

OBSERVATIONS OF RARE RAPTORS IN SOUTHERN ATLANTIC RAINFOREST OF BRAZIL

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Abstract.—The Serra do Tabuleiro, Santa Catarina, South Brazil, is one of the least disturbed areas of the southern Atlantic rainforest. The Serra do Tabuleiro is the third largest remnant left in pristine conditions of the Brazilian Atlantic rainforest. During the last years, rare and endangered species such as the Harpy Eagle (*Harpya harpyja*), the Ornate Hawk Eagle (*Spizaetus ornatus*), and the Black Hawk Eagle (*Spizaetus tyrannus*) were recorded in the region. Harpy Eagles have been recorded since 1962, including records in 1980 and 1989, which suggest that there may still exist a population in the slopes and gorges covered with Montane Atlantic Rain Forest and probably in other coastal mountains of Santa Catarina. Information on additional poorly known raptors is also given. The recent presence of Harpy Eagle urgently calls for an effective conservation action in the Serra do Tabuleiro region. Harpy Eagle is an indicator of a still intact ecosystem.

OBSERVACIONES SOBRE LAS AVES DE RAPIÑA RARAS EN LA FLORESTA ATLÁNTICA DEL SURESTE DE BRASIL

Sinopsis.—La Sierra de Tabuleiro, en Santa Catarina, Brasil, es el tercer mayor fragmento de bosque pluvial de la floresta del Atlántico brasileño y una de las áreas menos perturbadas. Durante los últimos años, han sido documentadas en dicha localidad especies raras y en peligro de extinción tales como la arpía (*Harpya harpyja*), y otras águilas como *Spizaetus tyrannus*, y *S. ornatus*. Las arpías han sido informadas desde el 1962 con registros en 1980 y 1989, lo que sugiere que pueda existir una población de estas en las pendientes y gargantas cubiertas con bosque pluvial montano de la Sierra de Tabuleiro y posiblemente en otras montañas costaneras de Santa Catarina. La presencia del águila arpía en la región hace urgente un plan efectivo de conservación para la Sierra de Tabuleiro, ya que el ave es un indicador de ecosistemas intactos.

OBSERVAÇÕES SOBRE AVES DE RAPINA RARAS NA FLORESTA ATLÁNTICA DO SUDESTE DO BRASIL

Sinopse.—A Serra do Tabuleiro, em Santa Catarina, é uma das áreas menos impactadas na Floresta Atlântica do sudeste do Brasil. Ela é o terceiro maior fragmento desta formação florestal ainda em condições primitivas na Floresta Atlântica Brasileira. Aves de rapina ameaçadas, tais como o Gavião-real (*Harpya harpyja*), o Gavião-de-penacho (*Spizaetus tyrannus*) e o Gavião-pega-macaco (*Spizaetus tyrannus*) foram registradas na região nos últimos anos. Gaviões-reais vem sendo registrados na área desde 1962, com registros em 1980 e 1989, o que sugere poder ainda existir uma população nas encostas e gargantas cobertas com Floresta Atlântica Montana da Serra do Tabuleiro e, possivelmente em outras montanhas costeiras de Santa Catarina. Informações sobre outras aves de rapina raras são fornecidas. A presença recente do Gavião-real pede a urgência de ações de conservação na Serra do Tabuleiro, pois é um indicador de ecossistemas ainda intactos.

The Brazilian Atlantic Rain Forest is a lowland and montane forest stretching along the Brazilian Atlantic coast from Rio Grande do Norte State (7°S) to Rio Grande do Sul (30°S). Perhaps no other region in South America has as large a number of endemic birds (Cracraft 1985, Ridgely and Tudor 1989). Today only 8.81% of its original area still remains. At

the present the Atlantica Rain Forest is divided into 456 fragments (S.O.S. Mata Atlantica, unpubl.; Fonseca 1985). Eight of these remnants are considered top priority conservation zones because of their large areas (ranging from 12 to 32,000 km²). The Parque Estadual da Serra do Tabuleiro (27°41'–28°04'S, 48°34'–48°55'W), located in Santa Catarina State, is the third largest top priority conservation zone (S.O.S. Mata Atlantica, unpubl.).

