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FIRST DESCRIPTION OF THE NEST OF THE WING-BANDED WREN IN FRENCH GUIANA

MATHILDE JULLIEN[1,2,3] AND DANIEL P. CARIVEAU[1]

ABSTRACT.—We describe for the first time the nests of the Wing-banded Wren (*Microcerculus bambla*), a little-known species of Trogoldytidae from northcentral South America. Two nests were discovered in French Guiana during the rainy season of 1999. Both nests were in abandoned termite mounds attached to the undersides of fallen trees. Chambers of the two nests were lined with a mat of dead leaf fragments. Each nest contained a single, well-feathered nestling that disappeared, possibly due to fledging, within a few days of nest discovery. Although we did not observe nest building, we suspect that other termitaria-nesting birds at our study site, such as Puffbirds (Bucconidae) or Jacamars (Galbulidae) excavated the chambers. Thus, both *Microcerculus* species with described nests, the Nightingale Wren (*M. marginatus*) and the Wing-banded Wren, apparently are secondary cavity nesters. *Received 19 Dec. 1999, accepted 20 Oct. 2001.*

Species of the genus *Microcerculus* occur exclusively in the undergrowth of humid tropical and subtropical forests and are among the least-known members of the Troglodytidae (Stiles 1983, Hilty and Brown 1986, Ridgely and Tudor 1994, Brewer and Mackay 2001). This genus comprises species of small, short-tailed, dark, and highly elusive wrens that often are difficult to observe (Slud 1958, Stiles 1983, Tostain et al. 1992, Ridgely and Tudor 1994). These species usually are not rare but their cryptic coloration and secretive behavior cause field researchers to rely mainly on vocalizations to detect them (Meyer de Schauensee and Phelps 1978, Stiles 1983, Tostain et al. 1992, Ridgely and Tudor 1994). This, in addition to the complex variety of plumage and vocalizations these wrens display, have made this group the source of numerous taxonomic problems over the years (Slud 1958, Stiles 1983, Ridgely and Gwynne 1989, Stiles et al. 1989). As a result, the number of species in the genus *Microcerculus* is still debated but should not exceed three or four, including *bambla*, *ustulatus*, and the controversial *philomela* and *marginatus* (Ridgely and Tudor 1994). Their nesting habits have remained unknown until Christian and Roberts (2000) provided the first description of the nest and nesting behavior of the Nightingale Wren (*M. marginatus*) in Panama.

The Wing-banded Wren (*Microcerculus bambla*) is the only species of *Microcerculus* present in French Guiana, South America (Tostain et al. 1992, Thiollay 1994, Thiollay et al. 2001), and little is known of this species. The presence of one adult with food on 21 January 1988 at the Nouragues Field Station (French Guiana) was reported, but there was insufficient information to evaluate the status of this individual (Tostain et al. 1992). Apart from this single reference, no information has been published previously on the nesting behavior of this species. Here, we add further information about the breeding biology of *Microcerculus* by providing the first description of the nest of the Wing-banded Wren.

METHODS

Our study took place at the Nouragues Field Station (04° 03′ N, 52° 42′ W) from March until May, 1999. The station is located 100 km south of Cayenne in northeastern French Guiana in a vast and continuous tract of primary lowland rainforest. This area is hilly (40–400 m elevation) and dissected by numerous streams (Poncy et al. 1998). Annual precipitation reaches 350 cm distributed over 280 days with a substantial decrease in rainfall between September and November (dry season) and another shorter but irregular drier period in March. We conducted intensive nest searching at the station to examine the importance of nest predation and food limitation in the evolution of life history traits in tropical birds.

We monitored nests to determine their fate. One nest was checked with a flashlight every afternoon to provide an accurate description of the nestling just prior to fledging. We visually estimated pin feather measurements without handling the nestling. When activity at the nest was completed, the nest was described with

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respect to (1) nest substrate; (2) nest size; (3) habitat type in the vicinity of the nest; and (4) nest concealment, i.e., percent overhead cover and percent side cover, following Martin et al. (1997). Overhead cover was the percent of the nest obscured by vegetation ≤1 m above the nest as seen from an overhead view. Side cover was the percent of nest obscured by vegetation ≤1 m around the nest while the observer looked horizontally from nest height in the four cardinal directions; we express percent side cover as the mean of these four estimates.

RESULTS

Nest discovery.—By following parents carrying food, we located two Wing-banded Wren nests. We discovered nest 1 on 21 March 1999, by observing one adult dropping from a dead log and walking on the ground. Six min later, an individual carrying food disappeared into the same log, and reappeared later with an empty bill. During our first check of the area we did not find the nest, although we heard loud begging calls. Then, we observed one adult with food hop toward the same area, disappear inside the same log, and emerge with a fecal sac, which led us to find the nest.

