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OBSERVATIONS ON THE BREEDING OF TURQUOISE-BROWED MOTMOTS IN YUCATÁN

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Motmots typically excavate burrows in banks and lay their eggs on bare earth in terminal chambers of these burrows. The works of Skutch (1947), Klaas (1968), and Orejuela (1977) indicate that in much of Middle America, the behavior of the Turquoise-browed Motmot (*Eumomota superciliosa*) follows this pattern. In areas of the Yucatán Peninsula that possess shallow soils, however, this motmot commonly frequents the vicinity of natural wells or sinkholes (cenotes) and cave entrances during the breeding season (Gaumer 1881–1882, Klaas 1968, Orejuela 1977, Reddell 1977), using recesses in the limestone walls as sites for egg deposition. Differences among the observations of these authors and others (see also, Paynter 1955) suggest considerable plasticity in the reproductive pattern of this motmot. Here we present data on *E. superciliosa* taken at yet a different type of breeding site: elevated apertures in the walls and ceilings of rooms of archaeological ruins at Uxmal, Kabah, and Sayil, Yucatán, Mexico.

Observations were made at Uxmal on 19 June and 3 and 4 July 1979, and at Kabah and Sayil on 3 July 1979. On all dates, Turquoise-browed Motmots were abundant (at least 50) near The Governor's Palace and The Nunnery Quadrangle at Uxmal. Many of the birds were carrying food to nestlings, which were vocalizing in apertures, rectangular and circular in cross section, which had been made by the Maya in the walls and ceilings of both the inner and outer rooms of these structures. Several rooms sheltered more than one pair of motmots. Here, and at Kabah and Sayil, we saw no agonistic behavior or visible manifestation of territoriality.

On 3 and 4 July, recently fledged young (as judged by their size and flight ability) were observed at Uxmal; they uttered vocalizations similar to, but softer than, those given by adults. Twice on 3 July, and once on 4 July, an adult was flushed from the same clutch of three (clean) white eggs deposited on a thin layer of fine-particulate breakdown on the floor of a short, broad (approximately 40 cm length, 25 cm width, 14

cm height) hole located 2.5 m above floor level in the inner room of a 2-room complex within The Governor's Palace at Uxmal. This observation supports Skutch's (1945) judgment that the attribution by Gaumer (1881–1882) of relatively elaborate nests to well (cenote?)-nesting Yucatán Turquoise-browed Motmots was questionable. Together with our sightings of recently fledged young on these dates, this observation also supports the data of Klaas (1968) taken at a bank-burrowing colony near Champotón, Campeche on 9 July 1962 and his hypothesis that these motmots may rear two broods per season. Recent work on this species near Escárcega, Campeche, by Orejuela (1977), however, indicates that early July clutches in that area represent late starts and renestings. An additional observation made at Uxmal is of interest in regard to potential helpers at the nest in this motmot: On 4 July, we watched three individuals of similar size (apparently adult, but rectrices were hidden) perched on a rock within 30 cm of each other with prey in their bills; one held a large scorpion. The group appeared to be waiting to enter the chamber from which we watched. Unfortunately, they flushed at the approach of other visitors to the area, and we could not continue observation. I thank James Reddell and Norberto Gonzalez for their assistance.

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FURTHER ADVANCES OF HOUSE SPARROWS INTO THE BRAZILIAN AMAZON

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The House Sparrow (*Passer domesticus*) is advancing northward in South America in a pincer-like movement, mainly along the Pacific and Atlantic coasts. It

was introduced to Aconcagua province in Chile in 1904 (Goodall et al. 1946), reached the Peruvian coast in 1951 (Koeppke 1961) and Guayaquil at 2°S in Ecuador by 1969 (Crespo 1977). By 1977, the sparrows had crossed the equator and were thriving in Esmeraldas, in north coastal Ecuador at 1°N (Crespo 1977).

