

SHORT COMMUNICATIONS

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Nesting, voice, status, and relationships of the endemic Cuban Gundlach's Hawk (*Accipiter gundlachi*).—Gundlach's Hawk (*Accipiter gundlachi*) or "Gavilan cabeza grande" is a little known, rare raptor endemic to Cuban woods. Interest in this hawk is considerable because of its threatened status (Brown and Amadon 1970; see also Bond 1968), and its apparent close relationship with the North American Cooper's Hawk (*A. cooperii*) and the neotropical Bicolored Hawk (*A. bicolor*; Brown and Amadon 1970, Wattel 1973). Along with local forestry workers Emilio Díaz R. and Reynaldo Balón D., Reynard, Short, and Alayón studied a nest of Gundlach's Hawk 3 km south of La Municipión, elevation about 780 m, 33 km NNE of Guantánamo on 2 and 3 March 1985. To these observations Garrido and Reynard contributed information from past observations and communications with Cuban biologists.

Spectrograms of tape-recordings of the voice of this hawk were made by James Gulleddge of Cornell University's Library of Natural Sounds, who also provided comparative data and sonagrams of the Cooper's and Bicolored hawks, as did W. John Smith of the University of Pennsylvania for the Northern Goshawk (*A. gentilis*).

Field observations.—At dusk on 1 March, Reynard heard and tape-recorded (Fig. 1h,i) the squealing call of this hawk, which ceased calling when a Stygian Owl (*Asio stygius*) began to call. On 2 March Reynard detected the Gundlach's Hawk by its loud, harsh series of *Kek, Kek, Kek . . .* calls. Similar vocalizations of a pair of the hawks continued for 5 min. The larger, browner bird, presumed to be the female, was the first to call, the smaller male appearing after about the first minute of her calling. On 3 March Díaz was able to climb the tree and reach the nest, which contained 4 apparently fresh, immaculate (no stains or markings) grayish white eggs. In Garrido's experience the 3–4 egg clutch of this species is the greatest of any Cuban hawk, matched only by the American Kestrel (*Falco sparverius*) among falconiforms.

The nest was 19–20 m up a 25-m tall pine (*Pinus cubensis*) in a "crotch" made by 3 major branches protruding at a 65 to 75° angle from the trunk, spaced around the eastern and southeastern sides of the trunk at the same level. At its base the pine was about 35 cm in diameter, and it was about 15 cm in diameter at the level of the nest. The nest tree was in a dense stand of pines within 40 m of a dirt road frequently used by local woodsmen and their families. The nest measured 70–80 cm in diameter and was 50 cm high, with about a 10-cm deep depression in its center. Construction was entirely of small pine branches and twigs, with a lining of pine bark on which the eggs reposed. One brownish rusty and white barred ventral feather of the hawk was found in the nest. The nest seemed freshly built. The nest and eggs, given intraspecific variation in nest structure and color and markings of eggs, are typical for the Cooper's-Bicolored hawk group.

Both adults were wary, flying in circles at a distance from the observers. They flew with paused wing beats, and approached the nest in an upward glide from below, closing their wings as they landed, as Stone (1899:67) has described for Cooper's Hawks. The male, as well as the female, landed at the nest on several occasions, but at different times. Poor (due to light) but discernible, photographs of the male at the nest, and of the eggs, are on deposit in the American Museum of Natural History.

