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BEHAVIOR AND GENERIC STATUS OF THE RUFOUS FLYCATCHER OF PERU

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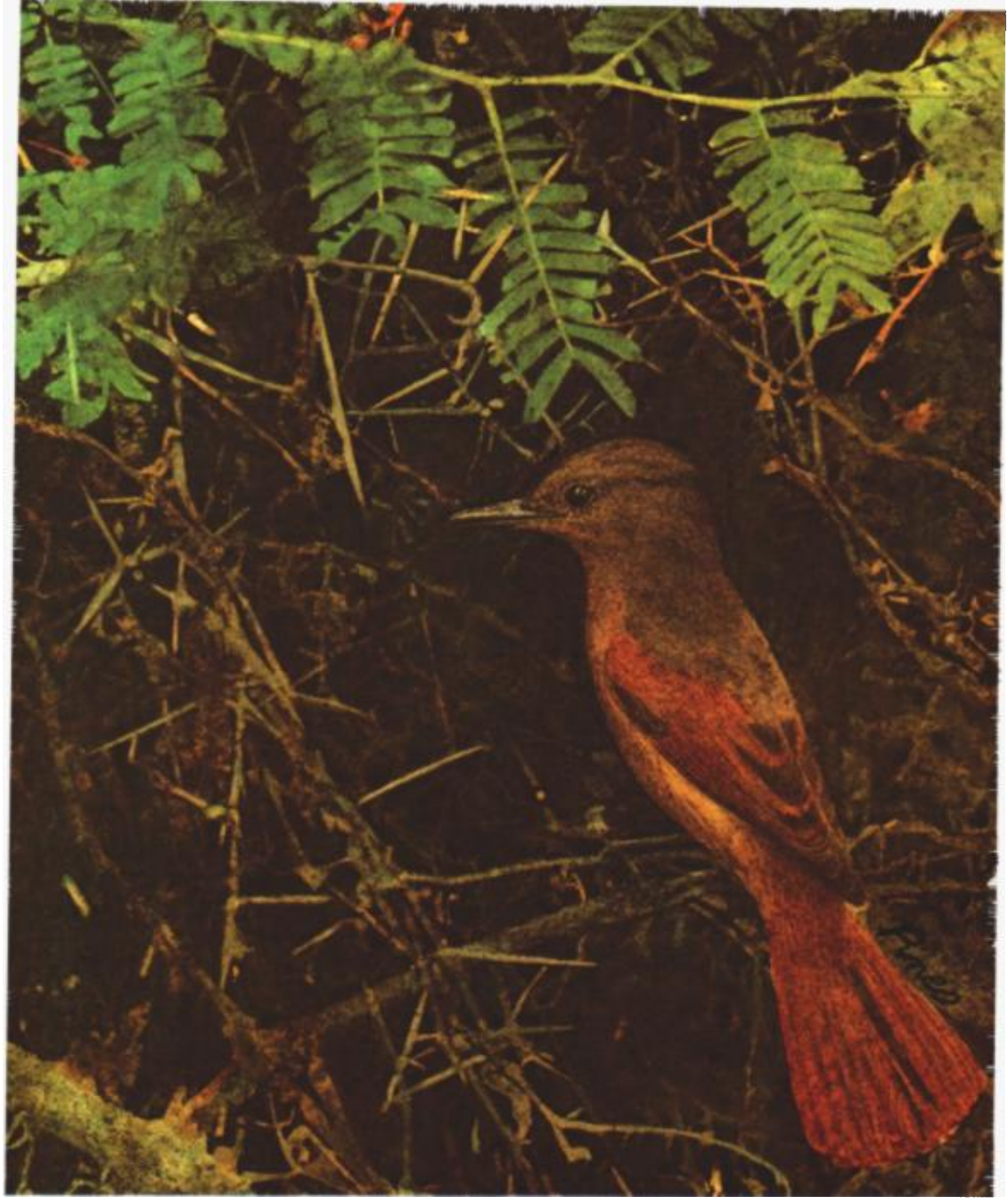
Other than references to its restricted range in northwestern Peru and to its uncertain generic status, there is little in the literature on the Rufous Flycatcher, *Myiarchus semirufus*. There had been no vernacular name in general use prior to the designation by Meyer de Schauensee (1966) of "Seaboard Flycatcher." Maria Koepcke, who up until her tragic death in 1971 probably had more field experience with this little known species than any other professional ornithologist, felt that "Seaboard Flycatcher" was misleading in its erroneous implication of restriction to a strictly coastal habitat. She suggested "Rufous Flycatcher" (Koepcke 1970) in recognition of the unique plumage coloration (see frontispiece) and after consultation with Eugene Eisenmann. Meyer de Schauensee later accepted this change of vernacular in the first separately issued "Addenda and Corrigenda" for his 1966 book.

