NESTING OF THE BLACK-TAILED FLYCATCHER ON BARRO COLORADO ISLAND

ALFRED O. GROSS

THE following account of the Black-tailed Flycatcher is based on notes and photographs taken on Barro Colorado Island, Canal Zone, Panama during visits in 1925, 1927, and 1949.

There are two species of *Myiobius* present on Barro Colorado: the Sulphur-rumped Flycatcher (*M. barbatus*) (the local race, *M. b. sulphureipygius*, has sometimes been considered a separate species, *M. sulphureipygius*) and the Black-tailed Flycatcher *M. atricaudus*. The range of the Sulphur-rumped Flycatcher extends from Veracruz and Yucatan south to western Ecuador. It is the most abundant of the two species in Costa Rica and neighboring countries as well as in certain sections of Panama. The range of the Black-tailed Flycatcher extends from Honduras south to Ecuador and Peru. Both species have been collected and are known to nest on Barro Colorado but, according to my experience, the Black-tailed Flycatcher is the more abundant and is the species that I found nesting during the months of June to September.

On 13 July 1949 I was fortunate to see a Black-tailed Flycatcher, at the entrance to the Barbour-Lathrop trail, carrying a single long fiber in its beak en route to its nesting site. There were only a few fibers present in what was the beginning of nest construction. These fibers were tightly wrapped around a slender stem that hung down over the water of a roaring brook. I watched the bird for an hour and during that time it made 35 trips with nesting material, usually a single long fiber. At 9:06 the bird was seen to drop a fiber on the nest without alighting. It flew to a limb of a tree about 2 meters away. Pausing a few seconds, she returned to the nesting site, grasped one end of the long fiber in her beak, and while holding on to the supporting stem with her claws, flitted her wings rapidly, propelling herself for three complete turns. In this manner the fiber was securely twisted around the stem. At 9:10 she flew to a nearby banana stalk where, with considerable effort, she pulled a fiber loose. She then came directly to the nest, circled in flight, spreading her tail and displaying the bright yellow rump patch. It was a unique and a beautiful performance. In some of the trips she alighted on a dead limb near the nest before adding the fiber to the now enlarged, well-anchored mass of nesting materials. The flycatcher exhibited a great deal of energy and activity in her nest building. The procedure of adding fibers was repeated at 9:12, 9:14, 9:17, 9:18, 9:20, 9:21, 9:21½, 9:24, 9:25, 9:27, 9:28, and 9:30. By this time the nesting material was 7 cm in depth. Only one bird was seen and it was assumed that all of the work of nest building was performed by the industrious female.

The next morning, 14 July, it rained very hard but in spite of the downpour the

bird continued to add nesting material, but not as often as on the previous day. Several times I saw her alight on a dead branch of a tree where she rested for a few minutes or preened her feathers to facilitate the drying of her plumage. Great progress was made, however, and by noon the structure took on the appearance of a nest, but as yet there was no nesting cavity formed. It cleared in the afternoon so that motion pictures could be taken to illustrate the method of the construction of the nest. During late afternoon I saw two birds for the first time. One individual, which apparently was the male, kept well away from the nest. He was not seen to take any part in nest building although the female was seen to go to the nest again and again with nesting material. Several times when the female alighted on a branch above the brook the male approached her in a nuptial display. The breast feathers are a dusky olive as seen under ordinary conditions, but when courting these feathers were elevated revealing a distinct yellowish coloration of the mid-basal portion of these feathers. During this performance his long tail was spread wide like a fan and the yellow rump patch was shown at its best. Finally the display culminated in copulation.

The next day, 15 July, the nest had taken the form of an empty cone of well-packed fibers but much was still to be done to the interior of the structure. In the course of an hour the female made 45 visits to the nest. Most of the fibers used were collected from sources within 25 to 30 meters of the nest. The exterior of the nest was approaching completion and hence the construction was now concentrated on the interior. She approached the nest from below flying directly upward to the inside of the cone. She usually remained inside just long enough to deposit the fibers. The bird could not be seen when inside but it was evident the materials were being utilized in thickening the walls and the building of a shelf-like mass on one side to form the nesting bowl.