The surrounding pines comprised a woods about 20 years of age, according to the foresters. The pinewood habitat extends along a small valley (below the nest site) for 3 km to the southeast and 1 km north of the nest. Pines of that size and age are restricted to the east

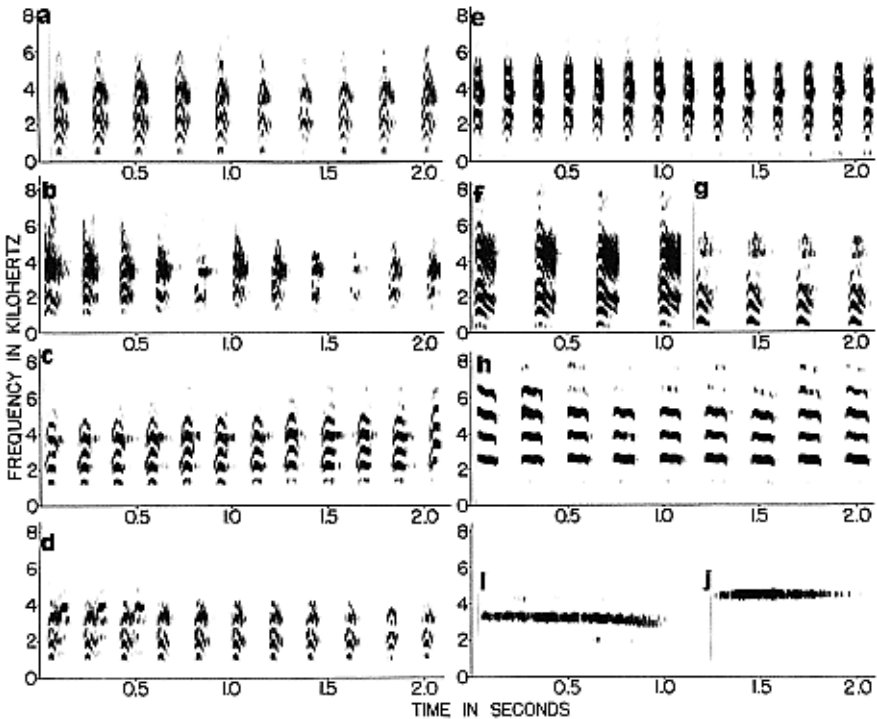


FIG. 1. Spectrograms in wide band pass filter of: (a) *kek* calls, female Gundlach's Hawk; (b) lower pitched *kek* calls of same female as (a); (c) *kek* calls, male Gundlach's Hawk; (d) *kek* calls of female (throughout) and male (first part, 3 notes, each following a female's note) Gundlach's Hawk; (e) *kek* calls of Cooper's Hawk from Arizona, sex unknown; (f) *kek* calls of presumed female Bicolored Hawk of pair, Rio Grande do Sul, Brazil; (g) *kek* calls of presumed male Bicolored Hawk, mate of bird in (f); (h) *kek* calls of Northern Goshawk from Arizona, sex unknown; (i) "squeal" call of Gundlach's Hawk, Zapata Swamp (see text); and (j) "squeal" call of one of nesting pair of Gundlach's Hawks reported in this paper.

side of the steep valley, but a few border the stream 150 m below. Plantings of younger pines occur to the north and east of the site. Dense low, secondary hardwood stands form a tangle in the valley, with a few taller trees reaching 50 m (hardwoods) or 30 m (pines) in height. The nearest habitation is over the limestone scarp bordering the valley, some 700 m west of the nest. Thus the hawks had available to them an extensive area of woods, with some diversity of habitat in the valley and on the surrounding slopes.

Potential competitors seen nearby were a Red-tailed Hawk (*Buteo jamaicensis*) and a Broad-winged Hawk (*B. platypterus*). Some wing feathers of a nighthawk (*Chordeiles* sp.) near the base of the nest tree possibly represent a prey item of the Gundlach's Hawk.

The female was larger and browner than the male Gundlach's Hawk, and both were pale below with markings visible only on the belly. Conspicuous were the flaring grayish white flank and undertail feathers against the darker, barred belly and thighs, the equally pale-

and-dark-barred tail, the distinct blackish gray cap of the male, and the pale bill that contrasts with the darker crown.