More significantly there are no accounts of the breeding biology of this species. In my revision of the crested flycatchers of the genus *Myiarchus* it was essential for me to acquire field experience with *M. semirufus* and, hopefully, to find the nest and eggs and record its vocal repertoire. I am reporting here the results of 2 trips that I made to northwestern Peru in 1973 (22 February through 4 March, and 18 December through 29 December), and will indicate the relevance of these findings to the generic status of the Rufous Flycatcher.

DISTRIBUTION AND HABITAT

The range of the Rufous Flycatcher is one of the most restricted of all of the *Myiarchus* flycatchers of South America. The localities at which it has been collected or observed are confined to a narrow zone along the coast of northwestern Peru, extending from Tumbes near the Ecuadorian border south to the vicinity of the Rio Pativilca, 200 km north of Lima (Fig. 1).



A Rufous Flycatcher, *Myiarchus semirufus,* perches near its nest in the dark recesses of a clump of *Acacia macracantha.*
Watercolor painting by Christopher M. Pineo, from a photograph taken near Chimbote, Peru, on 26 December 1973.

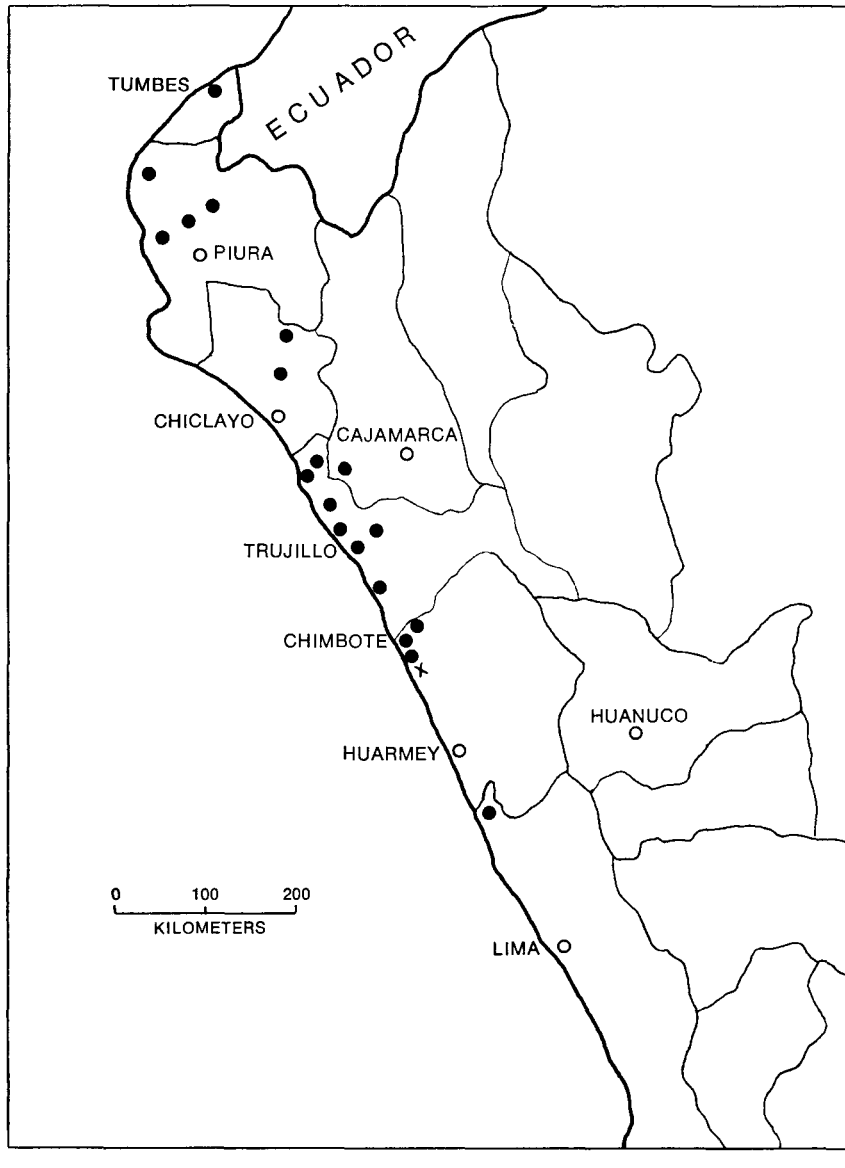


FIG. 1. Map of northwestern Peru, indicating localities (black dots) where the Rufous Flycatcher has been collected or observed. Localities and authorities are identified in the Appendix. The site of this study is marked with an x.