The Serra do Tabuleiro is a large U-shaped mountain range near the City of Florianópolis. This area is protected by law as a 90,000-ha State Forest Park, because most of the water supply of the Florianópolis comes from the Serra do Tabuleiro. The Tabuleiro range harbors five of the six main ecosystems from Santa Catarina (Klein 1984), including: Montane Atlantic Rain Forest, restinga in the coast, cloud forests, Araucária Forest and campos de altitude (high elevation grassy areas) (Klein 1981, 1984).

The park list includes 269 bird species (46% of the birds from Santa Catarina) (J. L. B. Albuquerque, unpubl. data; Bege and Marterer 1991). The region still shelters some of the most pristine areas in southeastern Brazil as the following accounts will illustrate. The fact that the Tabuleiro is protected by law as a park does not prevent logging companies from operating in several sectors of the park. The remnant Araucária Forests in the SW sectors of the area, for example, have been almost totally devastated by logging.

Large raptors such as the Harpy Eagle (*Harpya harpyja*), the Black Hawk-Eagle (*Spizaetus tyrannus*), and the Ornate Hawk-Eagle (*Spizaetus ornatus*), are considered rare and endangered species in southeastern Brazil (Sick 1969, 1985). Harpy Eagles and Ornate Hawk-Eagles were considered probably extinct in Rio Grande do Sul (Belton 1984, 1985). The designation as extinct in southeastern Brasil might be premature in light of the recent re-discovery of nesting Harpy Eagles in Misiones, Argentina by Chebez et al. (1990). The status of large raptors is unknown within most of their range in Brazil (Albuquerque 1986). These raptors are associated with undisturbed communities, such as in the Manú National Park in west Amazon (Terborgh et al. 1990). The goals of this paper are to report recent records of these species and other selected species of birds of prey in the Parque Estadual da Serra do Tabuleiro, Santa Catarina, Brazil, and to discuss the relevance of these recent records to the conservation of the region.

STUDY AREA AND METHODS

The study was conducted during 21 mo from April 1989 to December 1990 in the northern sectors of the Parque Estadual da Serra do Tabuleiro in the locality of Caldas da Imperatriz (27°44'S, 48°49'W; 140–400 m elevation). An earlier survey was done from 26 Aug. to 6 Sept. 1987 in the Vargem do Braço valley, located in the core of the park. Most of the study was conducted in the area of Hotel Plaza Caldas da Imperatriz. Occasional visits were made in the valley of Rio Vargem do Braço, inland Serra do Tabuleiro. I used 10 × 40 and 10 × 50 binoculars in my observations.

Raptors were watched from high ridges in the Caldas hills, from which there is an extraordinary view of the Rio Águas Claras valley and the slopes of Tabuleiro Peak (1071 m). The same strategy was followed in Vargem do Braço valley.

RESULTS

Gray-headed Kite.—I have rarely recorded the Grey-headed Kite (*Lepidodon cayanensis*) in southeastern Brazil. On 29 Aug. 1989 I observed one Gray-headed Kite gliding slowly West-East above the headwaters of Plaza stream in Caldas da Imperatriz.

Short-tailed Hawk.—I often recorded Short-tailed Hawks (*Buteo brachyurus*) in 1989 and 1990. The Short-tailed Hawk is common in large forested areas as in the Serra do Tabuleiro. Short-tailed Hawks were recorded on 30 and 31 Aug. 1987 in Rio Vargem do Braço at 500 m elevation in secondary forests. In June, July and Aug. 1989, a Short-tailed Hawk was observed flying, hunting and soaring above Caldas da Imperatriz hills. On 1 Aug. 1989 one individual was seen stooping upon an unidentified bird over the slopes. This hawk missed its prey and continued flying above the valley. On 14 Aug. 1989, a Short-tailed Hawk vocalized while soaring, a call sounding as "píiiiuééé" (stronger at "ééé"). The bird used the "still hunting" foraging behavior in which the bird soared in place for a few seconds observing the canopies, flapping only its wing tips.