On 16 July the building of the nest had progressed so that it measured 40 cm from the uppermost fibers twisted tightly about the supporting stem to the bottom of the funnel. The sides were now thicker and the interior cavity of the cone now measured 12 cm in depth. The most conspicuous feature of the exterior of the nest was the addition of ten dried leaves which apparently served to camouflage the structure.

On 17 July the nest measured 48 cm from top to bottom of the cone. The distance of the nest above the water of the brook was 1.5 meters. The male was seen several times during the morning and displayed in the presence of the female, usually when she alighted on a limb in going to or from the nest. The female did not seem impressed and was quite nonchalant concerning her mate's attentions, as she preened her feathers or merely rested a moment from her labors. A great mass of material had been added inside of the funnel and on the northern side fully one-half the width of the interior was taken up by a solidly packed shelf, the beginning of the nesting bowl. During 2 hours she made 35 visits to the

FIG. 1. Typical nest of the Black-tailed Flycatcher *Myiobius atricaudus* 13 August 1925.

nest with nesting material that was deposited chiefly inside of the cone. On several of these visits she carried a mass of spider cocoons. The spider webbing served well in holding and cementing the nesting materials in place.

On 19 July after 6 days of construction the nest was nearing completion. The female was seen flying about the trees near the nest and frequently capturing flying insects in flycatcher style. She did not go to the nest during 2 hours that I watched her. I visited the nest after dark and I was surprised to find the flycatcher in the newly constructed nest. Her long tail projected from the bowl opening and her head was turned backward and tucked under the feathers. She was not disturbed by the flashlight held within a few inches of the nest. There was no egg present when I examined the nest the next morning. The female was seen perched on a dead branch about 4 meters from the nest, at times darting into the air to capture an insect. At 10:26 the male arrived, chased the female, and both disappeared into the jungle. Twenty minutes later the female returned alone but was not seen to visit the nest.

No birds were seen in the vicinity of the nest during the day from 21 to 23 July, but the female continued to roost in the nest at night. Unfortunately, I had to leave the island on 24 July before any eggs were laid.

The following observations of the behavior of the birds and the account of their eggs and young were made jointly with the late Dr. Josselyn Van Tyne during June and July 1925. We located eight nests of the Black-tailed Flycatcher, three of which were closely observed. No nests in early stages of construction were found in 1925. All of the nests were similar in their general location, appearance, and structure, being pendant nests ingenuously attached to long slender stems or vines which overhung the water of Gatun Lake or over nearby brooks. We spent much time exploring the many trails but found no nests of the Black-tailed Flycatcher in the higher densely wooded portions of the island remote from water. The nests ranged in height from 40 cm to one 3 meters above the water. One nest that overhung the water of the lake was discovered while paddling along the shore in a cayuca. This nest was so well camouflaged that at first sight it appeared to be merely a mass of material that had accidentally lodged on the stem.

A nest of the Black-tailed Flycatcher containing two eggs was collected on 13 August 1925 (Figs. 1 and 2). The nest overhung the lake about 0.5 meter above the water. The length of the nest from the point of attachment to the bottom was 51 cm. The circumference at the level of the nesting bowl was 30.5 cm. The size of the opening leading from the porch cavity to the nesting bowl was 3.8×4.5 cm. The nesting bowl was lined with short fine rootlets and slender palm fibers, pale brown in coloration. The exterior of the nest, including the porch, was made up chiefly of long coarse fibers, plant stems, and leaves of various kinds. Several of the longer fibers when untwisted and detached were