We discovered nest 2 on 22 March 1999. We observed an adult that was carrying food walking on the ground while uttering 1–3 sharp metallic ''chek'' notes remarkably similar to the sound created when small stones are struck together. We followed this chipping individual from a 15-m distance. We saw it walking back and forth along a large rotting log. Ten min later, this bird performed a short flight below one of the large buttresses of the rotting log where the nest was located.

Nesting habitat.—Nest 1 was in a humid flat area at the bottom of a drainage (60 m elevation) between two small hills, about 15 m from the Nouragues River and 50 m from Couac Creek. The area is characterized by tall, mature stands with a fairly open understory and a closed canopy approximately 40 m high. However, the area immediately surrounding the nest more closely resembled open second growth habitat that regenerates after a large tree fall. Nest 2 was 40 m from the Nouragues River, approximately 800 m downstream from the first nest. Nest surroundings corresponded to the transition between the high mature stands and the dense liana forest (Poncy et al. 1998). The understory was damp, fairly open with a closed canopy around 10 m high, and rich in rotting logs.

Nest placement and description.—Both nests of the Wing-banded Wren were in old arboreal termitaries attached to the underside of a rotten buttress of a fallen dead tree (Fig. 1A). The logs on which nests were placed (approximate dbh: 215 cm for nest 1, 193 cm for nest 2) were old, partially rotten, and covered by thick evergreen vegetation (low shrubs and ferns; Fig. 1A). Both nests were highly concealed; overhead cover for each nest was 100%, mean side cover was 97.5% for nest 1 and 95.0% for nest 2. The nest substrate, i.e., the buttress, caused the nest concealment. Indeed, each buttress formed a roof above the termitary sloping downward at an angle of 10° nest 1 and 8° for nest 2, completely concealing the hole entrance (Fig. 1A, 1B). Checking nests required looking beneath the buttress while kneeling inside the depression left in the ground by the root mass.

The buttress above nest 1 was 56 cm long, and the buttress above nest 2 was 82 cm long. The bottoms of the termite mounds of nests 1 and 2 were 120 cm and 162 cm, respectively, from the main root mass. The termitaries were about 21 cm deep, 32 cm long, and 25 cm wide for nest 1, and about 26 cm deep, 41 cm long, and 31 cm wide for nest 2. Hole entrances of nests 1 and 2 were 69 and 78 cm above ground. Nest entrances were roughly triangular and pointed downward (Fig. 1C). The dimensions of the nest entrance in the termite mound were 17.3 cm deep, 7.7 cm high, and 8.5 cm wide for nest 1, and 19.4 cm deep, 8.1 cm high, and 9.3 cm wide for nest 2. The nest entrance tunnel led straight to the nest chambers (Fig. 1B). Nest chambers of both nests were coarsely lined with a mat of dead leaves. First lining materials of nests 1 and 2 were 10 cm and 16 cm from the hole entrance.

Nestling appearance and behavior.—Each nest contained a single nestling. On the day of discovery, the nestling from nest 1 had completely open eyes, was fully feathered, and was begging loudly during each adult visit. We could hear begging calls 10 m from the nest. The nestling was missing the typical white wing bar characteristic of the adult plumage. This nest was checked once more, the next day, when the young appeared ready to fledge.

