

## FIRST DESCRIPTION OF THE NEST AND EGGS OF THE WESTERN STRIPED MANAKIN (*MACHAEROPTERUS REGULUS STRIOLATUS*), WITH OBSERVATIONS ON NESTING BEHAVIOR

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**Primera descripción del nido y huevos del Saltarín Rayado Occidental (*Machaeropterus regulus striolatus*), con observaciones sobre el comportamiento de nidificación.**

**Key words:** Amazon, breeding biology, Ecuador, nest description, *Machaeropterus regulus striolatus*, Pipridae, Western Striped Manakin.

### INTRODUCTION

*Machaeropterus* manakins (Pipridae) are small, frugivorous, forest-dwelling birds characterized by modified secondaries and/or rectrices (Ridgely & Greenfield 2001, Snow 2004), which are used in the production of non-vocal sounds, or sonations (Bostwick & Prum 2003). In at least one species (*M. deliciosus*), sonations have largely replaced vocalizations, which are otherwise simple and inconspicuous (Bostwick 2000, Ridgely & Greenfield 2001, Snow 2004), as a result of a reduction of the syringeal musculature (Prum 1992). The genus is comprised of *M. pyrocephalus*, *M. deliciosus*, and *M. regulus*, the latter including the Eastern Striped Manakin (*M. r. regulus*) from the Brazilian Atlantic Forest, and the Western Striped Manakin (*M. r. striolatus*) from west

Amazon. According to Snow (2004), *striolatus* should be given species status due to marked differences in voice and, to a lesser extent, plumage.

As with most manakins, *Machaeropterus* are lek-breeders. The lek of the Striped Manakin is of the ‘exploded’ or ‘dispersed’ type, in which up to 11 males hold individual, adjacent territories of 25–30 m in diameter (Prum 1994, Bostwick 2000, Silva *et al.* 2000). Western males are olive with a red crown and nape, with the breast and belly streaked reddish chestnut and white; females lack red on the head and have a much finer streaking pattern (Ridgely & Greenfield 2001). In addition to sexual dimorphism in plumage, Western Striped Manakins also show moderate size dimorphism, with females weighing, on average, 11 g and males 9 g during the breeding

TABLE 1. Characteristics of nests of the Western Striped Manakin (*Machaeropterus regulus striolatus*) in eastern Ecuador. Nest diameters and depth in mm; nest height, distance to central stem of supporting plant, and plant height in m; orientation in degrees; “—” = not recorded.

Nest condition	Internal diameter1 <sup>a</sup>	Internal diameter2 <sup>b</sup>	External diameter1 <sup>a</sup>	External diameter2 <sup>b</sup>	Internal depth	Nest height	Distance to stem	No contacts <sup>c</sup>	Orientation <sup>d</sup>	Percent cover	Plant height	Supporting plant
active	44.1	44.6	57.3	58.5	38.2	0.8	0.25	2	174	5	1.1	<i>Rhinorea</i> sp.
active	43.7	39.4	56.3	50.0	30.4	0.4	—	1	340	95	0.54	<i>Rudgea</i> sp.
active <sup>e</sup>	42.1	43.9	53.9	54.7	31.0	0.4	0.13	1	16	90	0.54	<i>Rudgea</i> sp.
active	31.2	44.7	43.9	54.4	36.5	0.7	0.08	3	308	100	0.88	<i>Rhinorea</i> sp.
active <sup>e</sup>	55.0	45.0	70.0	48.0	33.0	0.4	0.44	3	—	50	-	<i>Rudgea</i> sp.
inactive	39.9	53.8	58.7	75.2	35.0	0.7	0.35	4	128	50	1.05	<i>Rhinorea</i> sp.
inactive	39.4	44.9	43.1	56.4	26.4	0.5	0.04	1	120	95	0.68	—
inactive	42.2	44.5	52.1	53.6	31.5	0.5	0.12	3	234	20	0.6	<i>Rudgea</i> sp.
Mean ± SD	42.2 ± 6.2	45.1 ± 3.7	54.4 ± 8.0	56.3 ± 7.8	32.7 ± 3.5	0.5 ± 0.1	0.2 ± 0.1	2.3 ± 1.1	188.6 ± 105.3	63.1 ± 34.8	0.8 ± 0.2	

<sup>a</sup>Measured on a horizontal line tangent to central stem.

<sup>b</sup>Measured on a horizontal line perpendicular to central stem.

<sup>c</sup>Number of individual plants touching the plant where nest is located.

<sup>d</sup>Taken as the direction the fork supporting the nest faces.

<sup>e</sup>These two nests belonged to the same female.

season (J.G. Blake & B.A. Loiselle, unpubl.). In Ecuador, the Striped Manakin displays alone or in small leks of up to 3 males, in horizontal perches between 10–15 m, on top of or on the upper slopes of small hills (Loiselle *et al.* 2007). The breeding behavior of the western form is considerably less known than that of the eastern subspecies, and details on nesting biology remain undescribed for either form. Here, we present the first description of the nest and eggs of the Striped Manakin, as well as notes on female nesting behavior, based on observations carried out on two sites in eastern Ecuador.

