturnus vulgaris*). NR. An incubating female was collected on 13 Apr. 1975 at its nest hole in a large, isolated dead tree in a wet lowland pasture 1 km east of La Palma. This occurrence may represent the southernmost nesting of starlings along the eastern coast of Mexico (see Phillips 1991).

White-eyed Vireo (*Vireo griseus*). Andrlé (1966) considered this species to be regular but not common as a migrant and winter visitant, most numerous in autumn (first autumn date 4 Oct.). We handled over 215 birds between 22 Sept. and Feb. (inclusive), and observed many others. Our spring records include dates from 2 Mar. to 11 May. This species was frequently encountered in second-growth, and at the edges of pastures and forests.

Bell's Vireo (*V. bellii*). NR. A female taken 16 May 1975 and subsequently identified by A. R. Phillips as *V. b. bellii*, is apparently the first record of this species for Los Tuxtlas. It was found in variably dense, 1–4 m second-growth on a dry south-facing hillside.

Warbling Vireo (*V. gilvus*). Our specimen (12 May 1975) and nine sight records (26 and 28 Nov., 3 Dec., 13, 17, and 18 Feb., 31 Mar., 7 and 30 Apr.) augment the single previous record from Los Tuxtlas cited by Andrlé (1966). This species occurred in scattered trees and shrubs in more open habitats, as well as in heavy second-growth.

Philadelphia Vireo (*V. philadelphicus*). Andrlé (1966) listed this species as only a rare autumn migrant with three records for Los Tuxtlas. We handled 25 individuals, nine from 3 Oct. to 13 Nov., and 16 from 16 Apr. to 24 May. Nine other sightings were recorded; the latest date was 3 Dec., although a sighting on 16 Feb. might suggest a rare winter presence. Habitats in which this species was encountered resembled those of *V. griseus* and *V. olivaceus*.

Red-eyed Vireo (*V. olivaceus*). Andrlé (1966) reported this species as an uncommon autumn migrant (7 Sept. to 24 Oct.) and gave only one

spring date (15 May). We handled over 110 individuals, including 74 from 30 Aug. to 9 Nov. and 36 from 1 Apr. to 28 May. There were numerous additional sightings, including two on 23 Nov., which is the latest autumn date. This species was encountered in second-growth and on the edges of pasture and rainforest.

Yellow-green Vireo (*V. flavoviridis*). C. Intratropical migrant with a breeding population in Los Tuxtlas. Present from 21 Mar. in spring; last autumn date observed was 4 Sept. Loetscher (1941) considered that nearly all were gone from Veracruz after Aug. Females showed breeding evidence in mid-Apr. (distended oviduct 13 Apr., egg in oviduct 15 Apr.).

Green Shrike-Vireo (*Vireolanius pulchellus*). Although Andrle (1967) considered the species rare, we found it to be FC in rainforest and oak-sweetgum canopy near El Bastonal (Jan.–Mar.) and on Volcán Santa Martha (Mar.). As Loetscher (1941) noted, individuals are usually detected by their calls. Phillips (1991) named the Los Tuxtlas population *V. p. ramosi*.

Golden-winged Warbler (*Vermivora chrysoptera*). To Andrle's (1966) two spring (18, 19 Apr.) and one autumn (23 Sept.) records we add our five specimens taken 26 Sept., 19, 21 Apr., and 6, 12 May.

Tennessee Warbler (*V. peregrina*). Andrle (1966) listed this species as a rather uncommon migrant. We have capture or specimen records of 64 individuals 4 Oct.–13 Nov., 19, 26 Mar., 29, 30 Apr., and 5, 31 May, and numerous sightings from 19 Sept. to 12 Dec. In addition, there seemed to be an influx of migrants during 13–19 Apr. 1975. This species is a common migrant in spring and autumn in Veracruz, as suggested originally by Miller et al. (1957). Most birds were found in 1–5 yr-old second-growth, or in large fruiting *Ficus* sp. trees at the edge of rainforest, although the La Peninsula (five) and Volcán Santa Martha (one) captures were in primary rainforest.

