
Lucifer Hummingbirds Banded in Southeastern Arizona

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ABSTRACT

We banded 23 Lucifer Hummingbirds (*Calothorax lucifer*) in the period of 1988-1992 in the vicinity of Sonoita in southeastern Arizona, establishing the species as a rare but regular summer visitant to the area. Site fidelity was indicated by five captures of one male over a three year period; two other males were recaptured a year following banding. No adult females (of four banded) were recaptured. Wings of adult females are significantly longer than wings of adult males, but culmen length and body weight did not differ significantly in our sample of adults. Molting flight feathers were found in adult birds captured in September, but not in hatching year birds.

INTRODUCTION

In the period of 1988 through 1992, we banded 23 Lucifer Hummingbirds (*Calothorax lucifer*) at three sites in the vicinity of Sonoita, Santa Cruz County in southeastern Arizona. These were among several thousand Black-chinned, Anna's, and Rufous hummingbirds that were the basis of a five-year study. Although we captured from two to seven Lucifer Hummingbirds in each of the five years, the species has been infrequently seen in southeastern Arizona (Monson and Phillips 1980, Scott 1993), where it is on the northern edge of its range, and it has rarely been handled by banders anywhere. We document its present status in the Sonoita area, add to the meager sample size of standard measurements of this species (Ridgway 1911), and describe its site fidelity and the timing of molt.

Sonoita (1550 m) is situated in oak-grassland between the higher Santa Rita and Huachuca Mountains. Hummingbirds were attracted to the study

sites by sugar water feeders that were kept filled from early spring to late November. We trapped at least once a week at one site 3 km south of Sonoita and less frequently at the other two sites. A 6 m (24 mm mesh) mist net was erected in a "U" shape; a piece of netting covered the top. Birds came to a feeder placed just inside the "U" and were captured when they flew into the net as a person approached. We measured wing chord, tail, and exposed culmen to the nearest mm, and weighed each bird to the nearest 0.1 g. Each bird was examined carefully for presence of ectoparasites (none were found) and for molt.

We captured 13 adult males and banded 12 of them. Two were taken in May, six in June, one in July, three in August, and one in September. Six of these males were subsequently recaptured. One of them was trapped on five dates. It was initially banded 4 June 1988; subsequent captures were 14 June 1989, 26 April 1991, 30 June 1991, and 17 July 1991. Two other males were recaptured one year following banding, within a week of the date of banding.

Of the five adult females we captured (we banded four), one was taken in June, one in July, one in August, and two in September. No banded adult females were ever recaptured.

Our measurements of wing, tail, and culmen length in adults (Table 1) are very similar to those presented by Ridgway (1911), who measured museum skins of 10 males and 8 females (locations not specified). Both studies show that wings of females (39-44 mm, Ridgway) are longer than those of males

(36-39 mm, Ridgway), a typical result in hummingbirds. Culmen length and body weight, on the other hand, do not differ significantly in our sample.

Hatching year birds are recognizable by faint striations on their bills (Ortiz-Crespo 1972); we call the striations "grooves." We estimate the extent of the grooving as a percentage of the maximum extent of grooving that we ever see on a juvenile bird. We don't know how long it takes the grooves to disappear in Lucifer Hummingbirds; but on the basis of our experience in other small hummingbirds, we estimate it takes at least 8-12 weeks. Appraising the extent of the grooves is rather arbitrary and is most reliable when the same individual makes all the estimations. Our estimations were made by R. Russell and S. Wethington who worked closely together to standardize their assessments.