White-rumped Hawk.—White-rumped Hawks (*Buteo leucorrhous*) were recorded always high in the slopes of Caldas da Imperatriz, above tall secondary and primary forest, and streams. On 31 Aug. 1987 the species was recorded in Vargem do Braço Valley about 500 m elevation. On 10 Mar. 1989, a hawk was seen flying high in the sky above Plaza River, Caldas da Imperatriz.

Mantled Hawk.—One individual of the rare Mantled Hawk (*Leucopternis polionota*) was recorded soaring above the slopes of Pico do Tabuleiro (500 m elevation.) in 17 Jul. 1989. It is worth mentioning one White-necked Hawk (*Leucopternis lacernulata*), which was brought to Ibama Rehabilitation Center in April 1993 after hitting a window of a building in Florianópolis (M. Becker, pers. comm.). The latter species is very poorly known in Brasil (Sick 1985). B. Marterer (pers. comm.) recorded the species breeding in Morro do Baú recently (26°48'S, 48°48'W).

Harpy Eagle.—Harpy Eagles were recorded on 16 and 17 Oct. 1989. On the first day I saw a pair soaring high above Caldas da Imperatriz. During the second day I saw one individual come from the east and soar above the low slopes of Pico do Tabuleiro, Caldas da Imperatriz. Besides soaring, this Harpy Eagle used "still hunting" behavior and remaining motionless, vocalizing many times ("uáhaaa. . . uáhaaa. . . uáhaaa. . .") when soaring. When a second individual joined the first one, it was possible to identify the sexes of the eagles. They were a male and a female, and both adults. Both spent the time I observed them soaring and "still hunting" above the forested hills. One individual did a "U" shaped flight over the slopes. The birds flapped strongly when flying.

Black Hawk-Eagle and Ornate Hawk-Eagle.—On 30 Aug. 1987, one Ornate Hawk-Eagle was seen soaring high in the slopes of Vargem do Braço moving down the valley. On the same day, two Black Hawk-Eagles (*Spi-zaetus tyrannus*), two Ornate Hawk-Eagles, and two unidentified large black buteo-like hawks were observed soaring high above the slopes inland Vargem do Braço. On 30 Aug. 1987, one Ornate Hawk-Eagle glided from the deep gorges SE of Vargem do Braço towards the SW at the opposite side of the valley, where the bird remained soaring in circles. On four occasions, Black Hawk-Eagles and Ornate Hawk-Eagles were observed using “still-hunting” tactics.

I recorded Black Hawk-Eagles several times in Caldas da Imperatriz in 1989 and 1990. On 23 Oct. 1989 one bird was recorded flying above the streams in the low elevation slopes (about 300–400 m). Other records were on 4 Oct. (two birds soaring above a secondary forest in Santo Amaro da Imperatriz), 15 Oct. and 8 Nov. 1989. P. Silva (pers. comm.) recorded the species carrying an opossum (*Didelphis* sp.) in Santo Amaro da Imperatriz. The most recent record of Tyrant Hawk-Eagle is an account given by P. Silva (pers. comm.) of one bird seen on 7 Apr. 1994 in Santo Amaro da Imperatriz.

