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FONSECA MANGROVE RAIL: A NEW SUBSPECIES FROM HONDURAS

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ABSTRACT: Large rails were discovered in the mangroves along the Pacific coast of Honduras in 2010, and confirmed as local breeders in 2012. Their taxonomic affinity was unclear because the region is far from yet between the ranges of several other species in the Clapper Rail complex. So we collected eight specimens in July 2013, recorded their vocalizations, video-recorded a duetting pair, and documented a nest. By sequencing a portion of their mitochondrial DNA we were able to place them unambiguously within the Mangrove Rail (*Rallus longirostris*). The specimens differ in plumage, being the only Mangrove Rails with a dusky breast band and light gray edging to their back feathers. Males, at least, are significantly larger than other male Mangrove Rails. We found one base pair among 650 of mtDNA in which the Honduras specimens differ from specimens from Peru and Venezuela. Therefore, we describe this population as a new subspecies, the Fonseca Mangrove Rail (*R. l. berryorum*). This discovery extends the Mangrove Rail's known range ~1500 km northwest along the Pacific coast.

The Mangrove Rail (*Rallus longirostris* Boddaert, 1783) was split from other members of the Clapper/King rail complex by Maley and Brumfield (2013) and Chesser et al. (2014). They thought it restricted to mangroves along the Pacific and Atlantic coastlines of South America, but its distribution was unclear because of past confusion over species limits in the complex. In 2010, Robert Gallardo and Mayron Mejía first discovered large rails in the mangroves of the Gulf of Fonseca, Honduras (Jones and Komar 2011), identifying them as Clapper Rails, but under the revised classification their identification was unclear. In 2012, van Dort observed a pair with two chicks, confirming a previously overlooked population (van Dort 2013). Since the initial discovery these rails have been recorded elsewhere in the Gulf of

Fonseca in El Salvador and Nicaragua (Figure 1). From photographs and recorded vocalizations, they appeared to be closely related to the Mangrove Rail, but no specimen of this population had been collected. Part of the difficulty in identifying them is that the Gulf of Fonseca lies between the known ranges of Ridgway's (*R. obsoletus* Ridgway, 1874) and Mangrove rails but far from both (Figure 1). Therefore, we sought to collect specimens to assess the relationships of this recently discovered population.

METHODS

In July of 2013, Maley, van Dort, and Juárez surveyed two locations in the Honduran Gulf of Fonseca to assess the abundance of these birds