The width of this range generally is less than 50 km, being restricted on the east by the foothills of the Andes. I found a number of heretofore unreported localities for the species, but did not extend the distributional range either to the north or south, beyond that previously reported (Zimmer 1938, Bond 1947, Meyer de Schauensee 1966). Since the preferred habitat extends for some distance north into SW Ecuador, I feel that this flycatcher will eventually be found there as well.

The distribution of the species is entirely within, but does not occupy all of, those Peruvian life zones identified by Tosi (1960) as tropical, subtropical, or thorny desert. This extremely arid region owes its existence to the influence of the cold Humboldt current that flows north along the Peruvian coast. What precipitation there is generally comes as mist or fine drizzle associated with the fogs that blanket the region seasonally: during summer months (Jan.–Apr.) in the north, and during the winter (May–Sept.) in SE Peru. From Tosi's (1960, p. 261) table of climatological data for the coastal region of Peru, I estimate that the mean annual temperature is 24.2° C at the extreme northern end of the species' range, and 18.8° C at the extreme southern end of the range. The mean annual rainfall is given as 181 mm at the northern end of the range and only 24 mm at the southern end.

It is possible to drive for many kilometers through this desert habitat along the coastal highway of Peru (Pan American Highway) without seeing any vegetation or with only sporadic views of widely scattered clumps (Fig. 2). Only where permanent rivers, originating in the snowfields and glaciers of the high Andes, reach the sea does one encounter vegetation, land of potential agricultural use, or human settlements. Here the land is irrigated and used for growing sugar cane, rice, cotton, and other crops. Formerly there were extensive stands of small to medium trees (mesquite, *Prosopis* spp.; acacia, *Acacia* spp.; willows, *Salix* spp.; *Capparis* spp.) associated with these permanent rivers, but wooded areas are now confined to regions where topography or lack of irrigation discourages cultivation. Even in such areas, the larger trees are quickly cut for firewood and fence posts.

The localities where I was most successful in locating the Rufous Flycatcher were open thorn-woodlands dominated by mesquite and acacia trees. Often the trees were widely separated by sparse grasses and herbs. Koepcke (1970) characterized the species as "typical of the xerophytic steppes and mesquite savannahs."

Nowhere did I find this flycatcher common, and at no locality could I be certain of having observed or heard more than 2 adults. In fact, it was only after I obtained sufficient recordings to use a playback tape that I was able to locate birds with any degree of regularity or predictability. A low popula-

FIG. 2. The tropical desert habitat used by the Rufous Flycatcher. This is a portion of the study area marked with an x in Fig. 1. The utility poles border the Pan American Highway. A nest of this flycatcher was in the large clump of *Acacia macracantha*, center right.

tion density is characteristic of most *Myiarchus* flycatchers, however, for each pair apparently requires several hectares of suitable habitat in which to forage. Most wooded areas within the coastal desert of Peru are small and each such locality may be capable of supporting no more than a single pair of Rufous Flycatchers. This low density, coupled with the fact that it is not a very vocal flycatcher, accounts for the difficulty in locating the species; many bird watchers who have visited Peru's coastal region have failed to find it.

Some of the avian associates of the Rufous Flycatcher at the study area shown in Fig. 2 were the Croaking Ground-Dove (*Columbina cruziana*), Groove-billed Ani (*Crotophaga sulcirostris*), Lesser Nighthawk (*Chordeiles acutipennis*), Amazilia Hummingbird (*Amazilia amazilia*), Coastal Miner (*Geositta peruviana*), Baird's Flycatcher (*Myiodynastes bairdi*), Vermilion Flycatcher (*Pyrocephalus rubinus*), Tawny-crowned Pygmy-Tyrant (*Euscarthmus meloryphus*), White-crested Elaenia (*Elaenia albiceps*), Peruvian Plantcutter (*Phytotoma raimondii*), House Wren (*Troglodytes aedon*), Long-tailed Mockingbird (*Mimus longicaudatus*), Cinereous Conebill (*Con-*

irostrum cinereum), White-thighed Meadowlark (*Sturnella bellicosa*), Blue and Yellow Tanager (*Thraupis bonariensis*), Streaked Saltator (*Saltator albicollis*), and the Hooded Siskin (*Spinus magellanicus*).

With the exception of the extreme northern end of its range, the Rufous Flycatcher is not sympatric with other *Myiarchus*. It is not found far enough up the Andean slopes to overlap the distribution of *M. tuberculifer*. Locally within the northern departments of Piura and Tumbes, *M. semirufus* may occur in the same open thorny woodland as *M. phaeocephalus*.

