SHORT COMMUNICATIONS

The Condor 92:237–239

DESCRIPTIONS OF NESTS, EGGS, AND YOUNG OF THE BARRED FOREST-FALCON (*MICRASTUR RUFICOLLIS*) AND OF THE COLLARED FOREST-FALCON (*M. SEMITORQUATUS*)[1]

RUSSELL K. THORSTROM
The Peregrine Fund, Inc., World Center for Birds of Prey, 5666 West Flying Hawk Lane, Boise, ID 83709

CHARLES W. TURLEY
Department of Biology, Boise State University, 1910 University Drive, Boise, ID 83725

FELICIANO GUTIERREZ RAMIREZ
Tikal National Park, Instituto de Antropologia y Historia, 12 Avenida 11-65, Zona 1, Guatemala City, Guatemala

BETH ANN GILROY
U.S. Fish and Wildlife Service, 1490 East Main Street, Ashland, OR 97520

Key words: Micrastur ruficollis; Micrastur semitorquatus; *nest; egg; nestling; young.*

The genus *Micrastur* contains six species of small to medium-sized falconids. All are long-tailed, short-winged, and inhabit forests from southern Mexico to central Argentina (Brown and Amadon 1968). There is little information on the reproductive biology of these species. The nest and young of only one species, the Collared Forest-Falcon (*M. semitorquatus*), has been described and that from only one breeding pair (Mader 1979). A captive Collared Forest-Falcon at the National Zoological Park laid two eggs in 1968, one of which was salvaged (Wetmore 1974). T. de Vries (pers. comm.) found a pair of Barred Forest-Falcons (*M. ruficollis*) going in and out of a hole, which he believed was a nest, in the top of a large tree near the forest edge. Other than these reports, the description of nests, eggs, or young of the remaining congeners are unreported (Thiollay 1985).

NESTS

Four nests of Barred Forest-Falcons and one nest of the Collared Forest-Falcon were located during 1988 in Tikal National Park, Guatemala. Observations were made from 1 April to 16 June 1988. Nests were located by searching areas in which early morning vocalizations were heard, then visually locating vocalizing birds and following their movements until nest sites were found.

Nest #1 was located on 13 April 1988 near the Maya ruins known as Complex R. The nest cavity was 23.7 m above ground in a living *Cedrelo mexicana* (Spanish cedar). Total tree height was 31 m and diameter at breast height (dbh) was 1.9 m. The cavity was in a decayed portion of a large limb extending horizontally from the main trunk. The cavity had two entrances. The main cavity entrance was on the top surface of the limb and was 15.5 cm in diameter and surrounded by epiphytic growth. The secondary entrance was on the bottom of the limb. RT climbed this nest tree on 20 April and found a clutch of two eggs. The eggs were located 66 cm (horizontal distance) from the cavity opening on a substrate of pieces of decayed wood. The eggs could be observed only with the aid of a flashlight and could not be reached by hand. This nest was rechecked on 6 May. At that time the eggs had apparently been moved farther away from the cavity entrance and out of view. We believe this to be the case, rather than that the nest failed, because prey deliveries continued throughout the remainder of the field season.

Nest #2 was located on 19 April 1988 near the Maya ruin known as Temple V. The nest cavity was 17 m above ground in a dead and badly decayed tree of undetermined species. Total tree height was 25 m, and the dbh was 65 cm. The cavity entrance was a vertical slit 12.5 cm wide. The cavity extended 68.5 cm below the bottom lip of the entrance and widened to 35.5 cm at the bottom. The floor of the cavity was lined with pieces of decayed wood. James Gilardi and Kirsten von Kugelgen climbed this nest tree on 1 May and

[1] Received 23 January 1989. Final acceptance 21 August 1989.

found a clutch of three eggs (described below). The nest was rechecked on 2 June. At that time no eggs or shell fragments were in the cavity that had large numbers of very aggressive black ants.

Nest #3 was located on 5 May 1988 near the Maya ruins known as Mundo Perdido. The nest cavity was 17.5 m above ground in a living *Cedrelo mexicana*. The total tree height was 22 m, and dbh was 58.5 cm. The cavity entrance was 18 × 19 cm with the cavity floor 50 cm below the lower lip of the entrance. FGR climbed this nest tree on 6 May and found a clutch of three eggs on a substrate of pieces of decayed bark and wood. The nest was rechecked on 11 June. At that time two nestlings approximately 1 to 2 weeks old were observed along with one unhatched egg. This nest was rechecked on 15 June and the young were photographed (young described below) and shell fragments were collected.

