NESTING OF THE FORK-TAILED EMERALD IN OAXACA, MEXICO

By Larry L. Wolf

Although the Fork-tailed Emerald (*Chlorostilbon canivetii*) is common in parts of México (Pac. Coast Avif. No. 29, 1950), little has been published about its breeding biology. Thus my observations on the growth and feeding of one young in a nest in the humid lowlands of northeastern Oaxaca are believed to be worth reporting.

From February to April, 1961, the emerald was common in the brushy fields around pastures and cultivated areas one mile southwest of Valle Nacional (latitude 17° 46′ N, longitude 96° 21′ W, elevation 300 feet). Judging from the enlarged testes of an adult-plumaged male taken on February 24, it seemed that the species might be breeding in the area. On March 1, Mr. L. C. Binford discovered a nest in which one young was hatching. I began observations on March 3 and continued almost daily until March 26.

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METHODS

My daily observations at the nest started between 9:30 and 11:00 a.m. and lasted until 12:30 or 1:00 p.m. This schedule varied only when the gathering of a large crowd of local people forced me to leave early. The report is based on approximately 40 hours of observation.

Observations of feeding and brooding were made with the aid of 8 × 40 binoculars from a position across a road about 30 feet from the nest. Every day the young bird was removed from the nest and examined while the female was absent.

NEST

The nest was situated approximately four feet from the edge of the main road from Ciudad Aleman, Veracruz, to Ciudad Oaxaca, Oaxaca. It was placed in dense, low second growth which ranged up to 15 feet tall, and which was within 100 yards of cut-over rain forest, cultivated fields, and a small coffee finca. Wagner (1957) states that this species inhabits more arid areas in Guerrero.

The pendent nest was suspended from small plants 29 inches above the ground. A small, broad leaf supported the nest on the side toward the road, and the back of the nest was attached to two grass stems. The outside diameter of the nest was 47 mm. and the inside diameter was 25 mm.; the nest cup was 20 mm. deep. The back rim of the nest was twice as high as the front rim, probably because the grass stem supports were higher than the leaf support at the front of the nest. With much of the back of the nest involved in a sloping support, the nest cup occupied only a portion of the front of the total structure. From front to back of the nest the outside measurement was 70 mm. Rowley (1962) reported a nest of this species that was pendent in the manner of the nest of a Red-eyed Vireo (*Vireo olivaceus*).

The body of the nest was formed by narrow strips of inner bark. Progressing to the interior of the nest the material became finer and finer. The lining was a downy material, evidently of plant origin.

The nest received sunlight during part of the day, since it was on the northwest embankment of the road. However, the surrounding bushes shaded the nest most of the

time during the first two weeks. Later the nest drooped until finally the front support was broken, so that the nest received direct sunlight during the midday hours.

Throughout the period of observation the hillside above and below the nest was covered with flowering herbs and shrubs, which may have served as feeding sites for the female.

When discovered at 9:15 a.m. on March 1, the nest contained two white eggs. At the time of discovery Binford watched the female fly across the road with a piece of nesting material which she placed in the nest lining. Hofslund (1950) has noted that a female Ruby-throated Hummingbird (*Archilochus colubris*) added materials to the nest lining on the day before the egg hatched.

GROWTH OF THE YOUNG

At 12:15 p.m. on March 1, Binford revisited the nest and found the female sitting on the rim. One young was emerging from the eggshell and the other egg was still intact.

Two days later, at 10:00 a.m., one of the two young still had half of the shell covering the posterior portion of its body. The down along the back was still wet, so I assumed this bird was just hatching. On March 4, the young in the shell was dead in the bottom of the nest. The female never removed the dead young and shell from the nest, although she probed the bottom of the nest on many occasions. When the nest collapsed, the remains of the dead young finally fell from it.

On March 4 the surviving nestling was black and naked except for two rows of brownish down along the back behind the interscapular region. Feather tracts first showed on March 7, and the feathers had broken through the skin on March 8. By March 13 pinfeathers were showing on all tracts. Mid-dorsally the longest sheaths projected 3 mm. and showed brown color. The next day feathers had broken from their sheaths on all tracts except those of the head and throat. On March 15 some of the pinfeathers on the back showed green tips, most of the brown down of the back had disappeared, and white feathers showed on the abdominal tracts.

