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OBSERVATIONS ON NESTING ORNATE HAWK-EAGLES IN GUATEMALA

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The Ornate Hawk-Eagle (*Spizaetus ornatus*) is a small eagle that inhabits the tropical rain forests from central Mexico to northern Argentina. Almost nothing is known of its breeding behavior, although 4 nests have been reported previously (Russell 1964, Brown and Amadon 1968, Kiff and Cunningham 1980). Here we present descriptions of 2 new nest sites and the first observations of the breeding biology of this species.

STUDY SITE AND METHODS

We observed nesting Ornate Hawk-Eagles at Tikal National Park in the Department of Petén in northeastern Guatemala. On 9 March 1977 we found an occupied hawk-eagle nest (nest A), but were unable to make detailed observations at the site. In March 1979 we returned to the site and found that the nest had fallen, and that there were no hawk-eagles in the immediate area. On 1 April 1979 we found a new nest (nest B), about 5 km from the old site. From 8 to 10 April we constructed a blind in the nest tree, 10 m from the nest. During this time, the incubating female hawk-eagle was very tame and remained on the nest while we worked in the tree. We started observations on 11 April and watched the nest for about 9 h each day until 27 April, resulting in a total of 170 h of observations.

The habitat at Tikal is a semi-deciduous, dry, tropical forest (Holdridge 1957). The most abundant tree species include zapote (*Acras* sp.), ramon (*Brosimum alicatrum*), mahogany (*Swietenia macrophylla*) and Spanish cedar (*Cedrela mexicana*) (Smithe 1966). Most of the rain falls during the wet season that lasts from May to November (mean annual rainfall of 1400 mm). The park is in a region of very low, eroded limestone hills, and surface water is limited to a few, widely scattered, small forest ponds where runoff collects. These "aguadas" are important watering holes for local wildlife. A more detailed description of the vegetation and climate at Tikal is provided by Smithe (1966).

NEST SITES

Nest A was 20 m up in a 30 m silk cotton tree (*Ceiba pentandra*). It was wedged into a fork of a large side branch, 5 m out from the trunk. Although the tree was an emergent, the nest was slightly below the canopy.



Male Orate Hawk-Eagle (*Spizaetus ornatus*)
at a nest, Tikal, Guatemala, April, 1979.
Photo by Albert Kuhnigk.