One young bird caught on 30 June had seven metallic "royal purple" gorget feathers and the grooves were appraised as "7%." Probably it had left the nest at least two months previously. Females are not known to have iridescent gorget feathers so we assume this young bird was a male. It had no sheathed feathers, indicating molt was not in progress. Perhaps some metallic feathers are a part of the immature plumage in males, as in other hummingbird species. In comparison with 13 adult males, its wing was much longer, its tail shorter, and its culmen longer (Table 1). In Black-chinned and Anna's Hummingbirds, Ewald and Rohwer (1980) found that juveniles had longer wings than adults (sexes not distinguished), while not differing in weight. They noted that this should result in lower energy expenditure per unit time in flight, which is likely an advantage for birds of subordinate status. Our measurements of wing length in the seven hatching-year birds were intermediate between adult males and adult females.

The six other young birds were captured on dates from 27 August to 27 September. The extent of their grooves ranged from 20% to 80%, and four of the September birds still retained over 50% of the maximum grooves possible. We surmise these birds fledged at various dates from early May to August. None of these birds had any metallic gorget feathers. If some metallic gorget feathers

are always present in young male Lucifer Hummingbirds, then their absence would indicate the sex is female. But until more young birds have been examined, the absence of metallic feathers in young birds may not be a diagnostic character for sex determination. Measurements may be of some help in determining the sex (see Table 1), but sample sizes are inadequate at present. Three of the hatching-year birds were retrapped two weeks after banding.

At Mexico City, Wagner (1946) found that Lucifer Hummingbirds molted flight and body feathers from February to April, but it is not clear whether he examined birds taken in fall. Our data suggest that adult Lucifer Hummingbirds summering along the U.S.—Mexico border begin molt of flight feathers in September, and that body molt occurs from July to September in some but not all birds. In adults, molting flight feathers were found in all three birds captured in September, but not in the 15 birds captured earlier in the season. Of three birds captured on 3 September, a male had primary 4 of each wing sheathed, a female was molting primaries 3 and rectrices 1, and another female was molting primaries 2. The male also had moderate molt in ventral tracts and light molt in dorsal tracts. One of the females had some molting feathers in ventral tracts but the other female lacked body molt. Four other adult males captured 18 August or later had some molt of body tracts. An adult female on 5 July had light molt ventrally and dorsally, and one on 28 August had no molt in any tracts. Six of the seven hatching-year birds had some molt ventrally and dorsally (on dates from 27 August to 27 September).

We found no evidence that the birds were nesting in the vicinity of the banding stations, although one male was present on dates from April into July. In our experience, female hummingbirds do not develop a recognizable brood patch when they incubate. No female Lucifer had an extensive cloacal swelling that is often characteristic of egg-laying hummingbirds. One female on 15 June did have a slightly swollen abdomen, which we think is suggestive of laying. Male hummingbirds do not develop a swelling (cloacal protuberance) that is useful in determining the sex, as is the case with most passerines.

Lucifer Hummingbirds are hearty birds, as are other hummingbirds, and showed no indications of stress during handling. We always offer banded hummingbirds the opportunity to drink after they are processed. The birds are hand-held before a sugar water feeder and invariably drink; they are then released. Often they return repeatedly to drink sugar water in the trap. Some Lucifers were captured as many as four times in the same morning.

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Table 1. Measurements of Lucifer Hummingbirds.

	AHY - M ^a n = 13	AHY - F n = 5	HY - M n = 1	HY - U n = 6
WING (mm) Mean \pm SE Range	37.5 \pm 0.268 36-39	41.8 \pm 0.583 41-44	43	39.5 38-42
TAIL (mm) Mean Range	30.3 29-31	24.0 23-25	25	24.2 20-28
EXPOSED CULMEN (mm) Mean \pm SE Range	21.2 \pm 0.154 20-22	22.0 \pm 0.316 21-23	23	19.5 19-21
WEIGHT (g) Mean \pm SE Range	3.2 \pm 0.070 2.9-3.7	3.3 \pm 0.068 3.2-3.5	3.5	3.2 2.8-3.4

^a t-test of difference of adult male and female values: wing, $t = 7.629$, $p = < 0.0001$; culmen, $t = 2.696$, $p = 0.016$; weight, $t = 0.895$, $p = 0.384$.