BREEDING BIOLOGY

Since there are no references in the literature to the breeding biology of this species, my only clues to the timing of breeding had to come from data on the labels of museum specimens and the degree of plumage wear or evidence of molt in the specimens. The latter information suggested a difference of 1 to 2 months in the timing of the prebasic (annual, complete, post-breeding) molt between birds at the southern end of the range (departments of Ancash and La Libertad) and those at the northern end (Piura). Ancash specimens collected from February through April show various degrees of replacement of the flight feathers, while others taken as early as March and April are in fresh plumage. Piura specimens showing molt in the wings and tail have been taken in April and May and there are fresh plumaged June specimens. These data on molt suggest that the birds in the south breed from 1 to 2 months earlier than those in the north. It is probable that differences in the timing of the scant precipitation in this region and the resulting seasonality of the vegetation and insect populations are responsible for this asynchrony in the annual cycle of the Rufous Flycatcher.

In early March 1973, David Ewert and I found a group of 3 Rufous Flycatchers at a locality along the Pan American Highway about 50 km S of Chimbote, in the department of Ancash ("x" in Fig. 1) We observed them for a total of 6 hours over a 2 day period, during which time they were silent except for occasional renditions of a "huit" note (Fig. 6, 4–6). Two of these birds were adults, on the basis of their plumage, and one of these was completing its tail molt (median pair of rectrices half grown). The third bird, a juvenile, was collected. It had large "windows" in an incompletely ossified skull. On the basis of this information I believe this pair must have nested in December and January. Other avian associates at the same locality suggested a similar timing of breeding. Juveniles of the Long-tailed Mockingbird and Peruvian Plantcutter were present, and there were adult mockingbirds in obvious molt. None of the Vermilion Flycatchers were courting or displaying here, though we had found them doing so in Piura a few days

FIG. 3. The arrow indicates the location of a nest of the Rufous Flycatcher, located in a darkened recess of the clump of *Acacia macracantha* seen in its entirety in Fig. 2. A swath of vegetation and debris had to be removed to permit access and photography.

earlier. Further, there was very little song at dawn from any species at this locality. During our observations the Rufous Flycatchers spent most of their time foraging for insects at low to medium levels within the woody vegetation, in typical *Myiarchus* fashion. When stimulated, they would raise the feathers of the crown in a manner characteristic of the genus. One of them plucked and swallowed a small bluish berry. We searched the area for potential nest cavities but found none. Is the Rufous Flycatcher a cavity-nester like all other *Myiarchus*?

I returned to the study area near Chimbote in late December, accompanied by my wife and determined to find a nesting pair of these birds. It was encouraging to find that many of the avian associates were breeding, thus confirming my prediction. The Vermilion Flycatchers were going through their aerial displays, mockingbirds were feeding recently fledged young, and the chorus of song at dawn was vigorous enough to indicate rather widespread breeding.

Our initial efforts to discover breeding in the Rufous Flycatcher were in vain, though we located one pair quickly and found them to be more vocal than they had been in March. On 20 December I noted that they appeared to be courting, for there were occasional aerial pursuits and one instance of attempted copulation. But on 3 mornings I was unable to identify any components of the dawn chorus as the dawn song of this flycatcher, though by this time I had recorded a variety of daytime vocalizations and therefore had a fair idea of what to expect by way of dawn song, if in fact the species possessed one.

On 25 December my wife spotted one member of the pair carrying a white feather in its bill. I followed this bird for about 10 min as it moved through its territory, carrying the feather all the while, until it eventually entered a clump of *Acacia macracantha* (Fig. 2). A subsequent vigil and observations of the behavior of the pair of Rufous Flycatchers at this site led to the discovery of the nest on the next day. The nest, about one meter above ground level, was well hidden in a darkened recess of the acacia (Fig. 3). Though it was an open cup (Fig. 4) and not located within a tree cavity in the typical manner of *Myiarchus*, the light intensity at the nest was extremely low due to the impenetrable mass of dead branches and accumulated litter from the foliage of previous growing seasons. Much of this nest cover had to be removed to permit closer inspection and subsequent collection of the nest. Photography at the nest was made difficult by the contrast between the low light intensity normal to the site and the brighter light introduced by the removal of surrounding cover.

