

NESTING BEHAVIOR OF REDDISH HERMITS (*PHAETHORNIS RUBER*) AND OCCURRENCE OF WASP CELLS IN NESTS

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REDDISH Hermits (*Phaethornis ruber*) are small hummingbirds of the forested tropical lowlands east of the Andes and south of the Orinoco (Meyer de Schauensee, 1966: 161). Five birds mist-netted at Belém (1° 28' S, 48° 27' W, altitude 13 m) weighed 2.0 to 2.5 g (average 2.24 g). I studied their nesting from 14 October 1966 to October 1967 at Belém, Brazil, in the Área de Pesquisas Ecológicas do Guamá (APEG) and Mocambo Forest reserves, in the Instituto de Pesquisas e Experimentação Agropecuárias do Norte (IPEAN). Names of forest types used and the Portuguese equivalents are: tidal swamp forest (*várzea*), mature upland forest (*terra-firme*) and second growth (*capoeira*). In all cases *capoeira* has been in mature upland situations.

At Belém *Phaethornis ruber* is common all year in the lower levels of second growth (*capoeira*) where thin branches are plentiful. Isolated males call frequently from thin horizontal branches, never higher than 2.5–3.0 m. The male sits erect and wags his tail forward and backward as he squeaks a series of insectlike “pi-pi-pipipipipi” notes, 18–20 times per minute; the first two or three notes are short and separated, the rest are run together rapidly. The bird sometimes stops calling for some seconds and flashes his tongue in and out several times during the interval. I found no singing assemblies of male hermits such as Davis (1934) describes for both the Reddish and Long-tailed Hermits (*Phaethornis superciliosus*), and Snow (1968) for the Little Hermit (*P. longuemareus*).

Breeding season.—The monthly rainfall at Belém in the year of the study was 350 to 550 mm from January to May and 25 to 200 mm from June to December, with lows in October and November and highs in March and April. I found nests of *P. ruber* from June to October, from the end of the wet season to near the middle of the dry season. Pinto (1953) reports two nests in November and two others in May. The peak is in July and August with 3 and 5 nests each. Ruschi (1964) states the breeding period farther south at Córrego Engano, Espírito Santo, Brazil to be October to February.

Nests.—Most of the 14 nests I found were in second growth, a few in tidal swamp forest, or mature upland forest. Figure 1 shows locations of nests in the APEG reserve. Nest 1, in the Mocambo Forest, and nest 4, in the southern end of the APEG reserve, are not shown.

All 14 nests were in young palms with few leaves: 10 were in *Astrocaryum mumbaca* (mumbaca—I know of no English vernaculars,