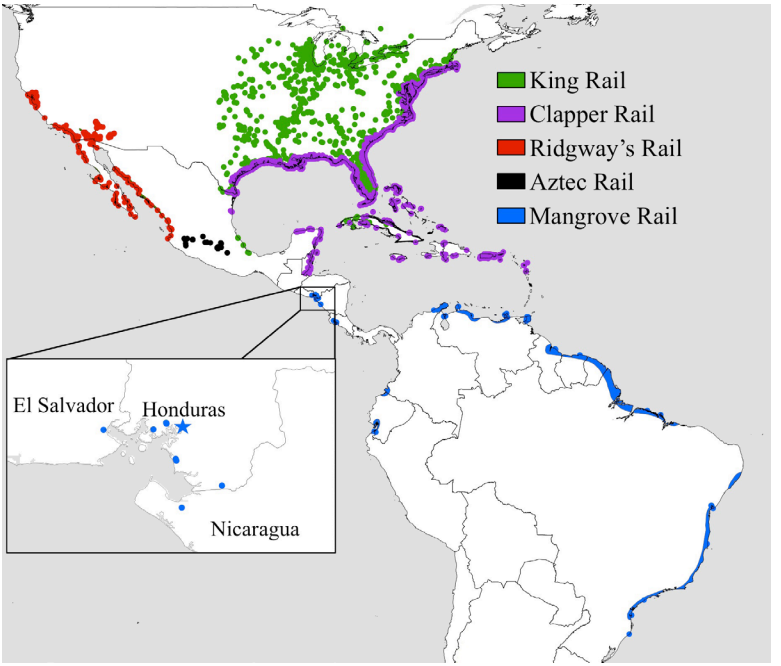

Figure 1. Distribution of five species of *Rallus* in the Americas, and in the Gulf of Fonseca (inset). Points based on sightings reported via www.eBird.org and specimens available through www.gbif.org; shapefiles were downloaded from www.natureserve.org. The inset map shows sites from which Fonseca Mangrove Rails have been reported from El Salvador, Honduras, and Nicaragua to www.ebird.org. The star denotes the type locality of *R. longirostris berryorum*. Other subspecies of the Mangrove Rail are distributed as follows: *R. l. cypereti* on the Pacific coast of South America, *R. l. phelpsi* in northeastern Colombia and northwestern Venezuela, *R. l. dillonripleyi* in northeastern Venezuela, *R. l. margaritae* on the island of Margarita off the coast of Venezuela, *R. l. pelodramus* on the island of Trinidad, nominate *R. l. longirostris* in Guyana, Suriname, and French Guiana, and *R. l. crassirostris* from the Amazon estuary south to southern Brazil (Taylor and Christie 2016).

qualitatively. We found them abundant in stands of Black Mangrove (*Avicennia germinans*) 2–3 m tall adjacent to shrimp farms and salt ponds. On 24 July, we recorded 33 individuals along a 500-m transect through dense mangrove forest adjacent to a shrimp farm. Over a two-week period, we observed an inactive nest and multiple individuals, including juveniles, at two localities. After confirming high densities in degraded habitat, Maley, with the assistance of van Dort and Juárez, collected eight specimens by air rifle or shotgun. Birds were brought out of the dense mangroves by broadcast of the vocalizations of a duetting pair recorded by van Dort (www.xeno-canto.org/127717), played repeatedly at maximum volume. Birds quickly responded vocally but often took 10 minutes or longer to emerge from the vegetation. Immediately after collecting each individual, we photographed it to document soft-part colors. All vocalizations recorded were uploaded to www.xeno-canto.org. A video of a pair of birds duetting has been uploaded to youtu.be/EFfL1ItMPHY. Specimens were prepared as round skins with tissue samples and stomach contents preserved. We collected four females and four males, two of the females being juveniles, the rest adults. All specimens were deposited in the University of Wyoming Museum of Vertebrates (UWYMV). After approximately one year of drying, Maley measured the adults' wing chord, exposed culmen, and tarsus length with a wing-chord ruler and digital calipers, and described plumage colors in comparison to specimens of all subspecies of the Mangrove Rail except *R. l. pelodramus* (there are no specimens of this form in U.S. collections) and the color swatches in Smithe (1975). Maley also measured specimens loaned from the Los Angeles County Museum of Natural History and the National Museum of Natural History. He visited the American Museum of Natural History and the Museum of Comparative Zoology, Harvard University, to measure additional specimens and compare plumages. Unfortunately, Mangrove Rails are very scarce in collections. Therefore, in statistical tests for morphological differences in males, we pooled all specimens collected away from the Gulf of Fonseca and ran two-sample *t*-tests, using the statistical package R (2016). We were unable to conduct two-sample *t*-tests for females because we only have two adult female specimens from Honduras and the test requires at least three values in each sample.

We extracted total DNA from tissues preserved in 70% ethanol with a DNeasy tissue kit (Qiagen, Valencia, CA), quantified DNA concentration with a Qubit 2.0 fluorometer (Life Technologies, Carlsbad, CA), and assessed DNA quality by gel electrophoresis. To amplify the coding mitochondrial gene NADH subunit 2 (ND2) we ran 25-µL polymerase chain reactions with 2.75 µL of 10X Standard *Taq* Reaction Buffer (New England BioLabs, Ipswich, MA), 1.0 µL of 10 mM each dNTP, 1.0 µL of each of the 10-mM primers RallusND2F and RallusND2R (Maley and Brumfield 2013), 1.0 µL of 5000 units/mL Taq DNA polymerase, 2.0 µL template DNA, and 16.25 µL double-distilled water. Thermocycler conditions were 2 minutes at 94 °C, followed by 30 cycles of 94 °C for 30 seconds, 51 °C for 30 seconds, and 72 °C for 1 minute, followed by 72 °C for 10 minutes. Completed reactions were visualized on an agarose gel by electrophoresis, then were shipped for Sanger sequencing to the Sequencing and Genotyping Core at the University of California, Los Angeles.

