ORNITOLOGIA NEOTROPICAL 17: 151–154, 2006

OBSERVATIONS ON THE NEST, EGGS, AND NATURAL HISTORY OF THE HIGHLAND MOTMOT (*MOMOTUS AEQUATORIALIS*) IN EASTERN ECUADOR

Harold F. Greeney[1,2], Lana H. Jamieson[1], Robert C. Dobbs[1], Paul R. Martin[1,2], & Rudolphe A. Gelis[1]

[1]Yanayacu Biological Station and Center for Creative Studies, c/o Foch 721 y Amazonas, Quito, Ecuador. *E-mail:* revmmoss@yahoo.com

[2]Research Associate, Museo Ecuatoriano de Ciencias Naturales, Rumipamba 341 y Av. Shyris, Quito, Ecuador.

Observaciones sobre el nido, huevos, y historia natural del Momoto Montañero (*Momotus aequatorialis*) en el este del Ecuador.

Key words: Nest, eggs, natural history, predators, diet, army ants, Andes, cloud forest, Highland Motmot, *Momotus aequatorialis*.

The Highland Motmot (*Momotus aequatorialis*) is the most montane of its congeners (3 spp.), preferring elevations between 1000 and 2100 m (ranging as high as 3100 m), and generally replacing Blue-crowned Motmot (*M. momota*) at these elevations from Colombia to Peru (Ridgely & Greenfield 2001, Snow 2001). While a fair amount has been written concerning the breeding and foraging ecology of the more wide-spread Blue-crowned Motmot, little is known for its congeners, and the Highland Motmot has yet to have its nest and eggs described. Here we provide brief observations on the nesting of this species in eastern Ecuador as well as opportunistically gathered information on its natural history.

From September 2000 to March 2005, we made observations at the Yanayacu Biolgical Station and Center for Creative Studies (00°35.95S, 77°53.40W, elev. 2100 m) on the privately owned reserve of Cabañas San Isidro, Napo Province, 5 km west of Cosanga. Observations were made opportunistically during the course of other field work.

Nest and eggs. While we encountered several active nests, only one was excavated and measured. This nest was first observed on 9 February 2005, when an adult bird was flushed from an earthen tunnel by gently probing inside with a thin stick. The adult inside the nest pulled sharply on the stick, then burst from the opening as soon as the stick was withdrawn. It remained nearby while observers were present, perching 7 m above the ground on an exposed branch and repeatedly uttering a muted "pu-dup!" When we returned to excavate the nest on 13 February, similar behavior was repeated. At this time, the adult remained in the area for 5 min while

we began excavation, and then flew silently away. This nest was situated 1.5 m above the ground in the side of a 3.3-m high soil bank. The tunnel entrance was excavated in tighly packed clay-like soil, 80 cm below the bottom of the topsoil layer. It was below a 60 cm overhang of roots and topsoil, and partially obscured by hanging roots and vegetation. The entrance was 10 cm wide and 12 cm tall but immediately widened and became shorter (12 cm wide by 10 cm tall). The opening was most likely slightly deformed by the repeated landing of adults as they entered the nest. Overall, the tunnel was slighly downsloped, and extended 75 cm at a roughly 30º angle (right) from the opening. At this point, the tunnel made a further 45º angle right turn and became increasingly larger (15 cm wide by 12 cm tall at this point). Ninety centimeters beyond this turn, the tunnel widened into a chamber 51 cm wide, 43 cm front to back, and 15–20 cm tall, sloping gently to the sides. We discovered two eggs, placed in the tunnel, just at the point where it opened into the terminal chamber. The tunnel at this point was 24 cm wide and 18 cm tall. We found no obvious lining materials, but there was a roughly 1.5 cm thick layer (across the bottom of the chamber, and where the eggs were) of loose soil in the form of small balls. Mixed with this soil we found hundreds of small pieces of beetle (Coleoptera) exoskeletons, the bones and some fur from at least two small mammals, several broken snail shells, and 30 Lauraceae seeds (cf. *Nectandra* or *Ocotea*). Among the beetle remains were predominantly rhinoscerous beetles (*Megaceras*: Dynastinae: Scarabaeidae), but also other beetles including *Semiotus* sp. (Elateridae), leaf chafers (Rutelinae: Scarabaeidae), and weevils (Cucurlionidae). The eggs were immaculate white and measured 38.1 by 30.1 mm and 37.9 by 29.5 mm. They weighed 16.86 and 15.79 g, respectively, and were both well developed.

Seasonality and nesting habitat. Unfortunately, for most observations of active nests (adults flushed from tunnels), we were unable to determine the activity within. We observed active nests in January (1), February (3), March (5), April (1), May (3), July (3), and November (1). We observed nests with adults bringing food in their bills, presumably to provision nestlings, in April (1) and May (1). Based on these dates, we suggest peak breeding during the wet season in our area (February–July), with possibly sporadic activity beginning late in the dryer season.

Nests of Highland Motmot were all tunnels excavated in earthen banks. The majority were well inside mature forest, usually along streams or in areas where natural collapses formed banks. A few were found along road cuts, usually near intact forest, and one was found along a stream through pasture, over 100 m from forest. Based on our observations, however, we suggest that preferred nesting habitat is within mature forest but that pairs in marginal habitat may use banks in disturbed areas if necessary.

