Stream flow and the diverging isobaths "downstream" (north) of Cape Canaveral, Florida. Virtually all North Carolina sightings of Band-rumped Storm-Petrels occurred downstream of the diverging isobaths north of Cape Hatteras (Lee 1984) (Fig. 1). Both regions contain similar bathymetry and both are strongly influenced by eastward Gulf Stream meanders that cause upwelling (Atkinson 1977; Lee et al., Deep-Sea Res. 28:347–378, 1981). Prior to 1984, more records of Band-rumped Storm-Petrels existed for the Gulf than the Atlantic coast of Florida (Sykes et al. 1984). Eddies of the Loop Current in the northeast Gulf of Mexico cause upwelling off western Florida, providing similar physical and biological conditions to those in the South Atlantic Bight (Paluszkiewicz et al., J. Geophys. Res. 88:9639–9651, 1983). The occurrence of Band-rumped Storm-Petrels in this region has been considered underestimated due to lack of observation and misidentification (Clapp et al. 1982).

Band-rumped Storm-Petrels are more solitary than the other Atlantic storm-petrel species (Cramp and Simmons 1977), and may more frequently exploit the localized and transitory patches of productivity found in tropical and subtropical water masses off the southeastern United States. Although I also observed Leach's (*O. leucorhoa*) and Wilson's storm-petrels (*Oceanites oceanicus*) at upwelling sites, their abundance relative to *Oceanodroma castro* was low compared to the abundances of these storm-petrels elsewhere in the Atlantic. For instance, at the eddy studied 31 July to 1 August 1984 (Fig. 2), 38% of 45 storm-petrels were *castro,* compared to 58% *oceanicus* and 4% *leucorhoa.* Leach's and Wilson's storm-petrels were common in the study area only during spring migration (May–June). The occurrence of Band-rumped Storm-Petrels in these generally oligotrophic water masses may lend support to previous speculations regarding the species as a low-density occupant of the Atlantic Ocean where other storm-petrels are scarce (Cramp and Simmons 1977, Naveen 1982).

Acknowledgments.—I thank L. Pomeroy for his generous support, including ship use 31 July to 2 August 1984. The captains and crews of the research vessels "Bluefin," "Cape Hatteras," and "Delaware II" provided assistance, as did P. Christian, G. Rogers, and S. Wainwright. H. Ansley (Georgia Dept. Natural Resources) arranged berthing on National Oceanic and Atmospheric Administration (NOAA) cruises. Logistic support was provided by the Univ. Georgia Marine Extension Service, NOAA, and Skidaway Institute of Oceanography. Financial support was received from the Univ. Georgia Dept. Zoology, Burleigh-Stoddard Fund, and NSF grant OCE8110707 to L. Pomeroy. S. McIntosh and A. Boyette drafted the figures, and S. Baig (NOAA, Miami, Florida) furnished the Gulf Stream System Flow Charts. L. Atkinson, P. McGillivary, and G. Rogers aided with discussions of the physical and biological processes at eddies. D. Ainley, K. Bildstein, and D. Lee commented on earlier drafts of this manuscript.—J. Christopher Haney, *Skidaway Institute of Oceanography, P.O. Box 13687, Savannah, Georgia 31416.* (Present address: *Dept. Zoology, Univ. Georgia, Athens, Georgia 30602.*) *Accepted 17 Apr. 1985.*

Wilson Bull., 97(4), 1985, pp. 547–551

Nest, seasonal movements, and breeding of Buffy Hummingbirds in xeric habitats of northeastern Venezuela.—The Buffy Hummingbird (*Leucippus fallax*) is restricted to the ". . .arid Caribbean littoral of Colombia in eastern Santa Marta and the Guajira Peninsula eastward along the Venezuelan coast to Sucre. . ." and some islands off northeastern Venezuela (Meyer de Schauensee, The Species of Birds of South America and their Distribution, Livingston, Narberth, Pennsylvania, 1966). The species also occurs farther inland (e.g., in the State of Lara; Phelps and Phelps, Bol. Soc. Venez. Cienc. Nat. 90:1–337, 1958). It

inhabits xerophytic areas and thorn scrub from sea level to 550 m and mangroves (Meyer de Schauensee and Phelps, A Guide to the Birds of Venezuela, Princeton Univ. Press, Princeton, New Jersey, 1978). The disjunct distribution of the three recognized subspecies (Phelps and Phelps 1958) largely corresponds to the discontinuous distribution of open xerophytic areas with bare soil, thorn scrub, and thorn forests (Anonymous, Atlas Forestal de Venezuela, Ministerio de Agricultura y Cria, Caracas, 1961; Sarmiento, J. Ecology 60: 367–410, 1972).