Nest #4 was located on 21 May 1988 near the intersection of the El Caoba and Estela trails. The nest cavity was 12 m above ground in a living *Lacuma campechiana* (Silillon). The total tree height was 22 m, and dbh was 30 cm. The cavity entrance was a narrow vertical slit 8 cm wide and 35 cm from top to bottom. The cavity floor was 35.5 cm below the lower lip of the entrance. J. Peter Jenny climbed this nest tree on 24 May and found a clutch of two eggs on a substrate of pieces of decayed wood and bark. One egg was removed, measured, photographed, and replaced.

One Collared Forest-Falcon nest was in a cavity 21 m in height in a 34-m *C. mexicana* and found on 24 May 1988 by RT. The nest had a double entrance in the main branch. The main entrance was 30.5 cm wide × 38 cm high and the back entrance was 30.5 cm wide × 92 cm long. From the main entrance to the cavity bottom was 45.5 cm, while it was 75 cm to the bottom from the back entrance. The nest-bowl circumference was 61 cm.

The four Barred Forest-Falcon nests were 600 m, 800 m, and 1.0 km apart in a more or less straight linear west to east line. The Collared Forest-Falcon nest was 800 m west of the furthest west Barred Forest-Falcon nest.

DESCRIPTION OF EGGS AND NESTLINGS

All observed clutches of *M. ruficollis* consisted of either two eggs (two nests) or three eggs (two nests). The eggs were rounded, and dark reddish-brown in color with small dark spots. One egg measured 41.0 × 32.0 mm at its longest and widest points, respectively. Eggshell fragments collected from *M. semitorquatus* were light tan color with small dark brown/black spots.

The two young *M. ruficollis* observed at nest #3 at approximately 1 to 2 weeks old were covered with white down with primary feathers developed to approximately 2 cm in length. The cere was greenish-yellow; the beak was very deep and laterally compressed. Legs were long and yellow with short toes. Eyes were dark with gray iris. The young of *M. semitorquatus* at approximately the same age was very similar in appearance but slightly larger.

PREY REMAINS

Prey remains were collected and identifications made by BAG. Barred Forest-Falcon prey remains included Tennessee Warbler (*Vermivora peregrina*), Magnolia Warbler (*Dendroica magnolia*), Spot-breasted Wren (*Thryothorus maculipectus*), Rufous Mourner (*Rhytipterna holerythra*), and Western Wood-Peewee (*Contopus sordidulus*). The only potential prey remains in the Collared Forest-Falcon nest were feathers from a Mottled Owl (*Ciccaba virgata*).

DISCUSSION

Laying occurred in the dry season while fledging, although not observed, would have occurred during the wet season. It is interesting to note that a large proportion of prey found in nests consisted of migrant species. Fledging of young occurs in the absence of migrants, but after most small birds have bred and young are independent.

The eggs of both *Micrastur* species were like those of most other members of Falconidae whereas primary hole-nesting birds typically lay a white egg (e.g., pygmy falcons). Based on current classification, *Micrastur* is placed near the Laughing Falcon (*Herpetotheres cachinnans*) in the subfamily Polyborinae (Amadon and Bull 1988). The allozyme data of Boyce and White (pers. comm.) show that it fits between *Falco* and the Laughing Falcon as their two closest relatives. It is of interest that downy *Micrastur* are white in color like most *Falco* species while downy Laughing Falcons are buffy with a darker eyestrip, not unlike the Aplomado Falcon (*Falco femoralis*) but quite unlike *Micrastur*.

Based on distance between nests, habitat use, and number of vocalizations heard after techniques of locating forest-falcons were perfected, we believe *M. ruficollis* is very common in mature tropical forests and has small nesting territories. *Micrastur semitorquatus* also was frequently heard but is believed to have a larger territory and to occur at lower density.

This information was collected as an incidental part of the Maya Project, a multi-year research effort being conducted and funded by The Peregrine Fund's World Center for Birds of Prey (Burnham et al. 1988) in cooperation with the Instituto Nacional de Antropologia y Historia (INAEH) and the Centro de Estudios Conservacionistas (CECON), Guatemala. We thank Lic. Leopoldo Colon Molina, Director, INAEH, Lic. Jose Rodolfo Morales Sanchez, Administrador, Tikal National Park, and Sr. Rogelio Chi Ochaeta, Secretario, Tikal National Park, for assistance during this project. We also thank William Burnham, J. Peter Jenny, James Gilardi, and Kirsten von Kugelgen of The Peregrine Fund and Aquilas Estuardo Hernandez Cordova, Cristabal Mateo Marales, Miguel Angel Vasquez Marroquin, and Julio Alfredo Madrid Montenegro of the staff of Tikal National Park for their assistance in data collection during the 1988 field season. We also thank Tom Cade and James Munger for their review of and suggestions for this manuscript.