On March 16 only the occipital tracts still had pinfeathers. Green was appearing on the flanks and hind neck. On March 18 the head feathers started to erupt. By March 19 the general color pattern of the female or immature male emerald was well marked on the nestling. On March 20 the young was well feathered except on the abdomen. Even on March 25 the abdominal feathers had not completely overlapped, as a midventral line was still bare.

Remiges first appeared on March 9. Growth was rapid and on March 20 the tenth and outermost primary of the right wing was 15 mm. long and unsheathed for 4 mm. After that date there was no measurable increase in total length of this feather although more and more of the primary broke from the sheath.

The bill increased in length from 2.5 mm. on March 4 to 5 mm. on March 13. During the next 12 days the bill grew very slowly; the final measurement, on March 25, was 7 mm. In contrast the measurements for the length of the exposed culmen in adults of this species are 13.5 to 14.6 mm. for males and 15.0 to 15.4 mm. for females (Ridgway, 1911:554). Thus when the young bird left the nest its bill was only about one-half the length of the bill of adults of the species.

The bill gradually darkened from yellowish on March 3 to brown on March 13. No color change was noted after that date.

Although eye slits were prominent on March 6, the nestling did not open its eyes until March 10 or March 12. The irides were brown.

The nestling was first able to hold up its head for extended periods on March 7. As I lifted the young from the nest on March 12, it grasped the bottom of the nest with its

feet. It also thrashed its feet after being placed on its back in my hand. On March 13 the nestling made slight ticking noises while being held and on March 14 it cheeped lightly.

The first wing fluttering was noted on March 18 while the bird was being handled. Each day after that the wingbeats of the nestling became stronger and more rapid. During the last week, the young usually remained near the top of the back of the nest, clinging to the exterior of the nest with one foot and to the grass supports of the nest with the other foot. In 1.1 hours on March 24 the young fluttered its wings thirteen times and in 1.5 hours on March 25 it fluttered nine times. The higher count the first day was partly influenced by disturbances, trucks and people passing by on the road, which several times seemed to stimulate fluttering. On March 25 the nestling could flutter for four or five feet when released from my hand.

When the nest was visited on March 26 the young was gone. There were no signs of a disturbance and I assumed that the young left of its own accord. It was not found in a brief search of the surrounding area. Thus the nestling period was 25 days. The average nest life of the Violet-ear Hummingbird (*Colibri thalassinus*) is 23 to 25 days (Wagner, 1945).

CARE OF THE YOUNG

In common with most species of hummingbirds (Moore, 1947) only the female was observed at the nest or nearby. During the first few days after the young hatched the female settled onto the nest each time after she fed the young. However, as the young grew she stayed on the edge of the nest; in this position she cast a shadow on the nestling. She was last seen to settle onto the nest on one of two trips on March 12. A female Violet-ear Hummingbird stopped brooding young when they were 10 days old (Wagner, *op. cit.*).

At first the female emerald moved directly onto the nest after feeding the young, but on each successive day settling to brood required more movements. On March 6, a hot day, the female shaded the young without contact. In settling on the nest after feeding the young, the female generally flew on. Sometimes she continued to beat her wings after sitting as though she might leave at any moment.

From March 3 until March 15 the female averaged two feedings per hour. Feedings varied from one to three per hour. During the last 10 days she averaged between three and four feedings per hour; the number ranged from two to four per hour. These rates represent data gathered only during the late morning hours. On several occasions the female approached the nest but departed without feeding the nestling when trucks or people passed on the road. She did not return immediately but stayed away until the next feeding was due.

I was unable to identify any food being brought to the nestling. Several times the female was observed apparently picking minute insects from the branches in the vicinity of the nest. She was never seen to feed the nestling after one of these bouts of activity.

To feed the nestling the female inserted her bill into the open bill of the young and performed rapid up and down movements with her head. During the early part of the nestling period the female apparently terminated the feedings. On March 20 and thereafter the young rotated its head back and forth in the manner of a person shaking his head "no," and feeding terminated abruptly. Several times the female fed again immediately so the pauses in feeding were probably not caused by lack of food. Apparently shaking of the head by the nestling communicated to the female that feeding should be stopped.