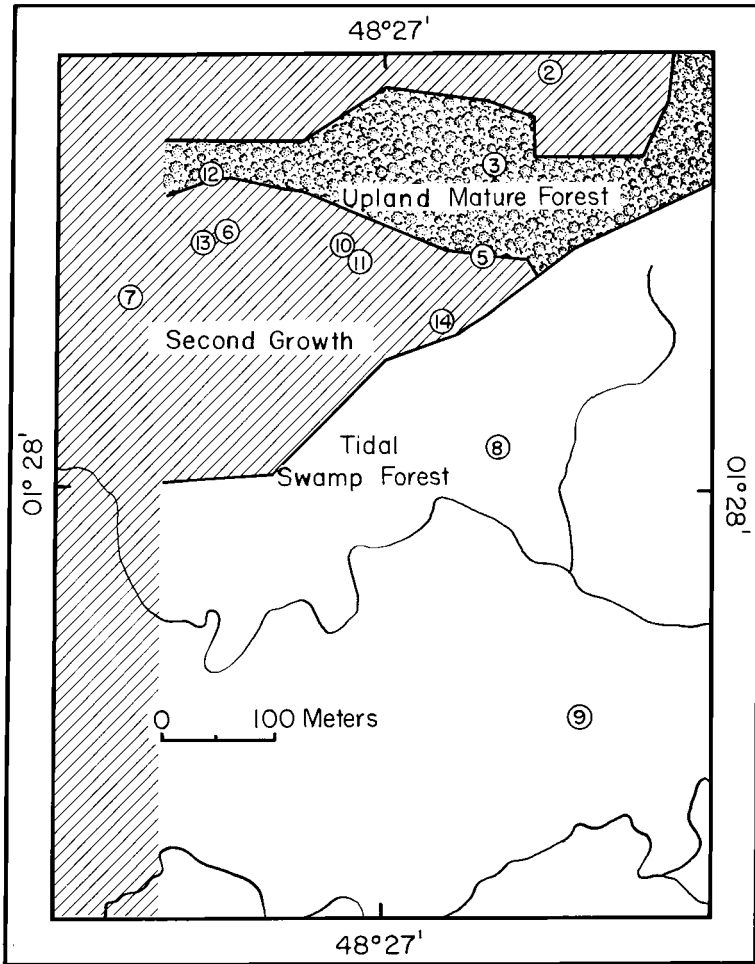


Figure 1. Locations of 12 nests found in the northern end of APEG reserve.

but the Portuguese ones will be convenient in Table 1), 3 in *Geonoma deversa* (ubim), and 1 in *Oenocarpus distichus* (bacaba). Pinto (1953: 146), reporting on 5 nests from Belém in the Carlos Estevão collection, notes 2 on palm leaves (*Maximiliana* sp. and *Euterpe* sp.) and 1 on a legume leaf (*Derris* sp.). The first two nests were in mature forest, the third in second-growth forest. Of 13 nests of the very similar *P. longuemareus* Skutch (1951) studied in Costa Rica, 12 were in small palms; the other was attached to a leaf of a coffee bush.

Most nests are attached with spider webs beneath the tip of a palm leaf. The leaf tip bends down with the weight of the nest and hides it.



Figure 2. Nest of *P. ruber* with a young bird. It flew off after picture was taken.

Usually I found a nest when the adult flew off. Nests ranged from 0.39 m to 2.30 m above the ground (average for 14 nests, 1.08 m). The wind sometimes shook a nest strongly, but birds did not build high in the undergrowth or in the open where the wind might overturn the leaf and spill out eggs.

The nest is typically elongate and spindle-shaped. The lining is of soft material, primarily plumes of seeds of *Prestonia surinamensis* (Apocynaceae) with some seed plumes of *Bombax mumguba* (Bombacaceae). The lower section of the nest is of coarser material, such as parts of leaves and branches, mosses and lichens, seeds of *Prestonia surinamensis*, and roots of grass. Some nests had long tails of these fragments (Figure 2; see Table 1 for nest dimensions).

At Belém nests of *P. superciliosus* differ from those of *P. ruber* in size and structure. The nests of *P. superciliosus* are of fibers so loosely attached that one can see the eggs through them. Nests of *P. ruber* are very

