

CURRENT STATUS AND BREEDING BIOLOGY OF THE RIDGWAY'S HAWK

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Abstract

We conducted searches for and monitored nesting pairs of the critically endangered Ridgway's Hawk (*Buteo ridgwayi*) in Los Haitises National Park, Dominican Republic, and in areas outside the park during the breeding seasons 2002 to 2005. In the Los Haitises region breeding commenced in February and spanned about 5 months. In 2002, we recorded 47 individuals, and in 2003, we recorded 93 individuals. In 2004, we documented 158 individuals made up of 72 territorial pairs and in 2005, we found 150 individuals composed of 74 territorial pairs which produced 83 fledglings. Of 138 Ridgway's Hawk nests, more than 52% were in Hispaniola Royal Palm (*Roystonea hispaniolana*). From 2002 to 2005, average overall productivity was 0.6 ± 0.2 (SE) fledglings per breeding attempt and 1.6 ± 0.1 fledglings per successful nest. The main threats to this endemic raptor are: habitat loss of forests from agricultural, logging and wood cutting activities; habitat loss from wildfires; human persecution as a threat to poultry; and lack of knowledge of this unique bird of prey.

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ESTATUS ACTUAL Y BIOLOGÍA REPRODUCTIVA DE *BUTEO RIDGWAYI*

Resumen

Condujimos búsquedas y monitoreamos parejas que se encontraban anidando de la especie críticamente amenazada, *Buteo ridgwayi* durante la época reproductiva de los años 2002 al 2005, en el Parque Nacional Los Haitises, República Dominicana, y en áreas fuera del parque. Ningún *B. ridgwayi* fue observado en el Parque Nacional Sierra Bahoruco y áreas periféricas del sudoeste y centro de la República Dominicana. En la región Los Haitises la temporada reproductiva comenzó en febrero y se extendió por aproximadamente 5 meses. En 2002, registramos 47 individuos y en 2003, registramos 93 individuos. En 2004 documentamos 158 individuos que consistían en 72 parejas territoriales, y en 2005 encontramos 150 individuos que consistían en 74 parejas territoriales que produjeron 83 polluelos. De los 138 nidos de *B. ridgwayi* que se encontraron, más del 52 % estaba en palmeras *Rostonea hispanioliana*. Del 2002 al 2005, la productividad promedio total fue de 0.8 polluelos por tentativa de anidación y de 1.7 en los nidos exitosos. Las principales amenazas para esta rapaz endémica que se observaron fueron: pérdida de hábitat de bosque por las actividades agrícola, maderera y la tala de árboles; pérdida de hábitat por incendios; persecución humana ya que se la considera como una amenaza por los avicultores; e ignorancia y falta de educación sobre esta ave rapaz única.

Introduction

The critically endangered Ridgway's Hawk (*Buteo ridgwayi*) is endemic to Hispaniola (Dominican Republic and Haiti) and its satellite islands (Wiley and Wiley 1981, Wiley 1986, BirdLife International 2000). Historical and specimen records depicted it as common in the eastern half of Dominican Republic and on several islands off Haiti (Christy 1897, Wetmore and Swales 1931, Wetmore and Lincoln 1934, Wiley and Wiley 1981) and uncommon to rare in Haiti (Wiley and Wiley 1981). Presently, the hawk has not been documented in Haiti in the last 20 years and is believed to be extinct there (Keith et al. 2003).

Ridgway's Hawks inhabit a variety of habitats, but seem to prefer mature subtropical wet forests, woodlands, and forest edge habitat and range from sea level to 1,800 m (Wiley and Wiley 1981). The only detailed information on the species comes from a study conducted on the ecology and behavior in the Los Haitises region of northeastern Dominican Republic during the breeding season of 1976 (Wiley and Wiley 1981). Currently, the last known stronghold for the Ridgway's Hawk is in Los Haitises National Park and surrounding areas. Here we present information collected on sightings of individuals, territorial pairs, nests, and monitoring of breeding pairs from 2002 to 2005 of the globally-endangered Ridgway's Hawk in northeastern Dominican Republic.