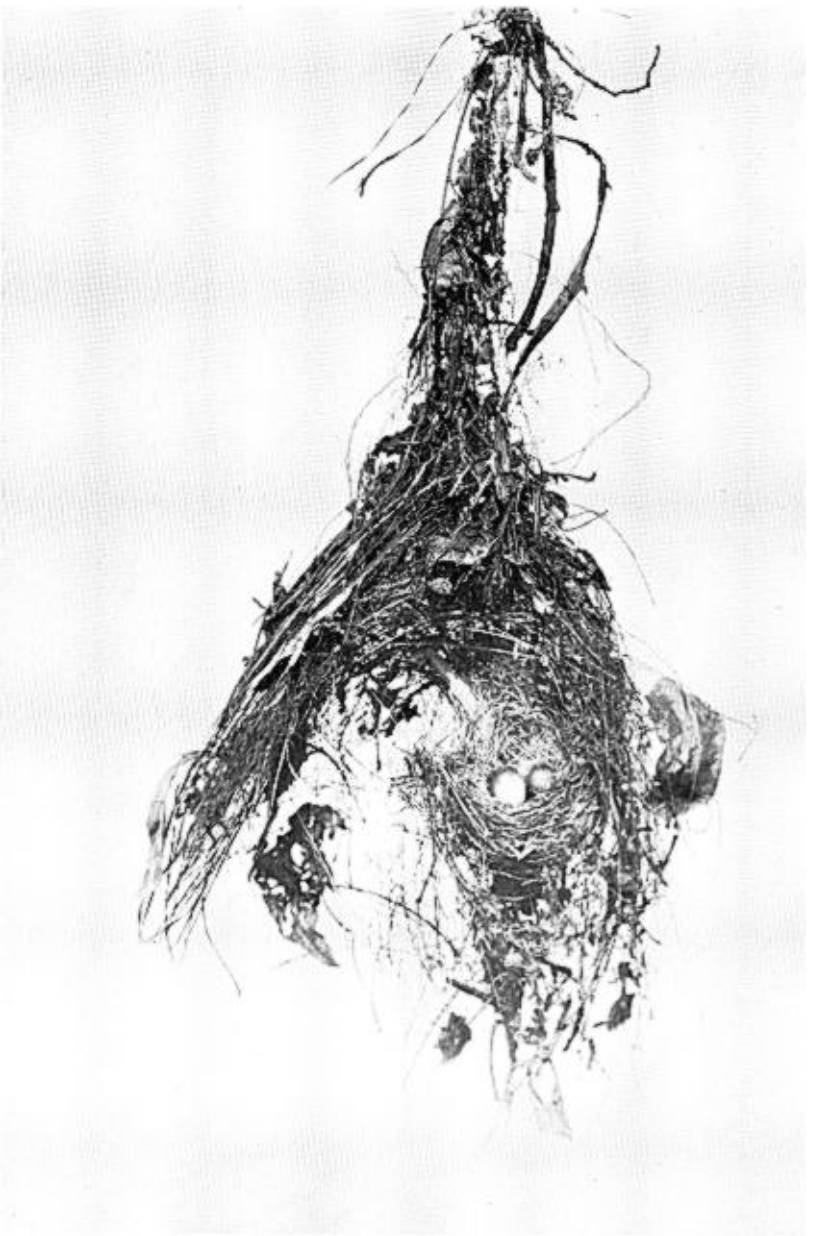

FIG. 2. Nest and two eggs of the Black-tailed Flycatcher *Myiobius atricaudus*. One side of the nest has been cut away to show the interior structure such as the "porch," nesting bowl containing the two eggs, and entrance to the bowl, 13 August 1925.

TABLE 1
WEIGHTS (IN GRAMS) AND MEASUREMENTS (IN MILLIMETERS) OF EGGS

Date	Weight	Long diameter	Short diameter
28 June 1925	1.58	18.3	12.9
	1.59	18.7	13.1
10 July 1925	1.30	17.0	12.8
	1.35	17.1	12.6
22 July 1925	1.11	17.2	12.5
	1.08	17.3	12.2

as much as 50 cm in length. All of the nests we examined were of similar structure and dimensions. When on the nest the bird was well concealed from view of predators by the overhanging porch. Being attached to long slender vines or stems the nests were free from molestation by peccaries, coatis, and other mammals; even the prowling mischievous monkeys would not dare to descend such a weak slender support so near the water. It is possible the agile lizards might account for some of the few eggs and young that disappeared, but of this we had no evidence. On the whole, as compared to the nests of certain other birds, the *Myiobius* type of nest is excellent and doubtless contributes to the survival of the species.