#### STUDY SITES AND METHODS

Tiputini Biodiversity Station (TBS, 00°38'S, 76°08'W, Orellana Province, 190–270 m a.s.l.) is a 650-ha biological station located within the larger Yasuni Biosphere Reserve. The predominant vegetation is wet-evergreen forest comprised primarily of *terra firme* and, at a lesser extent, of “várzea” (see details in Loiselle *et al.* 2007). At TBS, 11 nests (six active and five inactive) were found during systematic searches throughout two 100-ha study plots. Active nests were marked with flags located 10–20 m away, and checked on average every 3 days until completion. The following measurements were taken after nest completion: nest height (measured from the rim of the nest to the forest floor), distance to stem (measured as the shortest distance between the nest rim and the central stem/trunk of the supporting plant), nest orientation (the direction from the central stem/trunk of the supporting plant to the nest), nest internal and external diameters (measured along two perpendicular axes), depth (from the bottom of the cup to the nest rim), height of supporting plant (measured from the top of the crown), nest cover (percent of the nest that could be seen through the vegetation when looking from ~1m straight above

the nest), and number of contacts (number of other plants or lianas touching the nest tree). We found one additional active nest at the Shiripuno Research Center (SRC, 01°06'S, 76°43'W, Pastaza Province, c. 220 m a.s.l.) during general nest searching. The habitat at SRC is similar to that described for TBS. The SRC nest was only visited during the course of 2 days, and eggs were weighed twice, roughly 48 h apart, to the nearest 0.001g (mass loss = water loss; Ar & Rahn 1980). In addition, behavior at the SRC nest was monitored from 12:00 to 14:45 h on 6 January 2007, using a video camera placed 5 m from the nest.

#### RESULTS AND DISCUSSION

At TBS, we found six active nests; in addition, we found five inactive nests that were assigned to the species based on the nest characteristics, unique to this species (see below). The first nest was found during incubation in February 2005, and the other ten were found between January and March 2006. These months comprise the peak of manakin breeding in the region, which extends from November to April. We took measurements for five active and three inactive nests from 2006. We captured and banded the females tending those five active nests and found the nests to belong to four different females (i.e., two nests belonged to the same female, Table 1).

All nests were architecturally similar to other manakin nests: small, open cups suspended in the “Y” of horizontal branch forks (Snow 2004, Hidalgo *et al.* in press). One exception was a nest held instead between a living stem and a dead branch that had fallen over the branch so as to form a fork-like “V”. All nests were very similar (Fig. 1A), being lined internally with whitish fibers and externally decorated with whitish, yellowish, or pale brown fibers and dry palm or