Though *Myiarchus* flycatchers normally use cavities within wood, they have been known to select other sites that provide equally low light intensities at the nest. In May 1959, near Tapachula, in Chiapas, Mexico, I observed a pair of *M. tuberculifer* carrying nesting material into a darkened recess within a mass of dead fronds on a date palm. Burton (1973) has reported *M. ferox panamensis* nesting in a burrow in a roadside bank. There are no woodpeckers in the southern two-thirds of the range of the Rufous Flycatcher and natural tree cavities large enough for use by this flycatcher are scarce. All dead or dying timber is quickly removed for firewood and

FIG. 4. Close-up of the nest. One of 3 eggs is visible, as well as the typical *Myiarchus* lining of fur and feathers.

living trees seldom are permitted to reach a girth that might be suitable for a hole-nesting species of this size. We found no other nests of the Rufous Flycatcher, and can only speculate that, at least throughout the southern part of its range, this species commonly may resort to selecting the darkened recesses within clumps of acacia in the absence of tree cavities.

With respect to the materials used in its construction, the nest was typical of that of other members of the genus. It was lined with fine and coarse fur, numerous pieces of shed reptilian skin, fragments of tissue paper, newspaper, and clear plastic, and a few white feathers (Fig. 4). The fragments of shed reptilian skin were from at least 2 species of snakes and one species of lizard.

The 3 eggs in the nest had been incubated for about 2 days when collected on 26 December. In size, shape, ground color, and markings they are well within the range of variation one finds among the eggs of *Myiarchus* flycatchers (Fig. 5). The ground color is a creamy white, and the irregular markings and blotches of brown and brownish lavender are more concentrated at the larger end.

The female of the pair at this nest was collected on 26 December. She weighed 25.0 g and had a well-developed brood patch; her oviduct and ovary were much enlarged. The male was not collected until 3 days later, in order

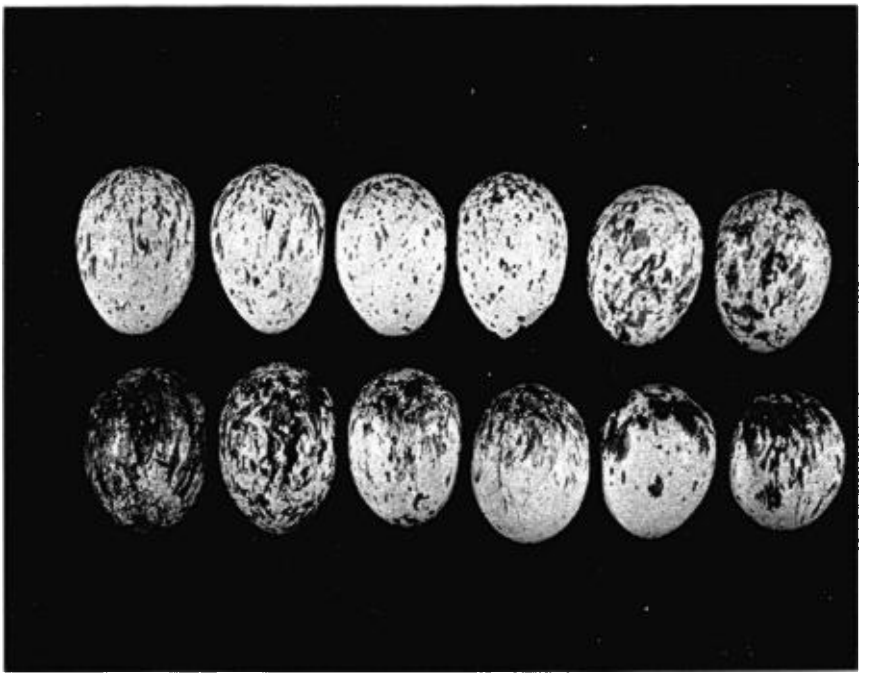


FIG. 5. Comparison of the eggs of the Rufous Flycatcher (median pair, top row) with those of 3 other species of *Myiarchus*. The 3 pairs of eggs in the top row, left to right: *M. tyrannulus*, Colombia; *M. semirufus*, Peru; and *M. cinerascens*, California. The 3 pairs of eggs in the bottom row illustrate the considerable intraspecific variation in the eggs of *M. crinitus*; left to right, a pair from South Carolina, and 2 pairs from Florida.

that I might obtain more tape recordings, particularly of its dawn song. He weighed 23.0 g and his testes were 10 mm by 6 mm. Both birds had fully ossified skulls, completely black bills, and yellow mouth linings.

Two other adults in breeding condition were collected south of Chimbote, in Ancash department in late December. A male, taken on 28 December, weighed 24.0 g and had testes that were 10 mm by 5 mm. A female, taken on 29 December, weighed 22.0 g and had the initial stages of a brood patch. Another adult female, collected on 21 December just north of Paijan, in La Libertad department, about 220 km north, weighed 21.0 g and was not yet in breeding condition (ova less than 1 mm diameter; no developing brood patch). This corroborates my earlier conclusion based on molt data that Rufous Flycatchers in the southern part of their range breed earlier than those in the north.