The species reached the Amazon region of Brazil in about 1964, having spread along the Belém-Brasília highway to Imperatriz and Marabá (Smith 1973). By 1971, a flourishing population had become established in the Transamazon Highway town of Marabá, whence it could readily colonize the 3,000-km pioneer highway

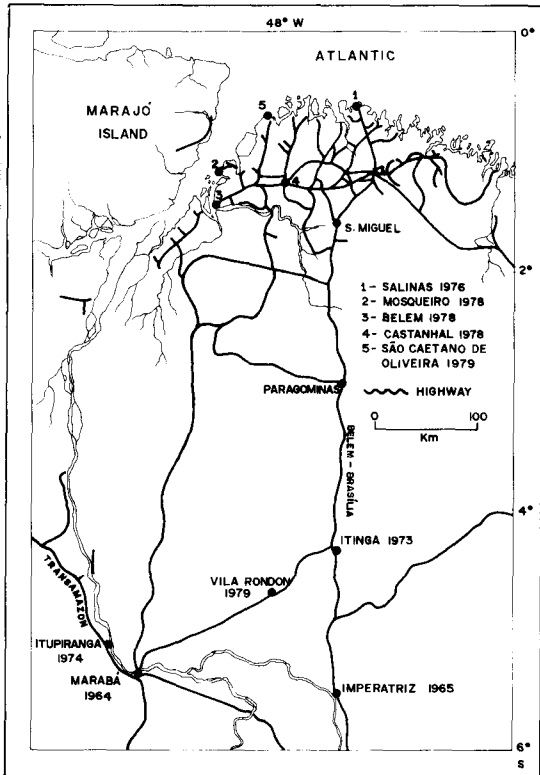


FIGURE 1. Distribution of *Passer domesticus* in Amazonia.

through the rain forest (Fig. 1). On 30 March 1979, I estimated the population of the species in Marabá at 800. On 23 June 1974, I found several House Sparrows at Itupiranga, 6 km east of the highway and 42 km northwest of Marabá. On 9 April 1979, I saw a small group in Vila Rondon (a site covered by thick rain forest 10 years ago), 134 km northeast of Marabá along the recently-opened connecting road to the Belém-Brasília highway. The species also spread north along the Belém-Brasília highway, reaching Itinga, 130 km north of Imperatriz, by 29 October 1973.

On 5 October 1976, I saw a group of six House Sparrows in Salinas, a coastal resort town in the state of Pará. They probably arrived from coastal Maranhão, a neighboring state to the east, since a population of around 1,000 was seen in São Luís on 18 July 1979. On 19 November 1978, I noted three sparrows in Mosqueiro, 140 km southwest from Salinas. On 21 November 1978, I observed 15 in Belém, the capital of Pará. On 23 July 1979, one male was seen in São Caetano de Oliveira on the coast of Pará (F. Novaes, pers. comm.).

The arrival of House Sparrows in Belém, a city of 800,000, is remarkable for two reasons. First, they were apparently introduced in 1927 but became extinct within two years. Second, Belém is very close to the equator at 1°27'S and annually receives 3,000 mm of rainfall; a hot and humid climate was considered to be unfavorable for this species (Sick 1959, 1971). Now they seem likely to thrive because they have presumably become adapted to the humid tropics by evolving lower rates of metabolism and adjusting to higher critical temperatures, as predicted by Kendeigh and Blem (1974).

House Sparrows do not appear to have reached Belém from the Belém-Brasília highway. On 19 July 1977

and 9 April 1979, I did not see any in Paragominas (Fig. 1), nor did I find any in São Miguel do Guamá on 23 November 1978. House Sparrows are thus advancing into Amazonia on two fronts in Brazil: along the Atlantic coast and the interior highways. Progress is faster along the coast (e.g., the species has spread 170 km from Salinas to Belém in two years). The birds are also moving inland from the coast; I noticed a small population at Castanhal, 80 km east of Belém, on 23 November 1978.

In the Brazilian Amazon, House Sparrows are most conspicuous in public squares where they often roost in large trees such as mangoes (*Mangifera indica*) or jackfruit (*Artocarpus heterophyllus*). Their diet includes discarded rice kernels, grass seeds, spilled manioc flour, bread scraps, cashew (*Anacardium occidentale*) fruit and flowers, and insects. Invertebrates are gleaned from mango leaves, chased through short grass, and caught on the wing in flycatcher fashion.

Eaves of houses with tiled roofs are the most common nesting areas, although buildings with corrugated or asbestos roofs are also used. The species also nests in the base of the fronds of babassu (*Orbygnya martiana*), a fire-resistant palm that thrives around human settlements. In Belém, a ledge on the façade of a church was in use on 22 November 1978. In the Brazilian Amazon, I have observed breeding in June, nest building in October, and the feeding of nestlings in November, all dry season months.