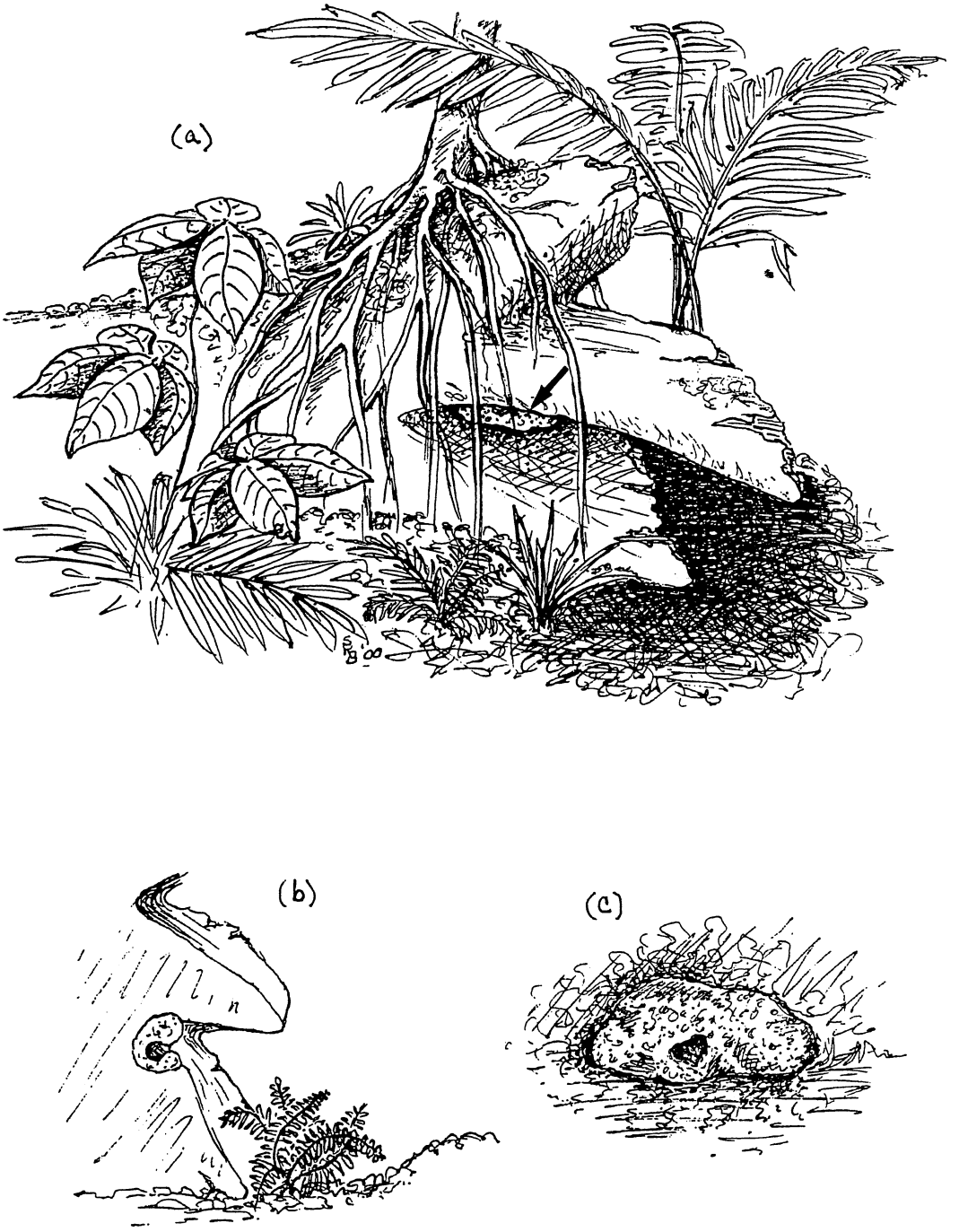

FIG. 1. Nest of the Wing-banded Wren, Nouragues Field Research Station, French Guiana. Nest 1 illustrated by S. K. Ball from photographs taken by MJ on 26 April 1999. (A) View of the nest site with a black arrow pointing toward the termite mound in which the nest was built. (B) Lateral section of the nest excavated inside the termite mound and attached to the underside of a buttress of a fallen tree. (C) Front view of the cavity entrance inside the termite mound.

On the day of discovery, the nestling from nest 2 had grayish brown pin feathers approximately 3 mm long on the throat and breast, and darker and browner pin feathers about 4 mm long on the lower underparts. Pin feathers on the crown, back, and rump were dark brown and about 3 mm long. Pin feathers on the primaries also were dark brown, and about 8 mm long. Rectrices were about 3 mm long and dark chocolate brown. Two days later, the nestling had fully open eyes and was more active inside the nest, preening frequently. The grayish brown chest was barred with dark chocolate brown. We could hear the loud begging calls 20 m from the nest. We noticed for the first time fecal droppings on the rim of the cavity. Two days later, the nestling appeared fully feathered. The sheathed primaries and rectrices were about 20 mm and 15 mm long, respectively. The nestling was observed for the first time standing at the entrance of the cavity. The next day, the nestling stood continuously at the nest entrance, repeatedly flapping its wings and stretching its wings and legs. Although fully feathered, this nestling also lacked the white wing bar on the greater coverts, characteristic of the adults.

Parental attendance.—Because we were interested in determining nest fate, we limited our disturbance around the nest and did not attempt to band the adults. This, and the fact that only one adult was observed at a time, prevented us from determining whether both sexes were involved in feeding bouts. An adult from nest 1 removed one fecal sac and made three feeding trips to the nest during 40 min. Each visit to the nest was accompanied by loud nestling begging calls. On 22 and 23 March, during four 60-min observations of nest 2, an adult removed 1–2 fecal sacs per h (mean = 1.75/h), and made 4–6 feeding trips to the nest per h (mean = 4.75/h). Foraging occurred ≤80 m of the nest, but adults may have prospected farther. Prey items brought to nest 2 included moths (n = 2), small frogs (n = 2), worms (n = 3), orthopterans (n = 5), and spiders (n = 5).