Nashville Warbler (*V. ruficapilla*). Not commented upon by Andrle (1966), and Loetscher (1955) noted no winter records. We observed individuals on 2 Dec., 2 Jan., and 16 and 18 Feb., suggesting wintering in low numbers.

Chestnut-sided Warbler (*Dendroica pensylvanica*). Andrle (1966) listed three spring and one autumn records. We have two autumn records (24 and 25 Sept.), and 40 spring records (18 Apr.–31 May). In addition, our observations suggest regular wintering. We have two specimens from 24 Dec. 1984 and 20 Feb. 1985, and about 24 sightings spanning the winter period: 2 Dec.–first week of Mar. This species was found in primary rainforest, where it did not show evidence of territoriality, as it does in Panamá (Greenberg 1984).

Cape May Warbler (*D. tigrina*). One specimen (7 Oct.) and two sightings

(three birds on 7 Oct., one on 10 Feb.) supplement the single previous Veracruz record, a sighting by Andrle (1966) on 20 Mar. 1960.

Black-throated Blue Warbler (*D. caerulescens*). NR. Our two specimens (21 Oct. and 1 Nov.) and four sight records (17 and 29 Nov., 21 and 25 Mar.) are the first verified records for Veracruz. Habitats included dense second-growth and the edge of disturbed rainforest.

Blackburnian Warbler (*D. fusca*). Our 13 specimens, collected between 10 and 27 May 1975, plus additional observations (24 Sept., 27 Oct., 1, 9, 10, 14, and 31 May) indicate that this species is considerably more common than suggested by the three earlier Veracruz records of Andrle (1966). Habitats ranged from moderately dense to rather open second-growth of variable heights.

Prairie Warbler (*D. discolor*). NR. The first verified records for Veracruz are specimens taken 30 Oct., 1 and 15 Jan., and 12 Feb. These plus an additional sighting on 30 Oct. were in clumps of second-growth consisting mainly of *Solanum* sp.

Palm Warbler (*D. palmarum*). Although listed for Veracruz on questionable grounds by Davis (1972), we collected three specimens (two on 23 Nov. 1974 and one on 7 Jan. 1974). All three were foraging in heavily grazed pastures with sparse clumps of *Solanum* sp. 1+ m in height, and areas of bare soil. The specimens were identified by A. R. Phillips as *D. p. palmarum*. Individuals were seen on 9 and 10 Feb. 1983 and occasionally Jan.–Mar. at El Bastonal (all in heavily grazed pasture).

Bay-breasted Warbler (*D. castanea*). NR. Not reported for Veracruz by Loetscher (1941, 1955) or for Los Tuxtlas by Andrle (1966), this species migrates through Los Tuxtlas and is probably more common in spring than autumn. We have records from Oct. (one specimen, two sightings), Nov. (one specimen, five sightings) and May (22 individuals captured or collected, 13 sightings). The birds were found mostly in second-growth consisting of tall shrubs and short, 3–10 m trees, or in fruiting *Ficus* sp. trees at the edge of rainforest.

Cerulean Warbler (*D. cerulea*). Our three specimens (one on 13 and two on 16 Apr.) and one sighting (1 May) add to the three previous records for Veracruz (all spring), and agree with Andrle's (1966) statement that the species is a rare migrant. They were found along forest edge.

Prothonotary Warbler (*Protonotaria citrea*). The 5–6 autumn records cited by Andrle (1966) apparently are the only previous records for Veracruz. We collected seven specimens and observed 16 other birds 11 Aug.–16 Oct., and captured one bird at La Peninsula on 30 Mar. (apparently the only spring record). Most of these birds were at the edge of disturbed rainforest in dense secondary vegetation. Foraging birds were seen as high as 15 m in *Ficus* sp. trees.