TABLE 1
NESTS OF *P. RUBER* STUDIED IN BELÉM, 14 OCTOBER 1966 TO 19 OCTOBER 1967

Nest	Date	Con- tents ¹	Kind of palm ²	Wasp cell present	Dimensions ³ (cm)			Height	Fate	
					ED	ID	EH			
1	14 Oct. 66	2 e	Ubim	Yes	5.0	3.0	18.0	105.0	Abandoned	
2	8 June 67	2 n	Mumbaca	Yes	4.5	3.5	13.0	230.0	Fledged	
3	14 June 67	2 e	Mumbaca	No	5.2	2.5	15.5	210.0	1 n fledged, 1 egg unhatched	
4	8 July 67	2 n	Mumbaca	Yes	6.0	3.0	15.0	77.0	2 n died	
5	12 July 67	0 ⁴	Mumbaca	No	4.7	2.5	12.0	39.0	?	
6	14 July 67	2 e	Mumbaca	No	4.5	2.5	9.0	118.0	1 n fledged, 1 egg unhatched	
7	25 July 67	2 e	Ubim	Yes	4.0	2.5	12.0	67.0	1 n fledged, 1 egg unhatched	
8	12 Aug. 67	1 n	Bacaba	Yes	4.5	2.5	13.5	118.0	1 n fledged	
9	22 Aug. 67	1 e, 1 n	Mumbaca	Yes	4.5	2.0	19.0	2.5	98.0	?
10	23 Aug. 67	0 ⁴	Mumbaca	Yes	4.0	2.5	16.5	2.5	40.0	?
11	23 Aug. 67	0 ⁴	Mumbaca	Yes	4.3	2.5	12.0	3.0	60.0	?
12	15 Sep. 67	2 e	Ubim	No	4.8	3.2	21.0	3.0	199.0	Disappeared
13	15 Sep. 67	2 e	Mumbaca	No	5.5	3.0	17.0	2.8	57.0	Abandoned
14	19 Oct. 67	0 ⁴	Mumbaca	Yes	5.0	4.0	16.5	3.0	100.0	?
AVERAGES					4.7	2.8	15.0	2.9	108.0	

1 e = egg; n = nestling; O = empty.
 2 Ubim = *Geonoma diversa*; bacaba = *Oenocarpus distichus*; mumbaca = *Astrocaryum mumbaca*.
 3 ED = external diameter of nest; ID = internal diameter; EH = external height; ID = internal depth.
 4 Recently abandoned.

tightly built, especially the receptacle, so eggs are not visible through the nest; the lower section of the nest is looser.

Eggs and incubation.—The clutch consists of two elliptical eggs which are whitish without bright reflections. Three eggs from different nests measured 8×11 mm, 9×12 mm, and 9×12 mm.

As the male and female look alike, it is difficult to tell which sex incubates and takes care of the young. I never saw both parents together at a nest. Pinto (1953: 146) reports that five *P. ruber* collected at the nest were females. In *P. longuemareus* females alone incubate and feed the young (Skutch, 1951).

As the nests I found already had eggs or young, I was unable to determine the incubation period. Skutch (1964) reports incubation periods of 17–18 days for *P. superciliosus* and 15–16 days for *P. longuemareus*.

In three nests only one egg hatched; the unhatched egg remained in each nest even after the young left. After the eggs hatched, eggshells remained in the bottoms of nests and were crushed under the young.

Nestlings and their care.—At hatching the young have pinkish skin and some light brown down on the back; the dark eyes are closed, but visible through the skin; the beaks are short and soft. They do not call; mainly they feed and rest. When handled for observations and weighing they sometimes excrete a pale yellowish liquid.

After hatching, young stayed in nest 3 for 18 days, in nest 6 for 22 days, and in nest 7 for 19 days. These young probably departed some days before they normally would have left, because I handled them repeatedly for observation, measuring, and collection of parasites. Skutch (1951) reported 20–21 days in the nest for young *P. longuemareus* and 22–23 days for young *P. superciliosus*.

Mosquitoes (Culicidae) bit the small young when the nest was shallow, but not when the receptacle was deeper and the young were less exposed.

When the young bird is about to fledge, it has blackish feathers around the eyes, a pale superciliary line, a pale, short, soft beak, and a short tail. The wings are blackish and darker than those of adults.

Table 2, summarizing observations on natal care at nest 7, shows the duration of absences from the nest gradually increased as the young grew, but the length of sessions on the nest remained almost the same. After the first week the adult fed the young and did not brood it.