VOCALIZATIONS

The basic vocal repertoire of the Rufous Flycatcher, as determined by the recordings that I made of 2 breeding pairs and of several non-breeding individuals, consists of 5 different notes. This repertoire size is consistent with what I have found in other *Myiarchus*. Likewise, the individual notes have counterparts in the vocalizations of other *Myiarchus*.

The note most heard from these flycatchers while they are foraging, particularly from non-breeding individuals and birds not stimulated by territorial intruders or by playback of sound recordings is the "huit" note (Fig. 6, 4–6). It may be given bv either sex, is at a low intensity and hence does not carry far, and is rendered singly. To my ear it is indistinguishable from a note of the Vermilion Flycatcher, given under similar circumstances.

When the incubating female left the nest, she was joined by the male and the pair foraged together, often covering several hectares of the male's territory. Particularly during the first few minutes following the reunion of the members of the pair and presumably in response to such stimulation, simple unmodulated and descending whistles might be rendered, either singly or in short series (Fig. 6, 10–11). I can not be certain that I heard both sexes give these whistles, though I believe they did. All evidence suggests that the sexes of *Myiarchus* have identical vocal repertoires. The only reference in the literature to the voice of the Rufous Flycatcher is Taczanowski's (1884) quotation from the field notes of Jelski: "Its voice is a monotonous whistle, repeated from time to time." The reference may have been to this whistle, or it may have been to the rasping, piercing type of whistle described next.

In circumstances of more intense stimulation, as when confronted with the presence of an intruder or with the sounds of a playback tape, either sex of a breeding pair may give a sharp rasping whistle, either singly or in rapid series. This whistle is modulated at a moderate rate of 50 to 60 cycles per sec, which lends a definite rasping quality to the note (Fig. 6, 7–9). In moments of intense excitement, the pair may vocalize in a duet, using this rasping whistle almost exclusively but occasionally interjecting a "hic-up" note or "brrrt" note.

Another note given by members of a breeding pair during periods of intense excitement is one I have labelled the "hic-up" note (Fig. 6, 15–16). It appears to be derived from modifications of the "huit" note, and sometimes includes the "brrrt" note (see below) as one of its components. It is usually heard by the human ear as a 2 or 3 syllabled note.

The "brrrt" note (Fig. 6, 12–14) sometimes is rendered singly as a conversational note between members of a foraging pair and sometimes is included as a component of the "hic-up" note. The modulation of the carrier