Nest fate.—We found nests 1 and 2 empty on 26 March and 28 March, respectively. Vegetation around the nests appeared undisturbed, lining material in nest chambers was flattened, and the gallery entrances still had a uniform shape with fecal droppings plastering the edge of the holes. We believe both nestlings fledged successfully; however, we did not observe fledglings, parents carrying food, fledglings begging, or adults chipping during the remainder of the field season.

DISCUSSION

The Wing-banded Wren nests were in old termite mounds attached to rotten logs. Although we did not observe nest building, we suspect that the nest tunnel was excavated by other species. At our study site, the Wing-banded Wren may nest in termitaries that have been previously occupied by the Yellow-bellied Jacamar (*Galbula albirostris*), Spotted Puffbird (*Bucco tamatia*), or Collared Puffbird (*B. capensis*), species that have nests of very similar structure and characteristics (Tostain et al. 1992). The Nightingale Wren also is a burrow-nesting bird that occupies the end of horizontal tunnels previously excavated in earthen banks by the Blue-crowned Motmot (*Momotus momota*) and Scaly-throated Leaftosser (*Sclerurus guatemalensis*; Christian and Roberts 2000). Thus, both *Microcerculus* species with described nests (of 3 to 4 species) apparently are secondary cavity nesters. In the Troglodytidae, only 14 of the 56 species with described nests are secondary cavity nesters, a rather uncommon characteristic in this family whose members mostly build retort-shaped domed nests with a side entrance (Brewer and MacKay 2001). Based on nest site and nest structure, and following Christian and Roberts (2000), we suggest that the nest types of the Wing-banded and Nightingale (Brewer and MacKay 2001) wrens are most similar to those of the Sumichrast's (*Hylorchilus sumichrasti*), Canyon (*Catherpes mexicanus*), Rock (*Salpinctes obsoletus*), Northern House (*Troglodytes aedon*), Southern House (*T. musculus*), Rufous-bowed (*T. rufociliatus*), and Brown-throated (*T. brunneicolis*) wrens, which construct open cup nests inside crevices and cavities. The other wrens that commonly nest in cavities (*Campylorhynchus fasciatus*, *Thryomanes bewickii*, *Thryothorus ludovicianus*, *Troglodytes troglodytes*, and *T. solstitialis*) construct a domed nest rather than a simple cup (Baicich and Harrison 1997, Christian and Roberts 2000, Brewer and MacKay 2001). Based entirely on morphological similarities, earlier classifications positioned *Mi-*

crocerculus near *Troglodytes*, but far from *Catherpes*, *Salpinctes*, and *Hylorchilus* (Peters 1960, American Ornithologists' Union 1998). As emphasized by Christian and Roberts (2000), if nest type can be used to infer systematic relationships within families, then the use of cavities of various types and the construction of a simple open cup rather than a domed nest may suggest a closer phylogenetic relationship among these genera. Ongoing biochemical studies conducted by K. Barker appear to support this hypothesis and currently place *Microcerculus* closer to *Salpinctes*, *Hylorchilus*, and *Catherpes*, and also suggest that these genera form part of the earliest radiation of wrens along with *Troglodytes* (Brewer and Mackay 2001: Fig. 2).

Only a single nestling was present in each of the two nests. Nevertheless, we doubt that the typical clutch size of the Wing-banded Wren is one. Indeed, we discovered only two nests, both well advanced in the nestling stage, and they may not have been representative. Clutch size varies from 2 to 3 in the congeneric Nightingale Wren, which also builds open cup nests inside cavities ($n = 2$ nests; Christian and Roberts 2000). Finally, the Wing-banded Wren apparently relies on pre-existing cavities for nest sites. If nests are restricted to old termitaries attached to fallen trees, a specialization that would limit nest site availability for the Wing-banded Wren, the result likely would be intense competition for nest sites. Nonexcavating cavity-nesting birds generally have life histories characterized by higher reproductive effort and lower annual adult survival than primary cavity nesters, which is thought to be a response to limited breeding opportunities (Martin 1993, 1995; Ghalambor 1998). Thus, there is reason to suspect that the Wing-banded Wren typically has a clutch size larger than two (the modal clutch size for tropical wrens; Skutch 1985, Brewer and MacKay 2001), in contrast to the small brood size observed here.

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