On 28 June 1925 we discovered a nest of the Black-tailed Flycatcher overhanging the water a short distance from the Barro Colorado station wharf. The nest contained two eggs. When we approached in a cayuca, the bird remained on the nest until we were directly under the structure. The bird was hidden from view except for her long tail which projected from the nesting cavity to the space covered over by the porch. The bird remained in the vicinity while we removed the eggs for description, weights, and measurements (see Table 1). She returned to the nest promptly after the eggs were replaced. The next day to facilitate our making observations and photographs we erected a blind between the nest and the shore. Another was constructed on a floating balsa log raft which could be maneuvered in any position in relation to the nest. In the afternoon we spent 2 hours in the raft blind. The bird left the nest several times. In flight she produced a buzzing sound made by the extremely rapid strokes of her wings, but we did not hear the bird utter any notes or other sounds. In approaching the nest she flew down within a few inches of the water, then dashed upward into the nest from below. She went to the nest at 4:45 and remained there for the night. The bird was not seen during the next 2 days. On 2 July there were no eggs. No eggshells were found and there was no clue to explain the absence of the eggs. Although we thought the nest was now deserted, fortunately, we left the nest and blinds intact. On 12 July we saw the flycatcher fly to the nest and found that one egg had been laid 6 days after the first set was known to have disappeared.

There was one egg on 13 July and 14 July. On the morning of 15 July there were two eggs and the female was incubating them. The following observations of the behavior of the adult as well as the description and daily measurements of the young were made at this conveniently located nest.

During the 22 days of incubation various birds such as grosbeaks, puffbirds, manakins, and a little kingfisher were seen in the vicinity of the nest. The flycatcher paid no attention to them and made no effort to drive them away from her territory. At one time a hummingbird was seen sipping nectar from some blossoms within 2 meters of the nest. Without provocation the tiny visitor dashed toward the flycatcher and chased her into the vegetation out of our sight. After a short interval the two birds appeared in the open with the aggressive hummingbird still chasing the flycatcher.

After the eggs hatched the flycatcher was not so indulgent of intruders and exhibited a high degree of territorialism. She was seen to chase wrens away on three different occasions and other birds were similarly treated. During the morning of 4 August we saw two Black-tailed Flycatchers in the vicinity of the nest. The female objected to the presence of the newcomer and violently chased it away. After about 5 minutes the female returned alone and the visitor was never seen again during the remaining days the nest was under observation.

For the purpose of photography I changed the position of the nest so that a side view could be obtained of the bird entering or leaving the nest. This was done by merely turning the long supporting stem about 90 degrees and tying it into position. This slight change confused the bird much more than was anticipated. She attempted to enter the nest on the side to which she was accustomed, fluttered her wings in midair for a few seconds, and then flew away. She returned in 2 minutes and made three darts toward the nest in the same position as her first trial. Finally, after repeated attempts, she discovered the changed position of the entrance. It is evident that the bird relied on her sense of position rather than by sight in locating the entrance.

The following abbreviated notes are taken from observations made by Dr. Van Tyne and myself when the young were 15 days old. The female was very active throughout the day, capturing insects to satisfy the hungry young. She entered the nest from below as previously described, but when once inside the cone she was hidden from our view and hence we could not see the manner of feeding and her behavior in relation to the young. She usually remained at the nest for only a few seconds, just long enough to deliver the food. She then returned to her regular perch to continue capturing insects but at times preened her plumage or just rested a few minutes from her strenuous task. After many of the feedings she was seen to carry a white fecal sac in her beak. This was sometimes eaten but more often dropped into the water where it was quickly devoured by minnows. At no time during our all-day watch did she remain at the nest to

brood the young, but after sunset she entered the nest and remained for the night. The male was not seen and it was evident that he did not share the task of feeding the young and of defending the territory. The young left the nest when 18 days old.