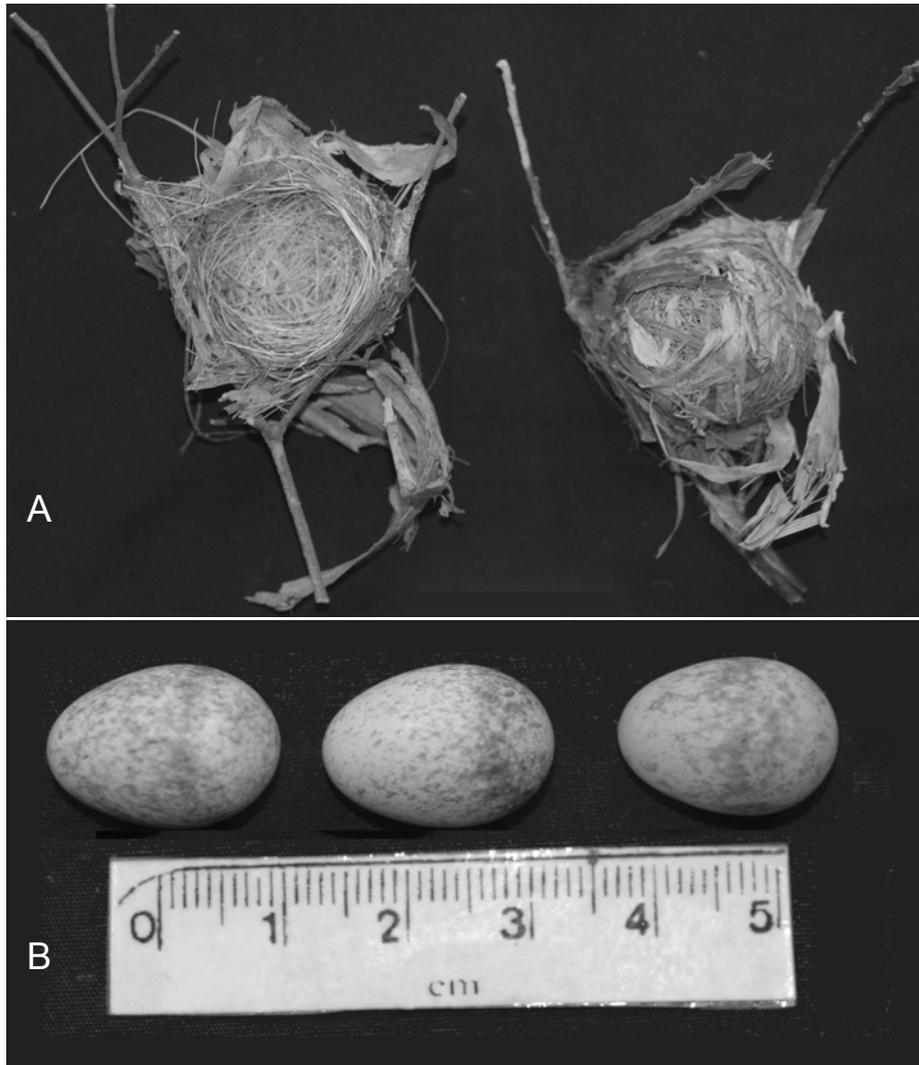


FIG. 1. Nests and eggs of the Western Striped Manakin (*Machaeropterus regulus striolatus*) in eastern Ecuador. In (A), the nest on the left is depicted from the top and a different nest is depicted from the bottom, on the right. In (B), the two left-most eggs belonged to the same nest, and the right-most egg belonged to a second nest.

angiosperm leaves and leaf strips. This external material usually hung well below the nest in a skirt-like fashion. Nest material was held together and bound to the supporting fork by spider webs. Nests were small, ranging from 31–55 mm internal diameter, 43–75 mm

external diameter, and 26–38 mm internal depth (Table 1).

Most nests were situated along slopes or on flat areas along hilltops, in habitats with a relatively open to very open understory. All were very low, between 0.4 and 0.8 m above

the ground, in low shrubs or saplings (usually < 1 m tall) that were in contact with few other plants (Table 1). Supporting plants included *Rhinorea* sp. (Violaceae) and *Rudgea* sp. (Rubiaceae), two common species at TBS that have branches oriented horizontally and which are used extensively as nesting plants by two other piprids, the Blue-crowned (*Lepidothrix coronata*) and the Wired-tailed (*Pipra filicauda*) manakins (Hidalgo *et al.* in press). *Rudgea* is a shrub, and although *Rhinorea* can reach over 3 m, only saplings were used as nesting trees by the Striped Manakin. All six active nests had two eggs, which were whitish with chestnut speckling (Fig. 1B). Three eggs were measured and had very similar dimensions, 14 x 18–19 mm.

Nests were characteristic enough that inactive nests could be assigned to Striped Manakins with great confidence. At TBS, these minute cups found very close to the ground could be potentially confused with nests of only one other species, the Blue-crowned Manakin. Nests of the Striped Manakin, however, are considerably whiter in color and deeper than Blue-crowned nests (33 vs 25 mm on average; Table 1, Hidalgo *et al.* in press).

The nest at SRC contained two eggs colored as described above and measuring 14.0 x 19.2 and 13.8 x 19.6 mm. They both appeared to be developing normally and weighed 1.89 and 1.92 g, respectively. Two days later they showed losses in mass of 0.9% and 0.7% of their original mass, respectively. This nest was as described for those at TBS, but was situated in a large flat area of *terra firme* forest. Because measurements for this nest were taken by a different observer than for those from TBS (Table 1), we present its dimensions separately here. The nest was round and had internal cup measurements of 4.4 cm wide by 2.2 cm deep. Outside it was 5.4 cm wide by 5.5 cm tall and had roughly 30 cm of material (leafy strips) hanging below the nest.

It was 45 cm up in a 60 cm tall sapling, roughly 20 cm from the main stem. The forks of the horizontal Y to which it was attached were 2.5 and 3 mm in diameter. The sapling, at the height of the nest, was only 4.5 mm in diameter, and has no contacts with other plants.

During 2.75 h of observation, the SRC female covered the eggs for only 10 min during a single bout near the end of the observation period. Upon her return to the nest, the adult peered briefly at the eggs and then settled down over them by gently rocking back and forth for several seconds. She did not sit facing the camera, nor did she appear to recognize its presence. While sitting on the eggs, she sat very still, peering about with short rapid movements of her head. During the female's absence, a large brachyceran fly, possibly a botfly (Muscidae), spent about 10 min walking around inside the nest and over the eggs. Infestation of manakin nestlings by botfly larvae is frequently observed in TBS (R. Durães pers. observ.). This suggests that the observed fly may have been ovipositing, potentially resulting in subsequent parasitism of the nestlings.

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