Unlike the relative tameness noted in England and North America, House Sparrows are very shy of humans in the Amazon region. Their wariness in new areas probably increases their chances for survival. Although they have a reputation as aggressive invaders that displace native birds (Goodall et al. 1946, Doughty 1978), such does not seem to be the case in Amazonia. I noticed hostile behavior only once when several individuals chased a Black Vulture (*Coragyps atratus*) from a backyard in Marabá. In Belém, the recently arrived House Sparrows were watched closely by a House Wren (*Troglodytes aedon*), but I did not see any interspecific aggression. The wren nests in cavities with entrances too small for the sparrow to enter.

In urban areas, House Sparrows, together with ground doves (*Columbina* spp.), are the only non-carnivorous birds which regularly feed on the ground. The sparrows have not yet become established in rural areas of Amazonia. Man is radically altering the zoogeography of South America and these sparrows are likely to continue to take advantage of habitat changes such as rain forest highways which provide corridors for dispersal.

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THE OAXACA SPARROW (*AIMOPHILA NOTOSTICTA*) HAS A CHATTER VOCALIZATION

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Wolf (A.O.U. Ornithol. Monogr. 23, 1977) did not record or hear a chatter vocalization from the rare Oaxaca Sparrow (*Aimophila notosticta*), which lives in the state of Oaxaca, Mexico. He suspected that it had such a call distinct from primary song, as the species is closely related to two others that do, the Rufous-crowned Sparrow and the Rusty Sparrow (*A. ruficeps*, *A. rufescens*). Prolonged chatter calls are characteristic of the tropical members of this emberizine genus; the calls are usually given in duet between male and female but also in solo performance. On 25 April 1978, I tape recorded the chatter vocalization of the Oaxaca Sparrow approximately 10 km north of Oaxaca City,

along Highway 175, on the slopes of the massif called Cerro San Felipe near the village of El Estudiante below La Cumbre at about 2,000 m elevation. The species is not uncommon there in the scrubby scrub oak vegetation, ranging from the alder-bordered stream up the dry slopes. By squeaking my lips on the back of my hand several times, I provoked individual Oaxaca Sparrows to erupt in the chatter call. It differs from other calls described by Wolf (1977, and contained on the supplementary phono-disc to his monograph) which are mostly various *chip* notes. The Oaxaca Sparrow's chatter is harsh and reminds me of the scolding notes of a wren. Figure 1 is a sound spectrogram of a part of one chatter solo that was about twice as long as the portion pictured. I did not hear chatter duets in these birds. The tape specimen is now in the Florida State Museum Bioacoustic Archive as FSM master tape 503, cut 11.

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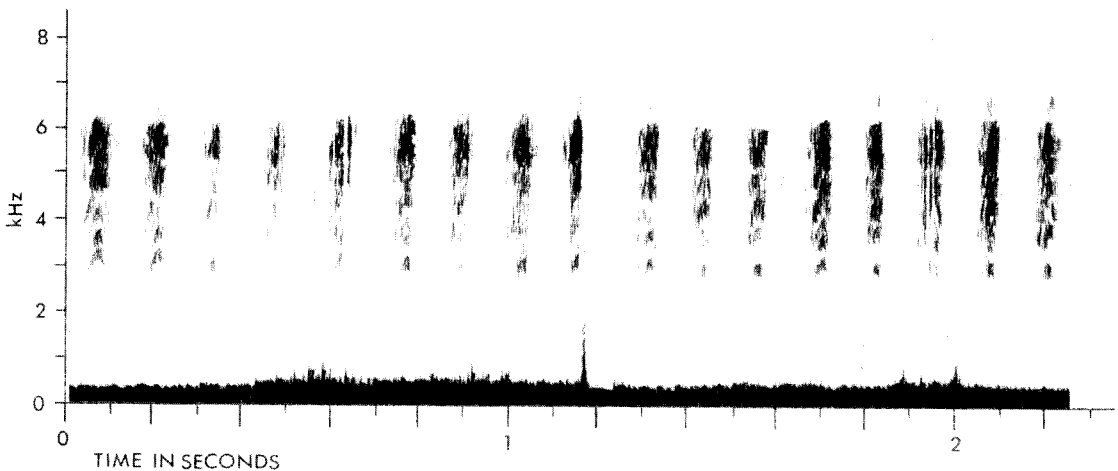


FIGURE 1. Sound spectrogram of the chatter solo vocalization of the Oaxaca Sparrow, reproduced at 80-8,000 KHz frequency spectrum, with wide band filter and flat equalization curve.