LITERATURE CITED

AMADON, D., AND J. BULL. 1988. Hawks and owls of the world: a distributional and taxonomic list. Proc. West. Found. Vert. Zool. 3(4):295–357.

BROWN, L. H., AND D. AMADON. 1968. Eagles, hawks, and falcons of the world. McGraw-Hill, New York.

BURNHAM, W. A., J. P. JENNY, AND C. W. TURLEY.

1988. Progress Report, 1988. MAYA PROJECT: investigation of raptors and their habitats as environmental indicators for preserving biodiversity and tropical forest of Latin America. The Peregrine Fund, Boise, ID.

MADER, W. J. 1979. First nest description for the genus *Micrastur* (forest falcon). Condor 81:320.

THIOLLAY, J. M. 1985. Falconiforms of tropical rainforests: a review, p. 155–166. *In* I. Newton and R. A. Chancellor [eds.], Conservation studies on raptors. I.C.B.P. Tech. Publ. No. 5.

WETMORE, A. 1974. The egg of a Collared Forest Falcon. Condor 76:103.

The Condor 92:239–242

HABITAT USE AND RELATIVE ABUNDANCE OF MIGRANT SHOREBIRDS IN A WESTERN AMAZONIAN SITE[1]

DAVID C. BOLSTER
Department of EPO Biology, University of Colorado, Boulder, CO 80309

SCOTT K. ROBINSON
Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, IL 61820

Key words: Migrant shorebirds; Manu River; southeastern Peru; habitat use; dry season.

Little is known about the ways in which migrant shorebirds use the interior of South America as a stopover and wintering area (Dott 1985, Thomas 1987). The extensive river systems of the Amazonian headwaters offer a potentially rich, but highly seasonal, array of habitats for shorebirds. During the wet season, river channels are completely covered with water and there is little shorebird habitat. During the dry season, however, water levels drop well below their wet-season levels, exposing extensive mudflats, sandbars, and beaches on the rivers and lakes. The availability of habitats for shorebirds should therefore depend upon the timing of the wet and dry seasons relative to the timing of the shorebird migration. Our purpose in this paper is to describe the dynamics of and habitats available to the migrant shorebird community in the Manu River area of southeastern Peru.

STUDY AREA

This research was conducted at the Cocha Cashu Biological Station in the Manu National Park in the Department of Madre de Dios, southeastern Peru, at 71°19′W, 11°51′S. The biological station is located on an oxbow lake (Cocha Cashu) 0.5 km from the bank of the Manu River (see Fig. 1). The Manu River meanders over a broad floodplain and forms extensive beaches on the inside of its many curves. The river channels along meander loops vary widely in structure during the dry season, but typically consist of five distinct zones. A zone of early successional vegetation forms along the inside of the meander loop (Zone 1 in Fig. 1) consisting largely of a tree-like composite *Tessaria*. On some beaches, a steep bank occurs at the edge of the *Tessaria* at the bottom of which is a shallow depression containing standing water (Zone 2). This depression represents a secondary river channel during periods of high water. Zone 3 consists of a beach of fine, white sand on which young *Tessaria* grow throughout the dry season. These beaches form above the usual dry season (mid-June to mid-November) water level and therefore seldom receive fresh silt during the dry season. At the edge of these beaches, there is often a vertical bank, 0.5 to 2 m above water level. Below this bank is a gradual slope which is only exposed at very low water levels (Zone 4). Sandbars sometimes form in the middle of the river (see Fig. 1), usually downriver from large logjams. The amount of beach and mudflat exposed in Zone 4 changes dramatically with slight variations in water level. The outside banks of meander loops (Zone 5), where most erosion occurs, are steep and generally mudflats occur there only at very low water. During the wet season, which usually extends from mid-November to early June, Zones 2, 3, and 4 are underwater, leaving no exposed mudflats. Periodic floods early (June) and late (October–November) in the dry season cover the sandy beaches with a layer of fine silt.

Oxbow lakes, or cochas, form when a meander loop is cut off from direct flow from the river. Marshes form in areas which had formerly been beaches; these marshes are invaded by shrubs as succession continues. The area that was Zone 5 when the lake was part of the river (see Fig. 1) becomes overgrown with vines, but the bank remains steep, and no marshy vegetation forms. The water level in these lakes drops gradually during the dry season. In dry years, mudflats are exposed along the edge of marshes.

[1] Received 15 February 1989. Final acceptance 21 August 1989.