DISCUSSION

The use of “still hunting” foraging behavior.—The observations described above showed the wide use of “still hunting” by buteos, Harpy Eagles, and hawk-eagles in the Atlantic Rain Forest of Serra do Tabuleiro. This style of foraging behavior has been recorded in other neotropical diurnal raptors, including Gray-chested Buzzards (*Geranoaetus melanoleucus*), White-tailed Hawks (*Buteo albicaudatus*), Crane Hawks (*Geranospiza caerulescens*) and Peregrine Falcons (*Falco peregrinus*) all in open formations or above gallery forests (Brown and Amadon 1968; J. L. B. Albuquerque, unpubl. data). Harpy Eagles are not known to soar or “still hunt” in the Amazon (S. K. Robinson, pers. comm.). The reason that Harpy Eagles and the other hawk-eagles do soar and use “still hunting” tactics above the forest along the slopes of Serra do Tabuleiro is not well understood. The rugged terrain can encourage birds to fly above the trees. Also the strong winds in the serra may enable Harpy Eagles and other hawk-eagles to soar and even remain motionless high above the forest. The two individuals observed in Caldas da Imperatriz when “still hunting” were watching the forest from above. The use of the “still hunting” strategy may enhance the chances of spotting groups of canopy birds, troops of cebus monkeys (*Cebus apella*), or other arboreal mammals.

On the distribution of Short-tailed Hawk.—Terborgh (1985) observed that in the east slopes of the Andes and in Manu, Peru, the Short-tailed Hawk is usually associated with tall forests. He noted that the Road-side Hawk (*Buteo magnirostris*) is more widely distributed in secondary forest areas. In Serra do Tabuleiro, one can find Road-side Hawks everywhere, but the Short-tailed Hawk is mostly in old secondary and primary forest. The same situation is repeated in the City of Florianópolis, which is lo-

cated very close to secondary forest covered hills (J. L. B. Albuquerque, unpubl. data). These observations suggest that the Short-tailed Hawk can be used as an indicator of undisturbed habitats.

The role of history.—Recent records of these rare and endangered species are very important as an argument for the conservation of Serra do Tabuleiro and nearby serras. With Harpy Eagles, the case becomes more relevant because of this eagle's history in the region. The species has been recorded in the area since 25 May 1962, when one specimen was collected in Rancho Queimado, located about 25 km west from Caldas da Imperatriz (27°50'S, 49°03'W) (Sick et al. 1981; F. Bruggeman, pers. comm.). Another Harpy Eagle was shot in 1980 in Pilões, north Vargem do Braço (27°50'S, 48°50'W; P. Silva, pers. comm.). This study reports a pair of Harpy Eagle in October 1989 in Caldas da Imperatriz.

Experienced residents of Vargem do Braço (e.g., R. Dias, pers. comm.), knew about the presence of Harpy Eagles in the area. R. Dias referred to the Harpy Eagle as "Gavião Gato," which means cat hawk. This name alone is not proof that the person is referring to a Harpy Eagle. He described the Harpy Eagle's call and mentioned that Harpy Eagles were seen usually after cold fronts in Fall and late Winter in Vargem do Braço. My October 1989 record was after a cold front, and the vocalization was similar to the one described by R. Dias. It was R. Dias who first called my attention to this eagle and the hawk-eagles in 1987.

These records and accounts suggest that the Harpy Eagle had been around the Serra do Tabuleiro for a long time. In one large forest fragment covered with Lowland Atlantic Rain Forest with seasonal flooding in Morro do Bino (29°10'S, 49°50'W), south Santa Catarina, near the slopes of Serra Geral, where is situated the Aparados da Serra National Park, there is an account of a pair of very large eagles seen in the winter of 1992 (J. L. B. Albuquerque, unpubl. data). These data indicate that a population of Harpy Eagles may still endure in southeastern Brazil. This speculation is supported by the recent records of Harpy Eagle in Misiones, Argentina (Chebez et al. 1990) and in the Serra do Tabuleiro.