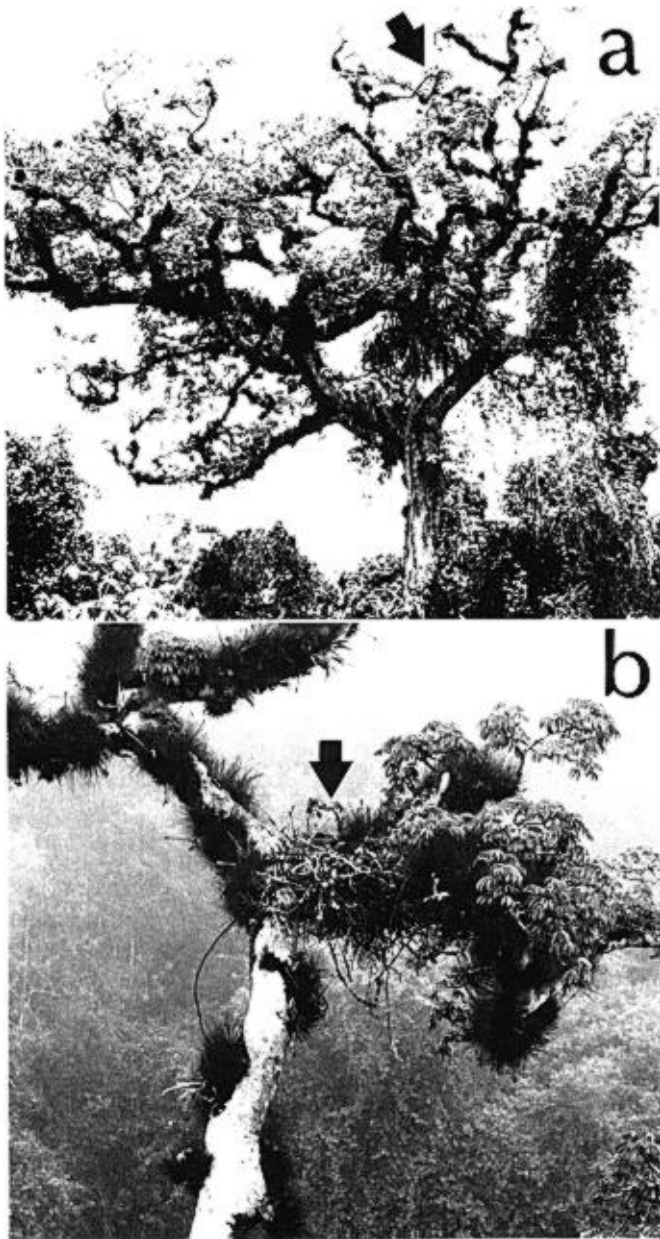


FIG. 1. (a) Giant silk cotton tree used for nesting by pair B in 1979. Arrow indicates position of nest, which is obscured from view by foliage. (b) Nest B in a fork of a side branch near the top of the tree. Arrow indicates nest position.



FIG. 2. Female at nest B during one of her breaks from incubation.

Nest B (Fig. 1) was 26 m up in a huge 30 m emergent silk cotton tree, well out from the main trunk near the end of a large side branch. The nest was 5 m above the top of the canopy, and its location afforded a clear view of the surrounding forest. The nest was roughly oblong in shape and was made of sticks between 5 and 10 mm in diameter. It measured 125 by 85 cm across and was 50 cm deep. When we climbed to the nest on 6 April it contained a single white egg, spotted with small faint brownish-red blotches. This is in contrast to the unspotted bluish-white eggs laid by a captive female (Kiff and Cunningham 1980), the only other egg description for this species.

Both Tikal nests were in tall emergent trees whose branches were well-festooned with a dense growth of bromeliads (Bromeliaceae). These bromeliads were likely incidental features of the nest sites, as the upper

branches of many emergent trees in the region are similarly covered with these epiphytes. We are aware of only two other descriptions of Ornate Hawk-Eagle nest sites. A nest in Panama was 28 m up in the crotch of a 31 m cativo tree (*Prioria* sp.) (Brown and Amadon 1968), and a nest in Oaxaca, Mexico, was in a crotch of the main trunk of a huge pine tree (L. Kiff, pers. comm.; data from R. Galley).

INCUBATION BEHAVIOR

The female performed 95% (121 of 126.6 h observed) of the incubation during the last two weeks of incubation (Fig. 2). The male provided the female with prey during this period and normally incubated only while she fed on this prey away from the nest. Normally, one member of the pair was at or very near the nest, and the nest was left unattended for only 9 min during the 127 h of observations during incubation.

During each daily 9-h observation period the female took an average of 11.4 short breaks ($SD \pm 2.73$, range 7–13, $N = 14$) from incubation to preen, exercise, roll the egg, and collect leafy green sprigs for the nest bowl. These breaks averaged 3.5 min ($SD \pm 1.87$, range 1–11, $N = 128$), and the female remained on the nest unless sprigs were collected.

The female collected leafy sprigs for the nest bowl at least once a day and always before 08:00. Twenty of the 22 sprigs the female brought to the nest came from a single tree 100 m NE of the nest tree. The female never collected sprigs from the nest tree itself. We observed the female collecting sprigs twice—on both occasions she flew to the end of a branch and removed a sprig with a couple of good tugs with her bill. She usually carried the sprigs to the nest in her bill ($N = 6$), but twice she used her feet. Preening was often associated with sprig-collecting, and often occurred in her “preferred” sprig-tree.

The male visited the nest daily, except on two occasions when he was absent for 1 and 2 d respectively. He always arrived before 12:00. He brought prey to the female on 6 of 9 visits, and prey transfers took place several hundred meters from the nest, and never at the nest. After the prey was given to the female, the male flew to the nest to incubate and he always left the nest upon the female’s return. He usually incubated for 0.5 to 1 h, but one unusually long bout lasted 2 h when the male came to the nest without prey and the female presumably went off to hunt for herself. The male also collected leafy sprigs for the nest bowl, usually during breaks in his incubation bouts. Four of eight sprigs he collected were from the tree preferred by the female.

The prey provided by the male appeared to comprise almost all of the female’s food during incubation. Only once during our observations did the female leave the nest area long enough to have been hunting.