Raw sequence files were imported to the program Geneious version 8.0.5 (Biomatters, Auckland, New Zealand), edited, aligned to other rail genes sequenced by Maley and Brumfield (2013; GenBank KP081557–KP081624), and uploaded to GenBank. We replicated the phylogenetic analyses of Maley and Brumfield (2013), integrating the new sequences.

RESULTS

We found that the birds from Honduras were larger overall than other Mangrove Rails. Males had significantly longer wings ($P = 6.4 \times 10^{-4}$, $n = 21$), longer tarsi ($P = 1.8 \times 10^{-1}$, $n = 15$), and longer bills ($P = 1.3 \times 10^{-5}$, $n = 14$) than all other Mangrove Rails, with very little overlap (Table 1). The average mass of the four adult males from the Gulf of Fonseca was 289.4 grams with a range from 263.2 to 308.8 grams, whereas four males from the closest sampled population on the Pacific coast (*R. l. cypereti* of Ecuador and Peru) averaged 208.3 grams with a range from 190 to 230 grams (LSUMNS specimens B-66005, 66008, 67817, 67819); this difference is

Table 1 Measurements of Subspecies of the Mangrove Rail[a]

	Wing chord	Exposed culmen	Tarsus length
Males			
R. l. berryorum	144.4 [140.5–147] ± 1.6 (4)	56.5 [55.4–57.9] ± 0.7 (3)	54.3 [53.2–56.1] ± 0.9 (3)
R. l. margaritae	127.7 [121–132] ± 2.4 (3)	52.8 [50–54.4] ± 1 (3)	44.4 [42.3–46] ± 0.8 (3)
R. l. dillonripleyi	136.6 (1)	53.8 (1)	45.2 (1)
R. l. phelpsi	133 [129–135] ± 1.8 (3)	49.3 [48–51.5] ± 1.1 (3)	45.9 [42.7–49] ± 1.8 (3)
R. l. pelodramus[b]	133.3 [129–136] ± 1.4 (5)	51.8 (1)	47.5 (1)
R. l. longirostris	137.5 ± 4.5 (2)	56.5 ± 2.5 (2)	47 ± 0.5 (2)
R. l. crassirostris	138 (1)	52.5 (1)	40.5 (1)
R. l. cypereti	129.2 [126.4–132] (2)	51.7 [51.4–52] (2)	43.9 (1)
Females			
R. l. berryorum	136 [136–136] (2)	49.4 [49.2–49.6] (2)	47.2 [47–47.4] (2)
R. l. margaritae	115.9 [109.5–120] ± 2.6 (4)	49.4 [48–51.5] ± 0.9 (4)	42.3 [39.6–44] ± 1 (4)
R. l. dillonripleyi	121.3 (1)	49.9 (1)	43.4 (1)
R. l. phelpsi	120 [113.9–125] ± 3.2 (3)	46.7 [45.1–48] ± 0.9 (3)	42.6 [39.7–45] ± 1.5 (3)
R. l. longirostris	128.5 ± 2.5 (2)	49.5 ± 3.5 (2)	44.8 ± 2.3 (2)
R. l. crassirostris	129.2 [120–132.9] ± 3.1 (4)	46.9 [46–48] ± 0.4 (4)	39.6 [34.6–44] ± 2 (4)
R. l. cypereti	118.3 [115.5–121] (2)	49.6 [49.2–50] (2)	41.4 (1)

[a]In millimeters, presented as mean [range] ± standard error (sample size). Standard error omitted for samples of fewer than three specimens. Measurements for taxa other than *R. l. berryorum* are from Ripley (1977) or made by Maley.

[b]Only males of *Rallus longirostris pelodramus* have been collected.