Status and distribution.—Observations by Garrido and by Carlos Wotzkow, Jorge de la Cruz, and Rogelio García Arencibia (Garrido and Alayón, pers. comm.) in the past decade indicate the presence of small populations of hawks in the Sierra del Rosario of Pinar del Río to westernmost Havana Province, in the Zapata Swamp region of southern Matanzas Province (Garrido 1980), and in central-southern Cuba between Laguna Guanaroca in Cienfuegos Province east to the Sierra del Escambray, Sancti Spiritus Province. All of the recent sightings reported by Garrido (1985) are from these three areas (*cf.* Bond 1963:10, 1964:5). There may be isolated pairs or small populations scattered elsewhere in western and central Cuba, as in coastal northern Matanzas Province where Reynard found the hawk (see below) in 1984. Garrido (1976) also has found Gundlach's Hawks on Cayo Coco and Cayo Guajaba off Ciego de Avila and Camaguey provinces, north-central Cuba.

The main center of distribution of Gundlach's Hawks must, however, lie in eastern Cuba between Gibara, Holguín Province on the north coast, the Sierra Maestra on the south coast (Granma, Santiago de Cuba provinces), and eastern Guantánamo Province, where a population was recently discovered near Baracoa. Short saw a displaying, squealing male Gundlach's Hawk near Ojito de Agua, north-central Guantánamo in April, 1986, as well as one of the rarer Sharp-shinned Hawks (*A. striatus*). There are many valleys, hills, and mountains in this region, which are not heavily populated and are rarely visited by ornithologists (Garrido 1985:995). We guess that most of the remaining pairs are to be found in this region, which affords the best chance for long-term survival.

We estimate that no more than about 150–200 pairs remain over the whole island. Disturbance, removal of forest, and persecution by farmers represent the main threats to the species. Overall, it is not as rare (Garrido 1985, pers. obs.) as are the Cuban race of the Sharp-shinned Hawk (*A. s. fringilloides*) and the Cuban Hook-billed Kite (*Chondrohierax [uncinatus] wilsonii*). Fortunately for it, most tree-planting in Cuba is of indigenous trees, especially pines, rather than exotic trees.

Diet.—There is a suggestion (above) that one of the birds may have eaten a nighthawk. It preys mainly or entirely on birds, including chickens, pigeons, and quail (Gundlach 1871, 1876). Wotzkow (in litt. to Garrido) noted it chasing "parrots." Possibly the large feet of the hawk relate to its feeding on birds of the size of the Cuban Parakeet (*Aratinga euops*), the Cuban Parrot (*Amazona leucocephala*), and the extinct Cuban Macaw (*Ara tricolor*), all birds of its habitat.

Vocalizations.—Two types of calls, the *kek* or "cackle" and the "squeal" were heard and recorded on tape in the nesting area. These represent the 2 main calls of species of *Accipiter*, e.g., the Eurasian Sparrowhawk (*A. nisus*) and Northern Goshawk, as described and figured by Cramp (1980). The Gundlach's Hawk *kek* calls likely were in the form of threat against intruders, among the categories of *kek* calls in Cramp (1980) and Schnell (1958). Both sexes called when perched and in flight, but, typical of the genus, most calls were uttered by the female. There were at least 26 "cackle" bursts, most by one bird, but both individuals called simultaneously 3 times. Noteworthy variation (Fig. 1) involves the number of *keks* per series, tempo, pitch, and loudness, with the female calling at a lower pitch. It will be seen from Figure 1 that the sexes differ markedly in quality, the *kek* of the male being softer, clearer, and with a shallower, longer peak (Fig. 1a–d).

For comparison we include *kek* calls of *A. cooperii* (Fig. 1e, perhaps a male) that resemble *kek* calls of Gundlach's Hawk, but have a faster tempo and notes shorter in duration, and of *A. bicolor* (Fig. 1f,g). The *kek* calls of *A. bicolor* represent a pair recorded by William Belton in Rio Grande do Sul, Brazil. Overall the notes of the Bicolored Hawk are longer with slower delivery than in Cooper's or Gundlach's hawks, but their structure more closely

resembles those of the Gundlach's Hawk. As a group, *A. bicolor*, *A. gundlachi*, and *A. cooperii* agree more with one another in the low pitch of the fundamental tone and number of overtones in the *kek* call than with their nearest relative, the Eurasian Sparrowhawk (Cramp 1980:166).