Swainson's Warbler (*Limnothlypis swainsonii*). NR. Our 18 specimens (ten from 20 Sept.–16 Oct.; two from 15 and 22 Jan.; two from 25 and 30 Mar.; and four from 6 and 7 Apr.) supplement the records of Loetscher (1941) and Peterson and Chalif (1973), who considered this species a casual to rare migrant and winter visitor along the Gulf coast. Birds were seen at the edge of disturbed rainforest in dense second-growth, typically foraging at less than 4 m.

Mourning Warbler (*Oporornis philadelphia*). Loetscher (1941, 1955) noted a general absence of autumn records of this species in Veracruz; we have one specimen from 4 Oct. and note another taken by R. W. Dickerman on 10 Oct. 1956 near Martinez de la Torre. In Los Tuxtlas this species was more common in spring (14 records, 29 Apr.–24 May).

MacGillivray's Warbler (*O. tolmiei*). Andrlé (1966) noted only autumn records; all five of our specimens are from spring (8–13 May).

Canada Warbler (*Wilsonia canadensis*). Although Andrlé (1966) considered this species to be an uncommon spring and autumn migrant, we handled 183 individuals between 2 Sept.–12 Oct., and 25 Apr.–24 May. We also observed many others within these periods.

Fan-tailed Warbler (*Euthlypis lachrymosa*). NR*. Not reported by Andrlé; seems very rare. We have one sighting on 20 Jan. 1983 at Playa Escondida during a *norte* (storm), and another of a singing male on 15 Mar. 1985 at about 500 m on Volcán Santa Martha.

Red-legged Honeycreeper (*Cyanerpes cyaneus*). Although Loetscher (1941), Andrlé (1967), and the AOU (1983) considered this species to be resident, our evidence suggests that the population in Los Tuxtlas is migratory. It appears to be absent from Los Tuxtlas during much of the boreal winter (Dec.–mid-Mar.). We have 22 captures at La Peninsula in spring (6 Apr.–26 May), and no autumn captures. At the Station we have four autumn captures (25 Aug.–13 Oct.) with sightings from 5 Aug. to 25 Nov., and spring records from 26 Mar.–26 May. The lack of later spring records is due to our absence.

Blue-crowned Chlorophonia (*Chlorophonia occipitalis*). VR. Andrlé (1967) reported it from 300 to 750+ m. We have four specimens (24 Feb. and 8 Jan. [three]) at elevations of 100 m and less. The Jan. birds were immature females feeding in a noisy flock of 15, about 12 m above the ground, in a *Ficus* sp. tree near the edge of disturbed rainforest. Other observations were made on 9 and 16 Jan. 1975, and 8 Jan. 1983.

Savannah Sparrow (*Passerculus sandwichensis*). NR. There appear to be few Veracruz records of this species (cf Wetmore 1943:338), although Loetscher (1955) thought that it was probably regular to locally common in winter. Three were taken on 2 Nov., 30 Mar., and 15 Apr. The bird taken on 2 Nov. was attracted to lights at night and was in migratory condition.

Clay-colored Sparrow (*Spizella pallida*). NR. Loetscher (1955) noted only a single record for Veracruz. We took one on 17 Oct. 1974, and had sightings of single birds on 7 and 11 Dec.

Lark Sparrow (*Chondestes grammacus*). NR. Appears to be uncommon in winter in Veracruz (Loetscher 1955, cf Wetmore 1943:338). Three were obtained on 4 Oct. and 1 and 5 Apr. One (female; 4 Oct.) was identified by A. R. Phillips as *C. g. strigatus*.

Grasshopper Sparrow (*Ammodramus savannarum*). NR. Only two previous specimens are recorded for Veracruz (Wetmore 1943:338, Brodkorb 1943:87). We took two on 4 and 21 Apr.