THE EGGS

The coloration of the eggs of the Black-tailed Flycatcher was determined by Ridgway's Color Standards (Ridgway, 1912). One set had a ground coloration of Seashell Pink with a wreath of Vinaceous-Rufous spots near the larger end. In a second set, slightly different in coloration, the ground color was of Flesh Ocher and the wreath of Ferruginous spots.

The weights and measurements of three sets of eggs are given in Table 1.

INCUBATION

The incubation period of the eggs of the Black-tailed Flycatcher was found to be 21 or 22 days, calculated from the laying of the first egg.

Nest 1		Nest 2	
6 July 1925	1 egg	10 July 1925	no eggs
7 July	2 eggs	11–31 July	1 egg
27 July	2 eggs	1 August	1 young
28 July	2 young		
Incubation:	22 days	Incubation:	21 days

PLUMAGES OF THE YOUNG

The young have no natal down. The eyes are closed for the first 4 days, slightly open on the 5th day, and well open on the 6th day. The skin color is Vinaceous Slate, the underparts lighter in coloration. The maxilla and mandibles Naphthalene yellow in color.

In young 6 days old the papillae of the primaries and secondaries are best seen. The papillae of middle tail feathers are 0.90 mm in length. Those of the ventrolateral tracts and of the rump patch show a distinct yellow through the sheaths.

In young 11 to 12 days of age the unsheathing of the primaries and secondaries is well advanced. The tips of the wing coverts, now unsheathed, are Olive-green. The feathers of the lower back and rump are Barium Yellow. The tail feathers are unsheathed for 1 to 2 mm; those of the crown tract are just beginning to unsheath and those of the nape have proceeded further. The breast feathers are yellow shading to Citrine Drab.

In a young 16 days old the unsheathing of the feathers has progressed to the extent of giving a smooth contour except for the region of the tail and crown, back Deep Olive; crown darker and duller; occiput, rump, and belly yellow; wing coverts and secondaries edged with Deep Olive; primaries and tail feathers dull black; legs and feet Blackish Plumbeous.

Weights and measurements of the young are given in Table 2.

TABLE 2
WEIGHTS AND MEASUREMENTS OF YOUNG

Age (days)	1	2	4	6	8	9	12	15	16	18
Weight (grams)	1.6	2.20	3.5	6.1	6.7	7.5	9.0	10.2	10.0	10.0
Length (mm)	30.1	34	36	50	55	62	74	87	88	94
Tail	—	—	2.0	2.8	3.8	5.2	9.8	16	18.6	24
Middle tail feather	—	—	0.01	0.09	1.9	3.4	6.7	12.5	14.5	19.0
Bill	4.1	4.9	5.0	5.8	6.1	6.8	8.5	8.6	8.6	8.6
Bill–eye	5.5	6.0	7.1	8.2	9.6	9.1	10.2	11.5	11.9	12.0
Bill–nostril	2.4	2.4	2.5	2.9	3.2	3.6	4.1	4.9	4.9	5.0
Manus	7.1	8.0	9.9	12.1	12.9	13.8	16.5	19.0	19.0	19.0
Wing	—	—	10.0	13.5	18.0	21.0	32.0	38.2	40.1	43.8
Extent	28.2	34.0	46.0	68.0	85.0	99.5	129.0	153.0	159.0	161.0
Tarsus	12.3	14.2	17.9	20.1	25.0	27.0	30.5	32.0	32.8	32.8
Foot	9.0	10.6	12.2	15.9	19.5	20.8	23.0	23.5	23.5	23.5
First toe	4.1	4.5	5.5	7.2	8.5	9.2	10.6	10.6	10.7	10.9
Third toe	5.2	5.8	8.5	8.8	10.1	11.2	11.3	13.3	13.4	13.4

The weight in grams and measurements in millimeters of an adult female *Myiobius atricaudus* collected 13 August 1925 are as follows: weight 9.1 grams, length 136, tail 58, bill 9, bill–eye 15, bill–nostril 7, wing 56, extent 172, tarsus 32, foot 24.

(The measurements bill–eye is from the anterior edge of the eye to the tip of the bill, the bill–nostril is the distance from the anterior edge of the nostril opening to the end of the bill. The others are the usual standard measurements.)

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