

nificantly, it was that of a female in the sparser area (both for bladderpod and other plants) away from the other hummingbird species. Two female Costa's Hummingbirds had territories adjacent to those of Rufous and Calliope Hummingbirds, but their nests, if they had any, were not found. Certainly the migrant hummingbirds were occupying habitat that appeared suitable for the resident species and which, were it

not for these migrants, would probably have supported and raised Costa's Hummingbirds. This appears to be quite an unusual situation, where a resident species is breeding at the same time a closely related or ecologically similar wintering or migrant species is present, and this writer is hard-pressed to think of more examples of the phenomenon. Hartley's (1950) case of the Wheatears (*Oenanthe* spp.) might qualify.

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NESTS OF THE RED WARBLER AND CRESCENT-CHESTED WARBLER IN OAXACA, MÉXICO

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I am placing on record some additional information on nests of two little-known warblers, the Red Warbler (*Ergaticus ruber*) and the Crescent-chested Warbler (*Vermivora superciliosa*). I found two nests of each of these species in an open forest of mature pines and oaks in Cerro San Felipe, Oaxaca, at about 9000 feet elevation about 27 km by road northeast of Oaxaca City.

Only two previous nests of the Red Warbler have been described, one found at an elevation of 11,200 feet in the Federal District of México (Elliott, *Condor* 67:540, 1965) and the other found near 7300 feet in southern Oaxaca (Rowley, *Proc. Western Found. Vert. Zool.* 1:192, 1966).

I found the first of my nests at 08:35, 8 May 1967, a few minutes after John William Hardy discovered the Red Warbler carrying material. The nest site was a barely discernible cavity in the ground cover, and I suspected this was the first day of building. For four days, 8-11 May, I spent from 2 to 2¾ hours each morning at this site, watching the building process until a time between 10:00 and 11:00 when the activity seemed to have tapered off for the day. Although I visited the site briefly on two afternoons and saw no warbler activity at these times, I cannot be sure there was no building in afternoon hours. In my 10 hours of observation, I counted 254 trips with nesting material by the warbler—by days, 59, 73, 93, 29. Hence, I suspect the warbler made more than 300 trips in the course of construction. On the morning of 12 May I saw no further building at the nest during an hour before and after 08:00 when activity

had been most energetic in the previous four days; however, the pair of warblers came once to within three meters of the nest and preened in the overhanging shrubbery. On 13 May, at 07:50, the female was off and the nest held one egg; on 14 May, at 07:00, the female was off the nest and it held a second egg. On 15 May the clutch was complete with 3 eggs. The female did not leave the nest when I approached at 07:00 and remained as though incubating until I flushed her at 07:55. She did not leave until my hand touched the vegetation over the nest. Thus, four days were spent in building, one day passed without activity, the sixth day brought the first egg, the seventh and eighth days completed the clutch, and incubation was in progress on the morning of the third egg's arrival.

All of the building was performed by the female. Most of the material was gathered from the ground, but some was gathered from low branches of shrubs. The identifiable materials were mostly brown pine needles and dead grass, but sometimes included green moss, gray lichens, and dried leaves. On the first day the materials were coarse and were gathered mostly within four meters of the nest, but later they were gathered farther afield, up to 20 meters away. On the final day the materials were noticeably finer, including several times the silky parachutes of a seed like a dandelion or thistle. The warbler usually approached and left the nest by horizontal flight just above the ground. She often stayed only a second or two at the nest, but now and then stayed more than a minute. Frequently the female announced her approach to the nest with a *chip*. The male meantime seemed to ignore the nest-building activity, singing and moving about high in the trees mainly, except in the first hour of the first day and briefly at the start of the second day, when he perched silently a meter or two above the busy female. The sexes appeared identical, but when working the female was almost constantly in sight while the male revealed his separate location by song.

The completed nest appeared to consist mostly of

pine needles. It was deeply set in low vegetation under fern and other broad-leaved plants. The nest itself had a roof of arching needles and opened outward from the slope of the hill. Bulky and shaggy on the outside, it was neat and compact on the inside. The cup was thickly lined with fine plant fibers and was about 49 mm in diameter and 39 mm in depth before incubation began. Immediately adjacent was a finger-thick woody stem of a shrub, and partially overhanging were several shrubs two to three meters tall. High overhead shade was provided by an open stand of oaks mostly about 25 meters tall and pines more than 30 meters tall. The ground slanted down steeply northward from the nest to a small stream about 15 meters away. The intervening slope had little vegetation and was covered mainly by pine needles and moss. The eggs measured 18×13 , 17×13 , 19×13 mm. They were pale pink with fine brown spots evenly distributed.

