

Plumages and Territorial Behavior of the Lucifer Hummingbird in the Chisos Mountains, Texas.—In the Chisos Mountains, the first Lucifer Hummingbird (*Calothorax lucifer*) was taken by a Biological Survey party, May 7, 1901. The second report of this bird stated that "Mr. Bailey found the Lucifer hummer with several other species common in June (1901) about the big agaves which were then in full flower" (F. M. Bailey, 'Handbook of Birds of the Western United States,' 1921: 243.) A second specimen was taken May 17, 1933, while the bird was feeding on an agave in the Chisos Mountains at 5,500 feet elevation. (Van Tyne and Sutton, Misc. Publ. 37, Mus. Zool., Univ. of Mich., 1937: 43.) The third specimen, also reported by Van Tyne and Sutton, came from the edge of the Rio Grande, May 17, 1935, elevation approximately 1,800 feet. These appear to be the only published records for the area.

On May 31, 1952, I watched two Lucifer Hummingbirds for thirty minutes as they fed from agaves (*Agave scabra*) and perched in piñons (*Pinus cembroides*) just west of the Basin, Chisos Mountains, elevation about 6,000 feet. The birds, apparently a pair, were seen once the following day, but no nest could be discovered. On July 17, 1953, I observed ten Lucifer Hummingbirds along one-half mile of the South Rim, Chisos Mountains, at an elevation of about 7,500 feet. The results of these observations, obtained at the South Rim when the agaves were in full bloom, are presented below. Revisiting the same area September 11, 1953, I saw no Lucifers, and the summering species seemed to have been largely replaced by Rufous Hummingbirds (*Selasphorus rufus*).

The plumages of the birds of July 17, 1953, six males, two females, and two immatures, were similar to most accounts, however the auricular patches on the males and the plumages of the two immatures are worthy of note. The auricular areas in all six males possessed some white. This varied from a very narrow band between the throat patch and the back of the neck to a triangular patch, broadest at the base, that replaced one-third of the normal throat patch. The size of the white area appeared similar on each side of the head and remained constant in size for each individual throughout the observation time. Thus the possibility that the differences might have been the result of disordered plumage is very small. Since the size of the patch varied with each bird, individuals were best identified by this character.

The plumages of the two immatures differed from one description (Bent, 'Goatsuckers, Hummingbirds and their Allies,' U. S. Nat. Mus. Bull., 176, 1940: 431) in that their underparts were noticeably more orange-brown than those of adult females. This orange-brown wash extended from the forked tail to the throat and was heaviest on the sides. The auricular patches were cinnamon in color. The bill and even the tongue appeared dark in color. The second immature bird was somewhat lighter in the color of the underparts than the first and possessed several dark feathers forming a horizontal line in the center of the breast about in the position of the base of the throat patch of a male. This beginning of the molt of the throat feathers is about two months earlier than a similar indication of a throat patch of an immature Lucifer reported by Bent.

Territorial behavior was exhibited by most of these Lucifers, and a male feeding territory was observed for two hours. This male territory contained two agaves on the edge of the South Rim and, from them, extended to the west parallel to the cliff's edge twenty feet to a oneseed juniper (*Juniperus monosperma*), east twenty feet to an oak (probably *Quercus grisea*) and a piñon, and north fifteen feet to an alligator juniper (*Juniperus pachyphloea*), all of these low trees serving as shady perches for the defender. The center of a territory of an immature Broad-tailed Hummingbird (*Selasphorus platycercus*) was thirty feet east of this territory and the

center of a Black-chinned Hummingbird (*Archilochus alexandri*) territory sixty feet west.

Timing the actions of this Lucifer without disturbing him for three twenty-minute periods in the course of two hours, I noted time spent feeding, resting, and defending territory. All feeding was done at the two agaves, lasted from a minimum of five seconds to a maximum of twenty-one seconds, and averaged twelve seconds. He fed fifteen times per hour and occasionally uttered a quiet twittering call while feeding. Observations were made in the early afternoon. Following every feeding, if no aggressor was sighted, he would retire to sit in the shade. Once he perched after five consecutive flights without feeding. This Lucifer perched a total of forty-one minutes per hour; rests averaged one minute, but ranged from ten seconds to four minutes. Usually he would perch on one of the trees in his territory nearest the side from which he chased an aggressor. In all cases he either perched in the shade or faced away from the sun. This Lucifer defended his territory thirty-one times per hour. The trespassers were a second Lucifer (four times), several Broad-tailed Hummers, and many Black-chinned Hummers. He ignored the Red-tailed Hawks (*Buteo jamaicensis*) diving past and the many large insects that even alighted on his agaves but crouched very low when a White-throated Swift (*Aëronautes saxatalis*) passed near him. He defended his territory against any hummers that came within fifty feet of the agaves. This defense began with a chattering, and usually movement to intercept the bird, which it pursued from 20 to 100 feet from the territory. When sitting in the open occasionally he would just chatter and flutter his wings if the attacker was moving fast and apparently not stopping. Twice he failed to see a bird approaching from behind, but neither bird stopped in the territory. Once he attacked a trespasser who approached chattering but unseen, the latter being below the cliff from the Lucifer.

The eight other Lucifers fed in an area three-hundred yards in length along the cliff's edge and roughly fifty yards deep. One female, the easternmost, appeared to be in only partial possession of her area. She would drive an immature Blue-throated Hummingbird (*Lampornis clemenciae*) and Black-chinned Hummers from one agave but also would feed with some Black-chins on other agaves seventy-five feet away. At such feedings her agave would be visited by others without challenge. She remained in the area for at least two hours. The second female, two hundred yards to the west visited several undefended agaves but was driven away from one by a male Black-chin. No male Lucifer was seen near her.

The immatures remained within fifty feet of each other sitting on a wire fence or perching quietly in a piñon. Occasionally they fed on an agave but challenged neither each other nor passing Black-chins for possession of the plants.

All but two male Lucifers were defending feeding territories, areas with forty-foot radii. The first of these two fed on several agaves, sharing them with Black-chins. This first Lucifer drove the second away from an agave to their west but shared an agave to the north with the second. These two Lucifers perched within twenty feet of each other never disturbing one another in their mutual territory.

From the behavior of the two females and these last two males, it appears that there is some sharing of feeding territory within the species and even with other species. This is unlike any behavior described by Frank Bené (Mem. Boston Soc. Nat. Hist., Vol. 9, No. 3). At the same time it is noted that the other male Lucifers were exhibiting marked territorial feeding behavior. However variations are to be expected, and little information is currently available on the Lucifer Hummingbird. ROBERT P. FOX, 311 Beale Street, Quincy 70, Massachusetts.