The adult flew directly to the nest and perched on the rim, beating its wings rapidly and wagging its tail up and down as it put its beak inside the buccal cavity of the nestling and regurgitated food by muscular contraction of the throat. To receive food the nestling tilted the head upward and backward, as it always faced the palm leaf with its back to the

TABLE 2
CARE OF ONE YOUNG (HATCHED 6 OR 7 AUGUST) AT NEST 7

Date (1967)	Age (days)	Observation period	No. of feedings	Total number	No. per hour	Absences from nest			Average (min)	% time on nest
						Minimum period (min)	Maximum period (min)			
8 Aug.	1-2	10:30-16:34	11	10	1.7	1	21	10.5	—	
9 Aug.	2-3	13:20-18:04	7	7	1.4	12	21	16.4	—	
10 Aug.	3-4	09:15-14:07	6	6	1.2	14	22	17.7	—	
11 Aug.	4-5	12:40-18:40	6	6	1.0	15	51	29.7	—	
						Brooding sessions				
8 Aug.	1-2	10:30-16:34	—	12	2.0	4	35	16.0	64.6	
9 Aug.	2-3	13:20-18:04	—	7	1.4	9	34	19.9	54.7	
10 Aug.	3-4	09:15-14:07	—	7	1.4	12	30	22.6	60.0	
11 Aug.	4-5	12:40-18:40	—	6	1.0	10	43	21.0	41.4	

parent. Sometimes feeding was interrupted by one or two short pauses. After a feeding the parent sometimes lowered its head and seemed to pick up something in the bottom of the nest. Then the adult sat on the nest with breast toward the leaf, so that parent and nestling faced the same direction. This also occurs in *Glaucis hirsuta* (Novaes and de Carvalho, 1957) and *P. longuemareus* (Skutch, 1964).

The adult sits on the nest with its head tilted upward so that the beak forms an angle of about 60–70 degrees with the horizontal. Occasionally the sitting bird protrudes its tongue and opens and closes its beak, but otherwise its only movement usually is that of the nictitating membrane. The bird ignores mosquitoes, but looks about alertly if a wasp or other insect flies by and perches on the lower part of the nest.

On 14 August the feedings were somewhat different; the adult came to the nest and hovered without perching while it fed the nestling. Then it withdrew the beak, perched on the rim, and fed the young again. When feeding was finished, the adult flew off without brooding the nestling.

When the young was 7 or 8 days old, it was more active when receiving food and moved its beak strongly. After feeding, the parent perched about 6 m from the nest on a thin branch. With its tail in constant movement forward and backward, it called and flashed its tongue in and out several times. As soon as the adult flew, the nestling moved about, and sometimes it raised its tail to eject feces beyond the nest. The feces were 3 to 7 small, oval pellets attached in a chain. After defecating, the nestling settled in the nest and stayed immobile with closed eyes.

To enter the nest, *P. ruber* flies to it directly without hesitation. On leaving the nest, the bird rises gently and, beating its wings, flies upward and backward and perches momentarily on the rim of the nest before flying away. Sometimes it looks closely at the nest and the nestling in the few seconds before leaving.

Nest success.—As Table 1 shows, from the 19 or 20 eggs laid only 6 young fledged. Of 9 nests with eggs or young, 2 were abandoned while containing eggs; in 1 both eggs disappeared, in 1 both young died, in 3 nests 1 egg hatched and 1 young was fledged, in 1 only 1 young fledged, and both young fledged only from 1 nest.

Occurrence of wasp cells.—I first noted cells of a wasp, *Pison* sp. under the lining in the lower sections of a *P. ruber* nest at the Mocambo reserve in October 1966. As 8 of the 13 APEG reserve nests contained such wasp cells, the association is probably regular (Figure 3). Although other hummingbirds such as *Glaucis hirsuta*, *Threnetes leucurus*, and *Phaethornis superciliosus* have somewhat similar nests and breeding seasons at Belém to those of *P. ruber*, I never found wasp cells in their nests.