Study Area and Methods

Nearly all searches, surveys, and monitoring were conducted in Los Haitises National Park (19°00'N, 69°30'W), which encompasses approximately 1600 km² (Marizán 1994), and several forested fragments bordering the park. The park is on the northeastern coast of Dominican Republic and south of Samaná Bay. For a description of the park and the Los Haitises area see Thorstrom et al. (2005). For forest recovery in abandoned agricultural lands we followed Rivera et al. (2000).

Ridgway's Hawk sightings of individuals, paired birds, and nests were found by foot searches and visual or aural responses to playback calls of the hawk. We entered the park from two access points along the southern side of Samaná Bay, Los Naranjos and Hervedera, and inland from the southern and western side of the park at Trepada Alta, Los Limones, and Pilancon. We searched for Ridgway's Hawks in Los Haitises National Park during the breeding season for 43 days from February to November 2002. In 2003, we searched for Ridgway's Hawk during the breeding season for 61 days from March to October in the same areas as in 2002 and in new sites farther inside the main forest block. In 2004, we searched for hawks during the breeding season for 70 days from March to July. In 2005, we also searched for hawks during the breeding season for 45 days from March to July. Once we found a nest we revisited the nest site two more times to verify the nest status and the number of nestlings and fledglings produced.

Hawks attending nests and showing signs of incubating behavior were considered a nesting pair making a breeding attempt. Reproductive variables were defined as productivity (number of young fledged per breeding attempt) and nest success (number of total breeding attempts that fledged at least one young). All values reported are means \pm SE.

Results

In Los Haitises National Park in 2002, we found 47 Ridgway's Hawks, including 19 territorial pairs and nine single birds (Fig 1). Of the 19 pairs found, at least nine attempted breeding and two pairs (22%) were successful in fledging three young.

In 2003, we found 93 hawks, made up of 37 territorial pairs, nine single birds, and 10 fledglings (Fig. 1). Thirty pairs attempted breeding, of which 44 nestlings were observed in the nests and eight pairs were successful in producing 10 fledglings. Thirty-four young disappeared from the nests from unknown causes. Of the 30 breeding attempts, nine were built on top of Palmchat (*Dulus dominicus*) nests in living trees of Hispaniola Royal Palm (*Roystonea hispaniolana*).

In 2004, we recorded 158 hawks, including 72 territorial pairs of which 33 pairs attempted breeding, producing 54 nestlings of which 6 pairs were successful in fledging 11 young (Fig. 1). Of the 33 breeding attempts, 18 were built on top of Palmchat nests, and of these 33 nests 16 were in living trees of Hispaniola Royal Palm. Twelve of the 33 nests were in areas of agriculture activity, 12 were in areas of abandoned agriculture (7-30 years), 6 were in primary and secondary forests, and 3 were in pastures.

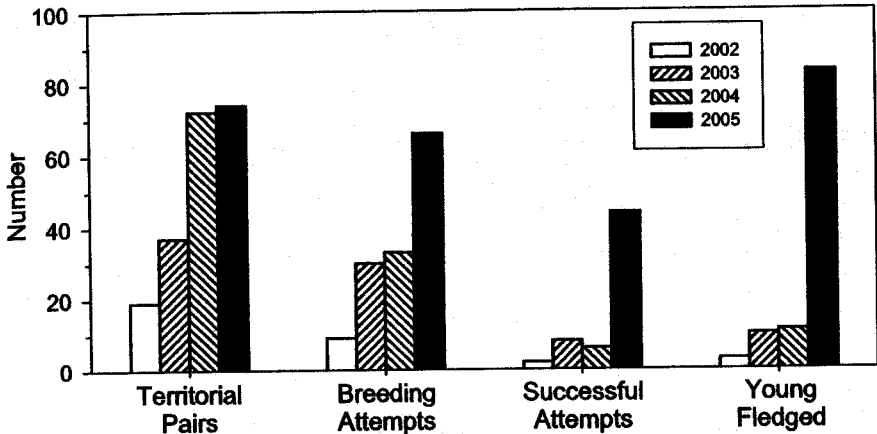


Figure 1. Ridgway's Hawk (*Buteo ridgwayi*) territorial pairs, breeding attempts, successful attempts, and numbers of young fledged in Los Haitises National Park, Dominican Republic, and surrounding areas 2002 - 2005.