Although the Buffy Hummingbird is one of the commonest hummingbirds of the coastal xerophytic habitats of northern South America, little has been published about its biology apart from the observations by Robinson (Robinson and Richmond, Proc. U.S. Natl. Mus. 18:649–685, 1895) on its habitat, food, song, and nest on Margarita Island. Virtually nothing is known of the biology of any *Leucippus* other than that they inhabit scrub habitats (J. V. Remsen, pers. comm.). *L. baeri* and *L. taczanowskii* inhabit arid scrub in western Peru (Schulenberg and Parker, Condor 83:209–216, 1981), and *L. chlorocercus* apparently is restricted to early successional scrub along rivers in western Amazonia (Remsen and Parker, Biotropica 15:223–232, 1983).

From May 1965 through June 1967, we gathered data on the biology of *L. fallax richmondi,* the form that breeds in northeastern Venezuela and on Margarita Island (Phelps and Phelps 1958).

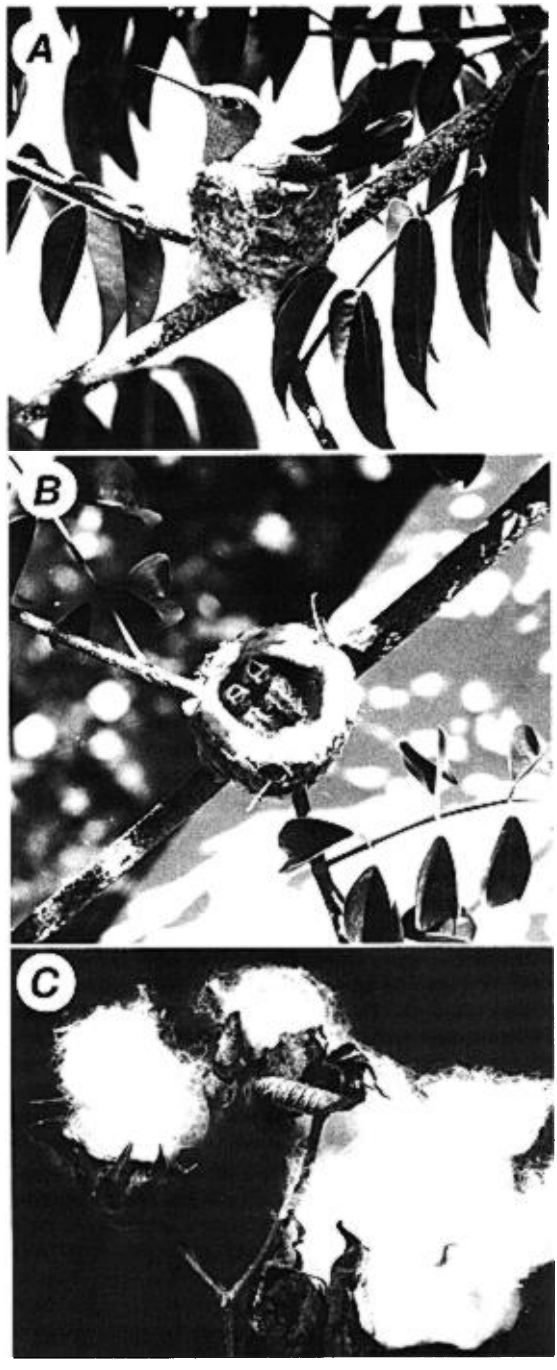
Breeding habitat.—In northeastern Venezuela, the Buffy Hummingbird breeds in cactus or thorn scrub as defined by Sarmiento (pp. 65–99 *in* Evolution of Arid Vegetation in Tropical America, D. W. Goodall, ed., Univ. Texas Press, Austin, Texas, 1976), dominated by various genera of Cactaceae (*Lemairocereus, Pereskia, Cephalocereus, Acanthocereus, Opuntia, Melocactus,* etc.) along with *Acacia* and *Prosopis* (Mimosaceae), *Parkinsonia* and *Cercidium* (Caesalpiniaceae), *Croton* (Euphorbiaceae), and *Capparis* (Capparaceae) (McNeil, unpubl.).

Nest.—Two nests were found on 25 May 1967 in Cumaná (State of Sucre). The first, containing two nestlings, was found 2 m above the ground saddled upon a branch of *Platymiscium diaphanum* (Fabaceae) near a house. The incubating bird was so fearless (see also Robinson and Richmond 1895) that it allowed itself to be photographed at a distance of 30 cm (Fig. 1A). It sat with its tail high in the air and its wings beneath the tail. When revisited 2 weeks later, the nest was empty. The second nest, which was found empty about 50 m from the first one, was in the fork of a branch 1.5 m high in a *Capparis pachaca.* Both nests were collected by the first author and were deposited in the ornithological collection of the Université de Montréal (Catalogue Nos. 01129 and 01130). At the end of November 1982, the second author found a third nest containing two nestlings. It rested on a branch of *Pithecellobium pubescens* (Mimosaceae), 2 m above the ground, in a desert close to Chacopata Lagoon, on the north side of the Araya Peninsula (State of Sucre).