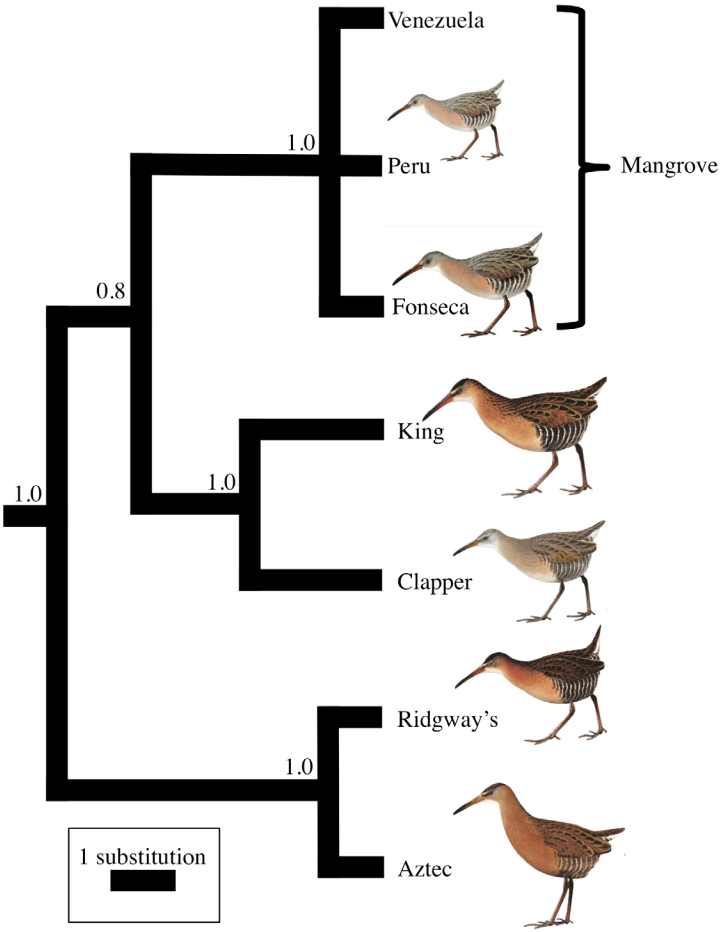

Figure 2. Maximum-clade-credibility tree based on the gene ND2, generated from the same sequences as in Maley and Brumfield (2013) and inferred in the program Beast (Drummond and Rambaut 2007). The tree was generated from mitochondrial DNA data only, with sample sizes as follows: 15 Mangrove Rails (including eight from Honduras, six from Peru, and one from Venezuela), 16 King Rails, 32 Clapper Rails, eight Ridgway's Rails, and five Aztec Rails. Each species except the Mangrove Rail is collapsed into a single node for clarity. Posterior probabilities are shown above the nodes. The length of the scale bar represents one base substitution. Samples of the Virginia Rail (not shown) served as the outgroup. Drawings used with permission from HBW Alive (del Hoyo et al. 2016).

significant (P = 0.001). Two females from the Gulf of Fonseca were also larger, with masses of 235.6 and 238.8 grams, while two females from Peru weighed 200 and 210 grams (LSUMNS B-67818, 67820). Mass was not available from any other subspecies, as to our knowledge this variable has

Figure 3. Typical Black Mangrove (*Avicennia germinans*) forest along the edge of the Gulf of Fonseca. This photograph was taken at the type locality for *Rallus longirostris berryorum* (13.4062° N, 87.3746° W).

Photo by John van Dort

Figure 4. Dorsal and ventral comparison of the holotype of *Rallus longirostris berryorum* (left; UWYMV 2768) with an adult male specimen of *R. l. phelpsi* (right; USNM 368582).

Photo by James M. Maley

not been recorded for any other collected specimens of the Mangrove Rail.

The duets of the Fonseca birds sound very different from those of other North American species of *Rallus* but similar to recordings of the Mangrove Rail from Peru. The Fonseca population does not have a grunt call typical of other members of the genus, and its duets consist of repeated *kek-burr* calls, sometimes with a double stuttered *kek* preceding each *burr*. Sometimes one member of the pair *keks* repeatedly while the other responds with *kek-burrs*. These duets can last from 10 seconds to a minute or longer. Unfortunately, the complexity of the vocalizations does not lend itself to quantitative analyses, but qualitatively there is nothing distinct about the vocalizations of the birds from Central America with respect to those from South America.