In 2005, we found 150 individuals including 74 territorial pairs; of these, 66 pairs attempted breeding, and 45 successfully produced 83 fledglings (Fig. 1). In 2005, 10 species of trees were used for constructing hawk nests, and of the 66 nests, 42 were in Hispaniola Royal Palm, and 44 nests were built on top of Palmchat nest structures. The most common clutch size was two ($N=37$), followed by clutches of one ($N=6$), and there were five three-egg clutches, for a mean clutch size of 2.0 ± 0.1 . Of the 66 nests, 26 were in areas of agriculture activity, 25 in areas of abandoned agriculture (7-30 years), 14 in primary and secondary forests, and 1 in a pasture.

Overall, 140 nesting attempts produced 107 fledglings from 61 successful breeding attempts or a productivity of 1.6 ± 0.1 young per successful breeding attempt. The overall productivity for all years combined was 0.6 ± 0.2 young per breeding attempt.

Nesting success for all years combined was $34\% \pm 1.2$ (Table 1). Nests were built in 12 species of living trees. Half the nests ($N=69$) were in *Hispaniola* Royal Palm, 16 in *Sideroxylon foetidissimum*, 10 in *Spondias mombin*, 6 each in *Ceiba pentandra*, *Clusia rosea*, *Bombacopsis emarginata*, *Cocos nucifera*, *Sloanea berteriene*, 3 in *Ficus mitrophora*, 2 in *Inga vera*, and 1 in *Cordia alliodora*.

Of 77 breeding failures, most were due to human impacts including fires for clearing land and uncontrolled wildfires, cutting nesting trees for use in building materials, collecting nestlings for food consumption, and persecution of hawks near nests. From 2003-2005, 13 adult Ridgway's Hawks were killed by people because the hawks are predatory birds and are believed to kill poultry. One local hunter claimed in the last decade to have killed more than 100 hawks in one community along the southwestern park boundary (pers. comm.).

Table 1. Productivity per breeding attempt, productivity per successful nest, and nesting success of Ridgway's Hawks (*Buteo ridgwayi*) in Los Haitises National Park, Dominican Republic and surrounding areas 2002 - 2005.

Year	Productivity per breeding attempt	Productivity per successful attempt	Nest success (%)
2002	0.3	1.5	22
2003	0.3	1.3	27
2004	0.3	1.8	17
2005	1.3	1.8	68
Mean \pm SE	0.6 ± 0.2	1.6 ± 0.1	34 ± 1.2

Discussion

During the late 19th and early 20th centuries, the Ridgway's Hawk's status was described as "uncommon to rare in Hispaniola with a localized population in the northeastern part of Dominican Republic," and was based on few specimen records and observations (Wiley and Wiley 1981). Currently, the breeding population of more than 70 pairs of Ridgway's Hawks has been well documented in Los Haitises National Park and surrounding areas in this study and in Thorstrom et al. (2005).

Ridgway's Hawks have been reported to occupy lowland tropical forests, woodlands and semi-open habitat, lowland scrub, pine forest, lowland riparian woods with marshland (Bond 1928, Wetmore and Swales 1931, Wetmore and Lincoln 1934). Our observations of 74 pairs of Ridgway's Hawks in the Los Haitises area confirms that the greatest numbers and nesting density are inside the national park, with some in the forest blocks, but the majority in the degraded forest fragments and human-altered habitat within and surrounding the park in forest edges, regenerating secondary forests, present and abandoned agriculture areas, plantations, and pasture lands (open habitat). This suggests that Ridgway's Hawks are adaptable, or that they at least tolerate human-altered habitats and subsistence agriculture, so long as a prey base exists and mature trees are left standing for nest sites. Wiley and Wiley (1981) reported occasional sightings of the hawk in the degraded wet forests on the northern coast south of Los Haitises in the mid-1970s.