The nests are hollow basket structures, i.e., typical hummingbird nests (Fig. 1A, B). The dimensions for Nos. 01129 and 01130 (Cumaná) and the Chacopata nest are, respectively: outside diameter, 3.2, 2.7 and 3.0 cm; height, 4.2, 4.0, and 4.0 cm; inside depth, 2.1, 2.0, and 2.0 cm. All three were constructed and attached to the branch with a fine, white, soft material (Fig. 1B). These fibers came from the fruit (Fig. 1C) of *Gossypium arboreum* (Malvaceae), a scrub in the bird's breeding habitat. The nest from Chacopata was covered

→

FIG. 1. Nest of Buffy Hummingbird in Cumaná, Sucre, Venezuela, 25 May 1967: (A) a side view showing an incubating bird, (B) interior view showing the material with which the nest is made and the nestlings, and (C) cotton-wool of *Gossypium arboreum.*


A
B
C

outside entirely with pieces of bark and bark lichens, apparently taken from the nest tree; the other two were covered on the outside with leaf debris and other small plant fibers and fragments, including small pieces of bark and bark lichens. The nest found by Robinson (Robinson and Richmond 1895) was ". . . saddled upon the branch of a small nettle bush only 2 feet from the ground . . ." and was also covered with lichens, although Yepez (Mem. Soc. Cienc. Nat. LaSalle 67:5–39, 1964) seems to question this.

Timing of breeding.—According to Robinson and Richmond (1895), *L. fallax* is not found where cacti do not occur in abundance, and is therefore strictly limited to the coast region. In Cumaná, Buffy Hummingbirds are present all year long in cactus or thorn scrub, but they are more abundant (No. of birds/net/day during 2-day netting periods every 2 or 3 weeks) from August to October (McNeil, unpubl.). Most individuals (38 of 46 captured birds) were in heavy molt (tail, body, and wings) from the end of July to mid-October. Brood patches were found on 6 heavily molting birds in the first half of September. These data, along with those from the 2 above-mentioned occupied nests (25 May and end of November) and that found in a similar habitat on 20 July by Robinson (Robinson and Richmond 1895), suggest that reproduction in this species is at its peak from May to the end of July and declines thereafter, but may occur on rare occasions into late November.

Seasonal movements.—In the area west of Cumaná, the cactus or thorn scrub plant formation constitutes only a narrow fringe between the sea and the thorn forest formation beginning on the lower slopes of the contiguous coastal mountains. The thorn forest is dominated by species of *Belencita* and *Morisonia* (Capparaceae), *Beureria* (Ehretiaceae), *Acacia, Capparis, Croton,* and *Pereskia* along with scattered individuals of the above-mentioned genera of Cactaceae. Floristically, the thorn scrub seems to be an impoverished thorn forest; Cactaceae, Capparaceae, Euphorbiaceae, and Momosaceae continue to be the best-represented taxa, but succulent species, particularly cacti, appear here at their optimum (Sarmiento 1976).

Buffy Hummingbirds seem to occur in coastal thorn forests mainly during the nonreproductive season. In fact, other mist-netting data obtained from May 1965 through June 1967 near Cumaná show that in that habitat *L. fallax* is absent or almost absent from May through October but is abundant from mid-October to the end of January, and then decreases thereafter until May. The Buffy Hummingbird appears to be the only trochilid species present in this habitat from the beginning of January to mid-April. Only one of 37 birds mist netted in October was molting, but 13 of 39 taken from 7 November to mid-December showed heavy molt.

These data suggest that by the end of the rainy season, which extends from mid-April to the end of November, many Buffy Hummingbirds leave the more arid xerophytic areas (thorn scrub) and move to thorn forest where they are not known to breed regularly. Several hummingbird species are known to show seasonal movements in the Neotropics (Colwell, Am. Nat. 107:737–760, 1973; Feinsinger, Ecol. Monogr. 46:257–291, 1976). The almost total absence of Buffy Hummingbirds from thorn forest between May and October coincides with the invasion of the habitat by other trochilid species (e.g., Ruby-topaz Hummingbird *Chrysolampis mosquitus,* Copper-rumped Hummingbird *Amazilia tobaci,* Blue-tailed Emerald *Chlorostilbon mellisugus,* and Rufous-breasted Hermit *Glaucis hirsuta*) which inhabit these areas during the rainy season (McNeil, unpubl.).