The wailing "squeal" call, associated with interactions between the pair (see Cramp 1980 for Northern Goshawk and Eurasian Sparrowhawk) was recorded on tape 1 March (Fig. 1j). Reynard previously had recorded the same type of call (Fig. 1i) on 13 March 1984 in a wooded area at Ciénaga de Zapata. Northern Goshawk and Eurasian Sparrowhawk wails are lower pitched than Gundlach's Hawk "squeals" (Cramp 1980:166, Bergmann and Helb 1982:83).

Taxonomy and zoogeography.—We are satisfied that the Gundlach's Hawk represents a valid species related to both the Cooper's and Bicolored hawks, forming a superspecies with them, as concluded by Brown and Amadon (1970) and Wattel (1973). Gundlach's Hawk resembles the Bicolored Hawk (particularly *A. bicolor chilensis* and *A. b. guttifer*) rather than the Cooper's Hawk in its grayish breast color without markings, more heavily rufous-banded belly and thighs, and lack of a conspicuous pale area on the side of the neck to the nape. Its "cackle" call tends toward the noisier, less clear "cackle" of the Cooper's Hawk and those of the Northern Goshawk and Eurasian Sparrowhawk.

Gundlach's Hawk resembles the Cooper's Hawk and differs from the Bicolored Hawk in its tail barring. Cooper's Hawks are more sexually dichromatic than the Bicolored Hawks, and Gundlach's Hawks are even more dichromatic. However, the very strong legs and feet of Gundlach's Hawk, its pale bill, the underwing spotting of immatures, and its large size are distinctive. If it were an extreme southeastern race of Cooper's Hawk, one would expect it to be smaller than more northern populations, but it is larger than Cooper's Hawks (and Bicolored Hawks). Cuban Broad-winged Hawks, Sharp-shinned Hawks, American Kestrels, and most Cuban birds representing North American species are smaller than their mainland relatives. Taken together, along with differences in color of the breast and thighs, lack of the neck marking and vocal divergence (all in the direction of the Bicolored Hawk), these traits argue for the recognition of Gundlach's Hawk as a full species related closely to both Cooper's and Bicolored hawks.

We conclude that this accipitrine has been on Cuba for a long time, evolving its unique features and combination of features in response to the environment there, particularly, available prey and raptorial competitors. The dearth of raptorial birds of similar size and habits may be related to its large size and the gap in size between it and the very small *A. striatus fringilloides* on Cuba. The 3 continental North American accipiters show a sharp difference in size, including intraspecific size differences between sexes within each species. Neotropical *A. bicolor* exists with a number of potentially competitive large hawks (and falcons), as well as smaller congeners (e.g., *A. poliogaster*, *A. striatus*). Such competitive pressure seems considerably less for Gundlach's Hawk (only the very different *Buteo platypterus* is similar to it in size) than for its mainland relatives.

We can offer no clue as to whether ancestral *A. gundlachi* reached Cuba from North America or Middle America, and consider either derivation as likely as the other. Wattel (1973:128) argued that it is futile to pursue "the question whether *A. gundlachi* is more closely related to *A. cooperii* or to *A. bicolor*." In view of the diverse features characterizing Gundlach's Hawk, and the possibility that it could have reached Cuba from Middle America as well as from North America, we concur.

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Postfledging behavior of American Kestrels in southwestern Quebec.—Postfledging dependency in the American Kestrel (*Falco sparverius*) lasts a minimum of 2-4 weeks, during which time the young gradually develop hunting skills and agility in flight (Balgooyen 1976). Anecdotal reports by Sherman (1913), Wheeler (1979), and Sherrod (1983) suggest that