HATCHING, CHICK DEVELOPMENT, AND NEST FAILURE

The day before the egg hatched the female began to incubate with her wings out and tail spread, similar to her brooding behavior after the egg hatched. At 08:00 on 25 April, the female returned to the nest with the remains of a Plain Chachalaca (*Ortalis vetula*) that she received from the male. This was the first time we observed prey brought to the nest. At 10:10 when the female rolled the egg, the blunt end fell off and the head and one wing of the chick emerged. Ten minutes later the chick was completely free of the shell. The female then ate most of the soft membranous tissue adhering to the shell. Several times during the day the female picked up and dropped the eggshell until it had been reduced to several large fragments. These fragments remained in the nest bowl.

By 12:20 the pure-white down of the chick was completely dry. When 2 d old, the chick could hold its head up long enough to be fed. By the third day it could maneuver itself to defecate over the edge of the nest cup. During the mornings of the second and third day the female brooded the chick with her wings and tail spread. On both days it was hot enough by 11:00 that she stood above the chick to provide shade.

On 27 April the female behaved abnormally and flew off the nest, leaving the chick exposed to the sun. The chick moved toward some shade but became caught in debris and died after 20 min of exposure to the sun, apparently of heat prostration. Prior to leaving the nest, the female was salivating heavily and thrashing her head about the nest. This behavior may have been a result of the exceptional heat that day. It is also possible that the female ingested and was stung by one of the large ants (*Paraponera* sp.) that were numerous on the branches of the nest tree. (One of us who was stung by an ant felt that it was easily as painful as a bee sting.)

The adult hawk-eagles remained in the vicinity of the nest after the chick's death and continued to bring leafy sprigs to the nest bowl. No observations were made after 29 April.

FOOD

We identified 5 prey items at the nest before the chick died; a young tinamou (Tinamidae), a Plain Chachalaca, a young Crested Guan (*Penelope purpurascens*), a Gray-headed Dove (*Leptotila plumbeiceps*) and a leaf-nosed bat (Phyllostomatidae). During incubation, the male brought the female a large whitish bird, but the prey was transferred too far away for identification. Kilham (1978) observed an Ornate Hawk-Eagle at Tikal attempt to catch a Crested Guan, and Brown and Amadon (1968) noted that medium- to large-sized birds and mammals as large as the kinkajoo (*Potus flavus*) are included in the diet.

NEST DEFENSE AND RESPONSE TO INTRUSIONS NEAR THE NEST

As hatch approached, the female began to attack us as we climbed to the blind, and only our vigorous waving and shouting prevented her from striking us. On the two occasions that the male was incubating when we arrived at the nest, he did not attempt to defend the nest in any way. At a nest in Oaxaca, Mexico, where the female had been collected before the nest was discovered, the male actively defended the nest against a climber (L. Kiff, pers. comm.).

On 16 March 1977 a troop of Spider Monkeys (*Ateles paniscus*) passing through the forest canopy passed within 25 m of nest A. The female hawk-eagle left the nest and swooped at one of the monkeys twice. The monkey responded by shrieking loudly and vigorously shaking the branch it was on before retreating into the foliage. On 6 April 1979 a troop of Spider Monkeys passed through the treetops within 20 m of nest B and although the incubating female watched them, she remained on the nest.

As hatching neared at nest B, the incubating female responded to raptors that soared within several hundred meters of the nest by raising her crest, mantling the egg, and calling loudly. Black Vultures (*Coragyps atratus*), King Vultures (*Sarcoramphus papa*), Turkey Vultures (*Cathartes aura*), Swallow-tailed Kites (*Elanoides forficatus*), and Black Hawk-Eagles (*Spizaetus tyrannus*) all elicited a calling response from her, the intensity depending on their distance.

NESTING PHENOLOGY

Incubation and fledging periods are not known for any *Spizaetus* eagle. *Hieraaetus* eagles, which are closely related to *Spizaetus*, have incubation periods ranging from 42 to 45 d, and fledging periods from 55 to 80 d (Brown and Amadon 1968). Using these data and extrapolating from hatch, the egg in nest B was probably laid during the second week in March and, had the eaglet survived, it would have fledged in late June or early July. Thus, the egg was laid in the dry season, and the chick would have been 3 weeks old when the wet season started. Most species of birds at Tikal begin to breed in early to mid-April (pers. obs.). Breeding in hawk-eagles at Tikal may be timed so that eggs hatch at the onset of the flush of young birds that takes place in late April and throughout May.

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COLOR PLATE

The Frontispiece of the Ornate Hawk-Eagle (*Spizaetus ornatus*) has been made possible by an endowment established by George Miksch Sutton (1898-1982).