That pattern in *L. fallax* may also result from seasonal variations in the sources of food (see Colwell 1973). Robinson and Richmond (1895) found that Buffy Hummingbirds eat not only juice but also the flesh of the fruits of *Lemairocereus,* as well as the nectar of the waxlike, coral-red flowers of melon cactus (*Melocactus*), and the flowers of tuna (*Opuntia*) and cardones (*Lemairocereus*). Stomach-content analysis shows that from mid-October to the end of January, when cacti fruits are not available, *L. fallax* feeds on insects (B. Poulin

and G. LeFebvre, pers. comm.), which are presumably more abundant in thorn forest than in thorn scrub during the dry season.

Acknowledgments.—We thank L. J. Cumaná, K. Bhat, and the late Prof. I. Bermudez for identifying the trees and shrubs, and H. Ouellet, J. V. Remsen, and R. Zusi for providing valuable suggestions on an earlier version of the manuscript. We are also indebted to the Shell Foundation of Venezuela for providing a vehicle during the field work. Financial support was given by the Universidad de Oriente, the Université de Montréal, the Natural Sciences and Engineering Research Council of Canada, and the Ministère des Affaires Intergouvernementales du Québec.—RAYMOND MCNEIL, *Centre de Recherches Écologigues de Montréal, C. P. 6128, Succ. "A," Montréal, Québec H3C 3J7, Canada*; AND JOSÉ RAMÓN RODRIGUEZ S., *Departamento de Biología, Universidad de Oriente, Cumaná, Sucre, Venezuela.* *Accepted 31 May 1985.*

Wilson Bull., 97(4), 1985, pp. 551–554

Brood-rearing and postbreeding habitat use by Virginia Rails and Soras.—Virginia Rails (*Rallus limicola*) and Soras (*Porzana carolina*) are abundant summer residents in upper midwestern marshes. Relatively little is known of their ecology because of their secretive nature and the dense vegetation that they inhabit. Recent research has focused on their breeding habitat (Weller and Sparcher, Iowa Agric. and Home Econ. Exp. Stn. Spec. Rep. 43, 1965; Andrews, M.S. thesis, The Ohio State Univ., Columbus, Ohio, 1973; Baird, M.S. thesis, Fort Hays State College, Fort Hays, Kansas, 1974; Tacha, M.S. thesis, Fort Hays State College, Fort Hays, Kansas, 1975; Griese et al., Wilson Bull. 92:96–102, 1980; Johnson, M.S. thesis, Iowa State Univ., Ames, Iowa, 1984), but their brood-rearing and postbreeding habitat use and movements are virtually unknown. In 1982, a biotelemetry study was conducted to identify these features of their ecology.

Study area and methods.—The study was conducted on Dewey's Pasture and Spring Run Game Management Areas in northwestern Iowa. Dewey's Pasture is a 136-ha wetland complex in Clay and Palo Alto counties (Weller, Proc. Iowa Acad. Sci. 86:81–88, 1979), including 45 ha of seasonal and semipermanent marshes. Dewey's Pasture wetlands are dominated by emergent stands of cattail (*Typha glauca*), sedges (*Carex* spp.), bulrushes (*Scirpus acutus, S. fluviatilis*), and bur reed (*Sparaganium eurycarpum*). Spring Run in Dickinson County covers roughly 200 ha. Krapu et al. (Iowa State J. Res. 44:437–452, 1970) describe the upland vegetation. Marshes are dominated by cattail, sedges, bur reed, and willows (*Salix* spp.), and are flooded seasonally or semipermanently.

Incubating and brood-rearing Virginia Rails and Soras were located by walking through marshes near known rail territories (Johnson, 1984) and listening for the adult alarm calls (Kauffmann, Wilson Bull. 95:42–59, 1983). A trap consisting of a catch box (Baird, 1974) placed at the apex of a "V" formed by two leads of poultry netting was constructed near the calling adult. Rails were driven into the trap by dragging a rope weighted with rock-filled cans and jugs through the emergent vegetation toward the trap.

Captured rails were banded with U.S. Fish and Wildlife Service bands and sexed using characteristics described by Horak (M.S. thesis, Iowa State Univ., Ames, Iowa, 1964). Captured rails were equipped with AVM single-stage transmitters powered by a single Hg575 or Hg41 battery. The transmitting antenna consisted of a 15-cm stainless-steel guitar string. The entire package, encapsulated in Hysol epoxy, weighed 3.6–4.0 g. Estimated package life based on battery size and current drain of individual transmitters was 67–90 days.