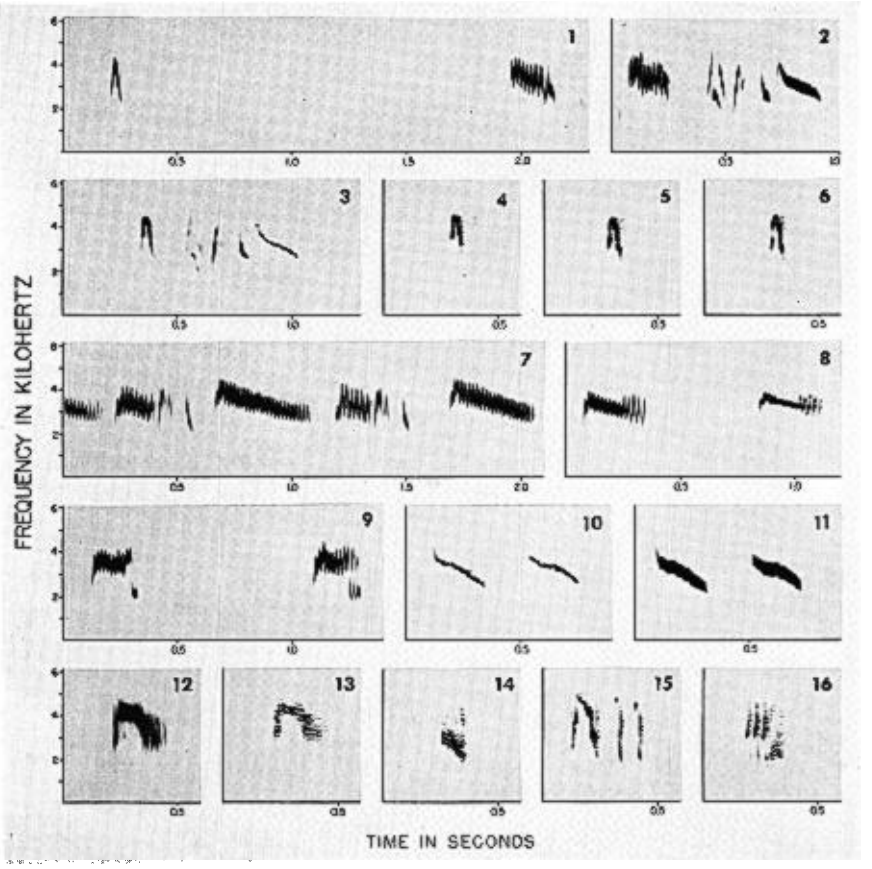


FIG. 6. Sound spectrograms of vocalizations of the Rufous Flycatcher: 1–3, components of the dawn song; 4–6, variations of the "huit" note; 7–9, variations of the rasping whistle; 10–11, descending whistles; 12–14, variations of the "brrrt" note; 15–16, variations of the "hic-up" note. Recorded 50 km S of Chimbote, Peru, between 25 and 29 December 1973, with a Uher 4000L tape recorder, preamplifier, and a Uher microphone mounted in a 61 cm parabolic reflector. Graphs were made on a Sona-Graph, model 6061B; the narrow band filter was used for displays 3, 4–6, 10, 13–16; the wide band filter was used for displays 1, 2, 7–9, 11, 12.

frequency of this note is about 3 times as rapid as in the case of the sharp, rasping whistle. This note has a counterpart in the repertoire of most *Myiarchus*.

The males of each *Myiarchus* species give a stereotyped, species-specific pattern of vocalizations just prior to and at dawn, beginning at the onset of territorial defense and extending for varying lengths of time through the

remainder of the breeding season. Many but not all genera of tyrannid flycatchers exhibit this vocal behavior, which has become known in the literature as the "dawn song." Each component of the dawn song can be heard as individually-rendered notes during the day; i.e., there are no components unique to dawn song. The arrangements of these components into predictable patterns having consistent temporal characteristics, and the repetition of these patterns in a nearly unbroken sequence for a period of 15 to 30 min at dawn each morning during the breeding season are unique features of this dawn song.

In my brief exposure to the breeding pair of Rufous Flycatchers at the study area in Ancash, I heard the male give dawn song on the morning that the female and nest were collected (second day of incubation) and again 3 mornings later, at which time the male had attracted a new female that showed the beginnings of a brood patch. I believe I could have recorded him for at least 2 weeks prior to the onset of incubation, had I been there and had I been able to recognize the vocalization as that of the Rufous Flycatcher.

The dawn song of this flycatcher consists of isolated and alternated renditions of "huit" notes and rasping whistles (Fig. 6, 1), with frequent interjection of a more complex component derived from a combination of a modified "hic-up" note and a simple descending whistle. This complex component is given less frequently than the other notes, and always follows in rapid sequence the rendition of either a "huit" note or a rasping whistle (Fig. 6, 2–3). A normal dawn song sequence might include the alternated renditions of "huits" and rasping whistles for 10 or 15 sec, and then a complex component introduced by a rasping whistle. After another sequence of alternated "huits" and rasping whistles, a complex component introduced by a "huit" note might follow.

GENERIC STATUS

In their original description of *Myiarchus semirufus*, Sclater and Salvin (1878) concluded that "although so abnormal in colour, we cannot arrange this bird . . . as otherwise than a typical *Myiarchus*." However, following a contrary opinion expressed earlier by Berlepsch (1907), Bangs and Penard (1921) assigned *semirufus* to a new, monotypic genus, *Muscifur*, and cited as their reasons a difference in the shape of the bill and the wing and the unique color of the plumage. In his revision of South American *Myiarchus*, Todd (1922) commented on Bangs and Penard's new genus: "Every one of the diagnostic structural characters claimed for it by these authors we find repeated in typical *Myiarchus*, leaving only the different color-pattern to be considered, and an additional character in what appears to be the rougher scutellation of the tarsi. Whether under the circumstances *Muscifur*

deserves recognition is an open question. Probably it would be better to keep its type in *Myiarchus* in spite of its aberrant coloration." Hellmayr (1927) agreed with Todd in discounting the importance at the generic level of the peculiar color pattern and the slightly rougher scutellation of the tarsus. He placed *semirufus* at the end of his catalogue entries for *Myiarchus*, next to 2 other flycatchers that he preferred to assign to separate monotypic genera (*Hylonax* and *Eribates*) but that have subsequently been placed in *Myiarchus* by Zimmer (unpublished MS) and subsequent authors.