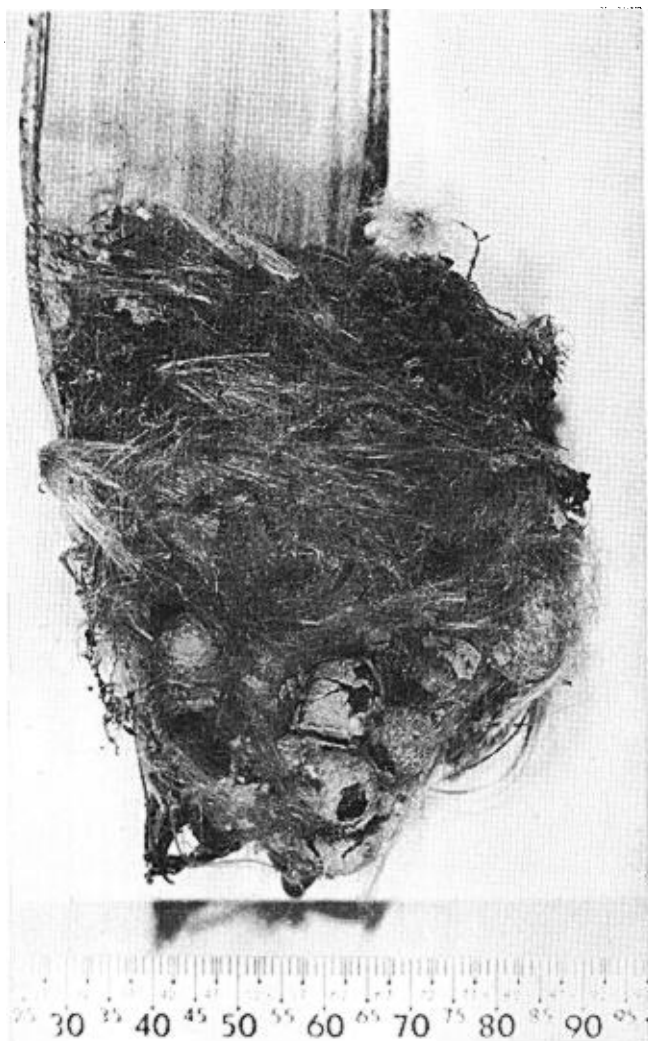


Figure 3. Nest with lower section removed, showing wasp cells.

Hummingbirds' nests with wasp cells show no structural differences from uninfested nests, but the former have a small hole in the lower section of the nest, into which the wasp carries mud and spiders. Details of the occurrence of wasps are described elsewhere (Oniki, 1970).

ACKNOWLEDGMENTS

I am grateful to Philip S. Humphrey for assistance during this study. Roger Arlé developed the photographs, and E. O. Willis, Paul Slud, and R. M. Mengel read the

manuscript and gave helpful advice. I am also grateful to Dr. João M. Pires for identifying plants.

The study was supported by the APEG Program through the Entomology Section of the Instituto de Pesquisas e Experimentação Agropecuárias do Norte (Belém) and by a fellowship from the Conselho Nacional de Pesquisas of Brazil. Preparation of this report was completed with the support of a student fellowship from the Organization of American States.

SUMMARY

The Reddish Hermit (*Phaethornis ruber*), a sedentary Amazonian hummingbird studied near Belém, Brazil, lives all year in second-growth vegetation. It usually nests in second growth, primarily in such palms as *Astrocaryum mumbaca*. Nests were 0.4 to 2.3 m up (average 1.1 m). The nest is of soft seed plumes and attached under the tip of a palm leaf by spider webs. Wind, which shakes the nests, may restrict nest heights and sites.

Nests were found from June through October, the first months of the dry season, in 1967. Clutches were always of two eggs. The number of fledglings was small, as some eggs failed to hatch and some nests were deserted or were emptied by unknown predators. At one nest the parent shifted sharply from regular brooding after feedings to no brooding when the nestling was about 1 week old.

The occurrence of wasps' cells in the lower section of the Reddish Hermit's nest is reported for the first time.

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