The second Red Warbler nest held three young when I found it on the morning of 15 May. The nestlings were well-feathered, and I judged them to be about six days old. This nest also was in open pine-oak forest like the other, but situated on a south slope. It was imbedded in pine needles and fallen oak leaves, and was anchored to the base of several pencil-sized stems of shrubs that overhung it. It was fully roofed, facing outward from the hill, and appeared to be constructed mainly of pine needles. The cup lining of fine plant fibers appeared to be less thick than in the first nest, but this may have been due to wear. The cup measured about 54 mm in diameter and 30 mm in depth.

In a late afternoon hour of a cold, drizzly day, 15 May, beginning at 16:20, the adults fed the young 19 times. Although I could not distinguish the sexes by their plumages, I saw both at the nest together three times. Also it was the female, I judged, that chipped loudly on nearly every approach to the nest and moved about actively near the nest. The male did not fidget as much as the female and was silent near the nest except for two whisper songs I could scarcely hear eight meters away. The young twittered softly when being fed.

It was my impression that the behavior of these birds, both in nest-building and in feeding young, was remarkably similar to that of the ground-nesting Kirtland's Warbler (*Dendroica kirtlandii*) that I have studied in the United States.

Two nests of the Crescent-chested Warbler (*Vermivora superciliosa*) have been reported previously from México. One was placed on a mossy oak limb "about 10 feet from the ground" at an elevation of 8500 feet in Morelos (Rowley, Condor 64:262, 1962); and the other, in a recess in a dirt bank of about 7300 feet in southern Oaxaca (Rowley, *op. cit.*, p. 190). In Guatemala, Skutch reported three nests of this species placed on the ground (Pacific Coast Avifauna 31:377, 1954). Therefore, it is of interest that the two nests I found were placed in niches on steep banks like the Oaxaca nest reported by Rowley and the three nests in Guatemala found by Skutch.

When I found the first Crescent-chested Warbler nest on 9 May 1967, the female was incubating three eggs. These hatched on 12 May. The nest was placed near the top of a sheer bank about two meters high. It was imbedded in a shallow natural cavity and par-

tially concealed by a drooping broad-leaved plant. The bank was formed by a stony outcrop on the north-facing slope of a valley dropping steeply to a brook about 15 meters below. The stone was completely covered with moss, and the slope otherwise was blanketed with pine needles. The understory of vegetation was sparse, and the ground was shaded most of the day by the large oaks and pines overhead. Nearby there was a small fir through which the female usually dropped down to the nest. The outer part of the thick-walled nest and most of its bulk consisted of green moss. In the lining were pine needles and finer plant fibers, mingled with more moss. The eggs were white. On the day after the hatching of the young, the nest's inside measurements were 48 mm in diameter and 30 mm in depth. The young were covered with dark brownish-gray down.

I found the second Crescent-chested Warbler nest on the afternoon of 11 May. The female was incubating at the time and was still incubating when I last saw the nest on the morning of 16 May. This nest also was imbedded in the vertical face of a bank on a steep slope, but in this instance the bank was tiny, scarcely sufficient to overhang the nest. The face of the bank and the ground about were covered thickly with pine needles. The green leaves of an oak seedling drooped over the nest, adding to the concealment. The nest opened outward from the west-facing hill. The undergrowth was sparse, but within a few meters there were several oak saplings and a young fir through which the warbler usually approached the nest. The outer part of the nest and the bulk of it were green moss. Next came an intermediate layer of pine needles, and then a thin lining of fine plant fibers. On 12 May it had an inside diameter of 50 mm, and the inside depth of the lined cup was 32 mm. I found it difficult to recognize the top of the outer structure at the back of the cavity and therefore did not try to measure its depth. The eggs were white and measured 16×11 , 16×12 , and 16×12 mm.

At both nests it appeared to me that the female alone incubated the eggs. The male sang mostly high in the pines and did not approach the nest. The incubating female sat until I approached within about one meter and then flew rapidly downhill just off the ground. After the young hatched in the first nest, the female sat tighter than before and left the nest with an energetic display each time I flushed her. She dropped to the ground twittering and ran along the surface, weaving and pirouetting, with wings fully spread and half-raised. This was as elaborate an exhibition of injury-feigning as I have ever seen in any species of warbler, in contrast to the half-hearted display of a female watched by Skutch.

The shy approach of the female at the nest, the elusive darting flight of the birds from cover to cover, and the aloofness of the singing males reminded me of the ground-nesting Nashville Warbler (*Vermivora ruficapilla*) that I have watched in the north-central United States.

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