In 2004 and 2005, more than 75% of the Ridgway's Hawk nests, including four in pasture lands, were in areas of active or recently abandoned agricultural areas further

documenting that they can tolerate a certain degree of human-altered and degraded habitat. About half of all nests were in Hispaniola Royal Palm trees, and about the same number were constructed on top of the nests of social nesting Palmchats (*Dulus dominicus*). There is evidence from Wetmore and Lincoln (1934) of a partially built nest in a royal palm, but there has been no documentation of Ridgway's Hawk nests in association with Palmchat nests. Obviously, colonial nest structures of Palmchats in Hispaniola Royal Palms provided an excellent platform support for Ridgway's Hawk nests in areas lacking mature deciduous trees for nest sites. A similar type of nest support was used by Puerto Rican Broad-winged Hawks (*Buteo platypterus*), where several nesting pairs constructed nests atop termite nests in the main crotch of a tree (Hengstenberg and Vilella 2005).

Of interest was the occurrence of five three-egg clutches for Ridgway's Hawks in 2005. This is the first documentation of three-egg clutches for the species. Wiley and Wiley (1981) reported at least one, and possibly another of the three nests studied in 1976 contained two-egg clutches. The closely related tropical Roadside Hawk (*B. magnirostris*) produces 1-2-egg clutches (del Hoyo et al. 1994, Panasci and Whitacre 2002) and the temperate Red-shouldered Hawk (*B. lineatus*) lays 2-5 eggs with numbers varying geographically (Palmer 1988).

The Ridgway's Hawks productivity of 1.6 young fledged per successful breeding attempt was similar to the small sample of three breeding attempts reported by Wiley and Wiley (1981) in 1976 of a probable 1.5 (3 young per 2 successful nests) young fledged per successful attempt. The closely related Roadside Hawk (*B. magnirostris*), nesting in mature forests and in farming landscapes in Guatemala had a productivity rate of 0.08 and 0.32, respectively, and was apparently due in-part to one-egg clutches, a high rate of nest failures caused by predation and human persecution (Panasci and Whitacre 2002). Nesting success was slightly lower for the Ridgway's Hawk at 34% when compared with the Bicolored Hawk at 76%, and the Puerto Rican Broad-winged Hawk at 70% and 50%, but similar to the Puerto Rican Sharp-shinned Hawk at 29%, which also suffered from high nestling mortality like the Ridgway's Hawk, as well as clutch desertion (Delannoy and Cruz 1988, Delannoy and Tossas 2000, Thorstrom and Quixchan 2000, Hengstenberg and Vilella 2005).

We observed low productivity and nest success from 2002 to 2004, and that these breeding parameters increased fourfold in 2005. The lower productivity and success during the first 3 years of the study may be due to a combination of factors including human activity and persecution, habitat degradation, and wildfires. Another potential consideration for the low nest success and hawk productivity we observed from 2002-2004 was the recent documentation of West Nile virus found in resident birds in Los Haitises National Park (Komar et al. 2003). This disease can be fatal to raptors (Fitzgerald et al. 2003, Wünschmann et al. 2004). In 2005, we observed an increase in fledgling numbers and nest success suggesting the variables inhibiting productivity and nest success, such as disease, climate and prey availability, had changed or had become more beneficial for nesting hawks.

We recorded 13 hawk deaths all in areas with human activities, and the comment by one local hunter suggests that any hawks in areas outside the park and in contact with humans may suffer human persecution due to the perception of the Ridgway's Hawk as a poultry predator.

Our findings suggest an estimated global population of about 200-250 Ridgway's Hawks, with the last stronghold being the Los Haitises National Park and outlying areas. The hawk's population in Dominican Republic is highly threatened and its

critical endangered status (BirdLife International 2000) is justified. Many areas within Los Haitises remain unsurveyed, and this park is extremely important for preserving not only the hawk but for all the other fauna and flora that exist there.

Outside the Los Haitises region, other forest blocks and fragments need to be surveyed for the presence of this endangered small woodland hawk. We suggest research focusing on habitat-tolerance levels in the species as reflected by foraging, survivability, movements, and nest sites. We also recommend learning more about the natural history of this species, particularly in terms of the dispersal of young, their survival, and when they enter the breeding population. Public presentations and programs about Ridgway's Hawks, conservation and environmental issues, and the need to protect biodiversity and habitat also are needed in the local communities that border Los Haitises National Park. The status of the Ridgway's Hawk in Dominican Republic is poorly known locally. Publicizing this species' status locally will increase the chances of its survival.

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