Dark-eyed Junco (*Junco hyemalis*). NR. An immature female, netted near the Station at the edge of a recently cleared field on 27 Nov. 1973 was identified by A. R. Phillips as *J. h. hyemalis*. This occurrence, which coincided with a recent *norte*, represents the first record of this species for Veracruz.

Eastern Meadowlark (*Sturnella magna*). VR. We found this species to be a fairly common but local species in moist grassy lowland pastures. Specimens include adults in breeding condition. A specimen examined by A. R. Phillips was identified as *S. m. mexicana*. A few of the songs heard at various times and places through the winter period suggested *S. neglecta*.

Brown-headed Cowbird (*Molothrus ater*). NR. A male and female collected near cattle in a closely grazed lowland pasture on 6 May 1975, and a sighting on 7 May 1975, provide the only records for Los Tuxtlas. By size, the two specimens seem to represent two races, the male (wing 101.5 mm) *M. a. obscurus*, and the female (wing 101.0 mm) either *M. a. ater* or *artemisiae*.

Hooded Oriole (*Icterus cucullatus*). VR. Four birds reported by R. W. Dickerman (in Andrlé 1967) on 7 Aug. 1962 constitute the only previous records. An adult female was taken on 16 Mar. 1974, in an area of dry, 3 m dune shrubbery, approximately 3.5 km east of La Palma, and a male was seen there on 31 Oct. 1974.

Chestnut-headed Oropendola (*Psarocolius wagleri*). VR. Andrlé (1967) cited two records for Los Tuxtlas. We collected six specimens in non-breeding condition (15 Aug. [two], 28 Sept., 10 Dec. [two], 1 May), and encountered groups of two–40 at irregular intervals during most seasons, usually at the edge of mature forest near the Station.

DISCUSSION

We obtained new information on the occurrence and abundance of a large number of migrant and resident birds in the Sierra de Los Tuxtlas. Our results are primarily the product of a large-scale observation and collecting effort carried out over 18 months in a relatively small area.

Additional work in other areas of Los Tuxtlas suggested that the coastal situation of the initial survey was a primary reason for the relatively high number of new records. Species added in later work tended to be tropical resident, forest-related species, reflecting the habitats investigated (mostly primary rainforest). Few new migrant records were discovered in the 1980s.

Our findings are not surprising, given the numerous local microhabitats and the diversity of the resident and migratory avifauna. However, considerable effort preceded ours, including the impressive surveys of Andrieu (1964, 1966, 1967). The intensity of earlier work might lead to the assumption that the occurrence and abundance of birds in Los Tuxtlas was well known. Thus, it is clear that caution should be used when interpreting avifaunal lists from areas that have not been the focus of intensive, long-term studies employing both observation and netting.

We recorded 58 species that appear to be new to Los Tuxtlas, or 14% of the total 405 species observed. Of these 58, 19 are probable local residents and the remaining 39 are temperate migrants (e.g., shorebirds, parulines) or vagrants (e.g., Brown Booby, Sooty Tern). Of these 58 noteworthy species, 40 are supported by voucher specimens. It is certain that these new records are a direct result of our sampling effort; mist netting documented the occurrence and abundance of hard-to-detect rainforest species, and collecting allowed accurate identification of morphologically similar species, such as *Empidonax* flycatchers. We do not find evidence in our study to support any type of "short-term avifaunal turnover." Rather, we conclude that the differences between our work and Andrieu's are mainly a result of differences in sampling effort (or "pseudoturnover," see Lynch and Johnson 1974).

Rapid deforestation in the neotropics has undoubtedly had an impact on both resident and migratory birds. The recent increase of second-growth forests, woodlots, scrub, and pastures has resulted in an increase in the abundance of species dependent upon these habitats. On the other hand, of 328 bird species from the northern neotropics considered by Ramos (1985) to be in danger due to tropical forest destruction, 96 species (29%) occur in Los Tuxtlas. This total represents 23.7% of the 405 species we recorded. The impact of deforestation on these primarily resident, rainforest species can hopefully be monitored by comparing future surveys with our study.

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