Foraging and natural enemies. We observed two prey items caught by adult Highland Motmots. The first was a c. 6-cm long, hairless green moth larva (Sphingidae, Lepidoptera), which was delivered to nestlings. The second was a c. 4-cm long bess beetle (Passalidae, Coleoptera), which an adult captured by alighting in the trail and retrieving the beetle from the leaf litter. Most often adults were observed perching silently in the mid-canopy as described for this and other motmots (Snow 2001). On two out of three occasions that army ant swarms were encountered in the area (*Labidus* sp., Ecitoninae, Formicidae), HFG observed a single adult Highland Motmot in attendance. No foraging was observed, but on both occasions he observed the adult remaining with the moving swarm for over one hour.

On 27 December 2001 we observed an adult Highland Motmot attacked and killed by a Collared Forest-Falcon (*Micrastur semitorquatus*). The motmot was attacked as it perched silently 3 m above the ground on an exposed limb. The force of the attack carried it directly to the ground with little or no visible attempts to escape. By the time we reached the fallen prey and predator (c. 1.5 min), the falcon had already consumed the head of the motmot, and it is likely the attack was directed at the head based on our momentary glimpse of the interaction.

Conclusions. Not surprisingly, the nest and eggs described here, both in situation and form, closely resemble those described for other members of the family (Skutch 1945, 1947, 1964, 1971; Snow 2001). While the lack of nest lining, and lose litter of dirt and insect parts is nearly identical to that described for other species (e.g., Skutch 1945), most nest descriptions state explicitly (or imply) that eggs were situated within the terminal chamber (e.g., Skutch 1945, 1947, 1964, 1971; Orejuela 1977, Martin & Martin 1980). The clutch of Highland Motmot found in the tunnel before the chamber differs slighly from this pattern, but possible reasons for this remain unknown. Breeding during the wetter months in our area is similar to that reported elsewhere for Highland Motmot (Miller 1963) and for most other species (Snow 2001).

Motmots are known to have a varied diet to include fruits, invertebrates, and vertebrates (Remsen *et al.* 1993, Snow 2001), and the high proportion of scarab beetles is similar to other species (e.g., Orejuela 1980). The mammalian bones and fur found inside the Highland Motmot nest, however, appear to be the only evidence of vertebrate predation for this species. Other species of motmots are well known participants in army ant following flocks (Skutch 1971, Snow 2001), and here we show Highland Motmots to also take advantage of the infrequent swarms at higher elevations. Only through the continued publication of similar natural history observations can we begin to asess the relative importance of dietary components, predators, and nesting requirements for this and other poorly known species. We hope this brief contribution encourages others to publish similar findings.

ACKNOWLEDGMENTS

As always, we are grateful for the generosity and support of Carmen Bustamante, Mitch Lysinger and the staff of Cabañas San Isidro. This study was funded in part by a Pamela and Alexander F. Skutch Award, funds provided by Ruth Ann and John V. Moore through the Population Biology Foundation, the Hertzberg Family Foundation, and a Rufford small grant. The PBHNS inspired and supported our work throughout the study period. This is publication number 50 of the Yanayacu Natural History Research Group and is dedicated to Jeanette Greeney for her love and encouragment.

REFERENCES

Martin, R. F., & M. W. Martin. 1980. Observations on the breeding of Turquoise-browed Motmots in Yucatán. Condor 82: 109.

Miller, A. H. 1963. Seasonal activity and ecology of the avifauna of an American equatorial cloud forest. Univ. Calif. Publ. Zool. 66: 1–74.

Orejuela, J. E. 1977. Comparative biology of Turquoise-browed and Blue-crowned motmots in the Yucatán Peninsula, México. Living Bird 16: 193–208.

Orejuela, J. E. 1980. Niche relationships between Turquoise-browed and Blue-crowned motmots. Wilson Bull. 92: 229–244.

Remsen, J. V., M. A. Hyde, & A. Chapman. 1993. The diets of Neotropical trogons, motmots, barbets, and toucans. Condor 95: 178–192.

Ridgely, R. S., & P. J. Greenfield. 2001. The birds of Ecuador. Cornell Univ. Press, Ithaca, New

York.

Skutch, A. F. 1945. Life history of the Blue-throated Green Motmot. Auk 62: 489–517.

Skutch, A. F. 1947. Life history of the Turquoise-browed Motmot. Auk 64: 201–217.

Skutch, A. F. 1964. Life history fo the Blue-diademed Motmot *Momotus momota*. Ibis 106: 321–332.

Skutch, A. F. 1971. Life history of the Broad-billed Motmot, with notes on the Rufous Motmot. Wilson Bull. 83: 74–94.

Snow, D. W. 2001. Family Momotidae. Pages 264–284 *in* del Hoyo, J., A. Elliot, & J. Sargatal (eds.). Handbook of the birds of the world. Volume 6: Mousebirds to hornbills. Lynx Edicions, Barcelona, Spain.

Accepted 3 October 2005.