It was Zimmer's (1938) analysis of *semirufus* that most influenced later workers: "This bird stands somewhat apart from the general assemblage of species in the genus *Myiarchus* in which it appears to have no very close relative. The color is predominantly rufous instead of gray and yellow; the plumage is rather coarse in texture; the crest is rather long; the scutellation of the tarsus is a little rougher than usual; the bill is relatively long, somewhat flattened, and convex in lateral outline to near the narrow tip. Nevertheless, except for the color, the characters are not perfectly diagnostic. The tiny tubercle on the underside of the wing at the base of the outer primary is present as in other members of *Myiarchus* (as well as in *Hylonax* and *Eribates*), pointing to close affinity. I believe that *Muscifur* of Bangs and Penard, erected for *semirufus*, is of good subgeneric value but that it is not entitled to full generic rank." Subsequent authors have followed Zimmer in retaining *semirufus* in *Myiarchus* (Bond 1947; Meyer de Schauensee 1966, 1970; Koepcke 1970), without exception to my knowledge, but place it either at the beginning or at the end of the species accounts in recognition of the degree of divergence from and the uncertain affinities with its congeners.

My observations on behavior and breeding biology support Zimmer's conclusion based on morphology, i.e., that *semirufus* is best retained within *Myiarchus*. Agreement between the Rufous Flycatcher and other *Myiarchus* has been established on the following points: foraging behavior; tendency to erect the feathers of the crown when stimulated; preference for extremely low light intensity at the nest site; prolific use of fur, feathers, shed reptilian skin, and paper or plastics in the nest lining; size, shape, ground color, and markings of the eggs; and vocalizations, in terms of repertoire size, actual components, and rendition of a dawn song.

SUMMARY

The little known Rufous Flycatcher is restricted to the coastal desert of northwestern Peru. Its predominantly rufous color sets it apart from other *Myiarchus* and has contributed to its uncertain generic status. Data presented here on the species' behavior, nest, eggs, and vocalizations support Zimmer's conclusion, based on morphology, that the Rufous Flycatcher is best retained in *Myiarchus*.

ACKNOWLEDGMENTS

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APPENDIX

List of Peruvian localities, by department, where *Myiarchus semirufus* has been collected. In addition, the localities for 3 sight records have been included, as indicated. The authorities for these localities are given in parentheses.

Tumbes: Tumbes (Sztolcman).

Piura: 15 km E of Talara, sight record (Ned K. Johnson); Somate (Watkins); Chilaco (Watkins); Pilares (Watkins); 23 km NE of Paita, sight record (Lanyon); Sullana (Bangs and Noble).

Lambayeque: Olmos (Carriker); 55 km NE of Chiclayo, sight record (Lanyon).
Cajamarca: Tembladera (Baron).
La Libertad: Chepen (Sztolcman, Baron); Guadalupe (Carriker, Raimondi); Pacasmayo (Steere, Sztolcman); Cartavia (Carriker); 5 km N of Paijan (Lanyon); Trujillo (Baron); Virú (Watkins).
Ancash: Hacienda de Suchiman (Carriker); Chimote (Sztolcman); 33 km N of Casma (Lanyon); 10 km N of Casma (Lanyon).
Lima: Huariconga (Birdseye); Paramonga (Carriker).

AMERICAN MUSEUM OF NATURAL HISTORY, NEW YORK, NY 10024. ACCEPTED 23 DEC. 1974.

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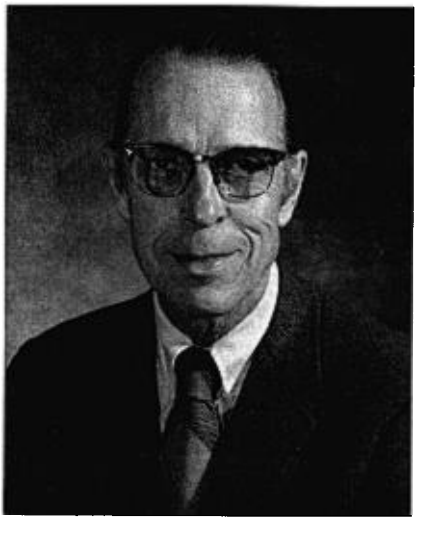

Dr. William H. Elder, Rucker Professor of Forestry, Fisheries & Wildlife at the University of Missouri, Columbia, Missouri is now a life member of the Wilson Ornithological Society. Dr. Elder is primarily interested in waterfowl biology and management and in the population dynamics of permanent resident passerines. He has published extensively in the professional and popular literature. Dr. Elder is married and has two children. In addition to his ornithological activities he is interested in wildlife photography and canoeing.