Generally the female alighted and sat on the rim of the nest, especially the southeast rim, during feedings. After the nest collapsed and the young bird clung to the back support, she fed while clinging to or fluttering on the support near the nestling or else she hovered behind or in front of the nest as if in front of a flower.

The female was remarkably regular in her path of approach to the nest. She generally approached from a small tree with dead branches about 10 yards west of the nest. After remaining there for various lengths of time she flew to some leafless stems with bushy tops about three yards directly uphill behind the nest and landed on a dead, bare branch. From here she generally flew in short flights with hovering stops at points along the way as she approached the nest. Sometimes her approach took her directly to the landing point on the east or southeast rim of the nest; at other times she circled the nest on the west and south sides.

She occasionally flew directly to the nest from a distance greater than 10 to 15 feet. When she did it was from across the road to the south, directly past me, going slightly to the right to land on the south or southeast rim. What prompted her to abandon the usual indirect approach was never evident.

The departure route of the female varied considerably. She generally flew up the slope into the dense second growth behind the nest, usually flying parallel to the road for a short distance before turning into the brush. Sometimes, more often later in the nest period, she flew back up to the bushes behind the nest and landed on one of the dead branches. Here she preened, wiped her bill on the branch, and often flicked her tongue in and out. Less often she immediately departed from the nest area by flying across the road and disappearing into the brush down the hillside south of the nest.

On March 17, when the female first discovered that the young had crawled up the back of the nest, she performed an unusual display. She immediately started a continuous buzzing note, similar to one made when approaching or leaving the nest, fanned her tail, and made several advances toward the young bird. It seemed that she actually struck the nestling with her bill. A similar but less intense version of the same display was directed toward an unidentified animal rustling the leaves on the ground just below the nest.

The female was never seen to remove fecal material from the nest. On several occasions she probed the bottom of the nest and apparently flicked something to the ground below. Once she seemed to be eating something from the bottom of the nest, but I could not tell whether it was debris or a small insect. The nest did not become fouled, so she probably was removing fecal material when she probed at the lining. At no time was the nestling observed to defecate over the rim of the nest as the young of some hummingbirds are known to do (Wagner, 1945). The fecal material was dark and contained no obvious uric acid crystals.

SUMMARY

From March 1 to March 25, 1961, I observed a nest and young of the Fork-tailed Emerald (*Chlorostilbon canivetii*) one mile southwest of Valle Nacional, Oaxaca, México.

The nest contained two eggs, one of which hatched on March 1 and the other on March 3. The second young died before freeing itself from the shell. The nestling period was probably 24 to 25 days, for on March 26 the young bird had left the nest.

Color differences between the feather tracts and the apteria were first evident on the young bird on March 7. Feather colors appeared by March 15 and by March 18 the general color pattern of the juvenile was apparent. On March 25, the last day of observation, there was still a bare line down the center of the abdomen.

Remiges first appeared from beneath the skin on March 9. By March 20 elongation of the remiges stopped; the only change thereafter was an increase in the unsheathed portion of the feathers.

The bill grew from 2.5 mm. on March 4 to 7 mm. on March 19. At first it was yellowish, gradually darkening to brown during the second week.

Eye slits appeared on March 5. The eyes of the nestling were kept open after March 12. The irides were brown.

The young was first able to hold its head up on March 7; it first grasped the bottom of the nest when removed for inspection on March 12. Wing fluttering began on March 18 and by March 25 the nestling could fly four to five feet.

Only the female was observed to visit the nest. She consistently used three avenues of approach to the nest and landed on one of two positions during early nest life of the young. On March 17 the young climbed onto the back support of the nest and the female then fed it either while hovering above the nest or after landing on this support.

The rate of feeding increased from an average of two per hour to between three and four per hour during the last 10 days. To feed the nestling the female inserted her bill into the open bill of the young and then made pumping movements with her head. From March 20 to 25 I saw the young rotate its head from side to side while feeding. This behavior seemed to terminate feeding.

I never saw the female remove fecal material or the young defecate over the rim of the nest, but the nest did not become fouled. Perhaps the female ate the black fecal material when she probed the bottom of the nest.

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