Sick (1985) mentioned that Harpy Eagles recorded during winter could be migrant birds. Some researchers in Brazil maintain that Harpy Eagles migrate from Misiones to southeastern Brasil in winter (P. Martucelli, pers. comm.). This belief might result from the recent records of breeding eagles in Misiones (Chebez et al. 1990). I believe there are probably two populations of Harpy Eagles in southeastern Brasil: one in the slopes of Serra Geral, Serra do Tabuleiro, and Serra do Mar; the other is in Misiones, Argentina and in Iguaçu National Park, Brazil. The two populations are separated by large tracts of soybean fields (Albuquerque 1986).

I do not believe that birds seen in Serra do Tabuleiro were in migration as Sick (1985) suggested. Instead, Araucária groves in the Rio Grande do Sul, Santa Catarina and Paraná highlands are bearing pine cones in winter that attract many birds and mammals. Besides this rich food source, there are many Myrtaceae trees fruiting in the same period, which together

might attract many birds and mammals to highlands. During such periods one can see Rusty-margined Guans (*Penelope superciliaris*), Red-capped Parrots (*Pianopsitta pileata*), Red-spectacled Parrots (*Amazona pretrei*), Red-breasted Toucans (*Ramphastus discolorus*), agoutis (*Dasyprocta* sp.), red-brocket deer (*Mazama americana*), and howler monkeys (*Alouatta fusca*) feeding in these groves. The Harpy Eagle was shot in 1962 in late Fall in Araucária groves in Rancho Queimado. Thus, large raptors can be attracted to these Araucária groves during the winter months. These birds do not necessarily need to be long distance migrants as Sick (1985) suspected, but might result from more local movements. The presence of Harpy Eagles in Serra do Tabuleiro during breeding season can be inferred from an account given by R. Dias (pers. comm.) of one presumed Harpy Eagle mobbed by a Swallow-tailed Kite (*Elanoides forficatus*). Swallow-tailed Kites are in fact migratory birds, visiting southeastern Brazil during spring and summer when they breed (Albuquerque, unpubl. data). Thus, Harpy Eagles and hawk-eagles can just come from the nearby gorges and canyons in the slopes of Serra Geral, Serra do Tabuleiro, and Serra do Mar where they probably breed.

The conservation of the region.—The presence of large eagles in the area may be associated with the rich wildlife still living there. Solitary Tinamous (*Tinamus solitarius*), Guans (*Penelope superciliaris* and *P. obscura*), agouties (*Dasyprocta* sp), coendou (*Sphiggurus spinosus*), troops of cebus monkeys, howler monkeys (*Alouatta fusca*), and opossums (*Didelphis albiventris* and *D. marsupialis*) are still abundant. Big game such as tapirs (*Tapirus terrestris*) and capibaras (*Hydrochoerus hydrochaeris*) are still found in Serra do Tabuleiro, as are puma (*Felis concolor*), ocelot (*Felis pardalis*), and small cats (*Felis wiedii* and *F. tigrina*) (Albuquerque, unpubl. data; Mazolli 1993).

The presence of such a diverse diurnal raptor fauna in the Serra do Tabuleiro calls for attention and a more effective conservation action in the region to find a reasonable way to perpetuate the pristine conditions still found there. There is still a continuous forest cover from Osório, in Rio Grande do Sul coast, to Rio de Janeiro along the slopes of Serra Geral, Serra do Mar and Serra da Mantiqueira. These slopes form a corridor where good quality habitats still exist. In spite of the existence of parks and reserves along the Brazilian coast, very little attention has been given for this lengthy corridor along the slopes of the serras (Mazolli 1993). The slopes where the corridor is situated are protected by Federal Law, but lumber companies do not obey the law.

There is an active lobby in Brazilian Congress to invalidate a Presidential Decree that forbids any logging activity in the Atlantic Rain Forest. This lobby is trying to persuade the Congress that sustainable management can be conducted in the secondary forests of the Atlantic Rain Forest, which form 95% of the remaining Atlantic Rain Forest. If this lobby succeed in granting permission for the logging and ceramic industry to use the secondary forest, we would endanger the conservation of a very diverse ecosystem where Harpy Eagles still survive.

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