The sequence of the mitochondrial gene analyzed implied that the Honduras birds are most closely related to Mangrove Rails from Venezuela and the region of Tumbes in Peru, having one unique single-nucleotide polymorphism across 650 base pairs of the gene ND2. When we reconstructed the phylogeny we recovered a well-supported clade comprising Venezuelan, Peruvian, and Honduran birds (Figure 2).

The Gulf of Fonseca population may now be described as

Rallus longirostris berryorum new subspecies

Holotype

Adult male, UWYMV:Bird:2768 (frozen tissue B-803); collected by James M. Maley (JMM 1583) on 24 July 2013, 1.73 km south-southwest of El Laure, at the upper end of the Bahía de San Lorenzo, Departamento Valle, Honduras; 13.4061° N, 87.3745° W, elevation 2 m. Duet with its presumed mate recorded and archived at www.xeno-canto.org/143338. Mass 295.8 grams, light body fat, no bursa of Fabricius, left testis 18 × 8 mm; stomach contained crushed invertebrate shells (saved), skull 100% ossified, moderate body molt, collected in low, scrubby Black Mangrove (*Avicennia germinans*) adjacent to a tidal canal (Figure 3).

Paratypes

Seven additional specimens collected from 23 to 27 July 2013, one at the type locality and six at two different salineras near El Caimito, ~3 km west of San Lorenzo (13.4331° N, 87.4847° W and 13.4247° N, 87.4825° W). Two juvenile females, UWYMV:Bird:2766, tissue B-801, on 23 July, and UWYMV:Bird:2770, tissue B-805, on 27 July. Two adult females on 27 July, UWYMV:Bird:2769, tissue B-804, and UWYMV:Bird:2773, tissue B-807. Three additional adult males, UWYMV:Bird:2767, tissue B-802 on 23 July, and two others on 27 July: UWYMV:Bird:2771, tissue B-806, and UWYMV:Bird:2772, tissue B-806.

Diagnosis

In comparison to other populations of the Mangrove Rail, *R. l. berryorum* is most similar in plumage to *R. l. phelpsi* but differs in having a lighter tawny lower breast, a vague dusky band across the upper breast, gray rather than brown cheeks, and margins to the back feathers light gray rather than brown (Figure 4). The Honduras birds are also similar in plumage to specimens of *R. l. cypereti* and nominate *R. l. longirostris* but have a dusky breast band and

light gray rather than brown-edged back feathers. The Honduras specimens are much paler than specimens of *R. l. margaritae* and *R. l. dillonripleyi*, both dorsally and ventrally. The plumage pattern is similar to that of other members of the Clapper Rail complex, with boldly barred flanks, back feathers having dark centers and lighter edges, and the breast some shade of buff or rufous. The breast is less rufous than in the King, Ridgway's, or Aztec rails, but brighter than in *R. crepitans crepitans*. Of all specimens examined, Honduras birds most closely resembled Clapper Rails of the subspecies *R. c. leucophaeus* from the Isla de la Juventud (Isle of Pines), Cuba. Specimen MCZ 80748 (Museum of Comparative Zoology, Harvard University) of that subspecies closely matched the holotype of *R. l. berryorum* in size and plumage except for having a more extensive dusky breast band, darker gray edging on the back feathers, and warmer brown in the crown and centers of back feathers. Honduras birds were quite different from the closest populations of Clapper Rails on the Yucatan Peninsula in Mexico and Belize. Specimens of *R. c. pallidus* of the Yucatan Peninsula of Mexico had a similar shade of tawny breast, but lacked a dusky breast band and had the wing coverts rufous rather than brown, the face paler gray, the flank barring paler brown, and the crown and back feathers, especially their centers, much paler. The only specimen of *R. c. belizensis*, MCZ 119747, and photographs in the Macaulay Library (ML) from coastal Belize (ML33475091, ML33475151, ML33475161, ML33475181), reveal that these birds are darker than the Honduras birds, with dark brown centers and brownish-gray edges to their back feathers. They have a darker gray cheek and brighter tawny breast, and do have a dusky breast band. The only known recordings of their *kek* calls (ML33427181, ML33436591) suggest that they belong with *R. crepitans*, not *R. longirostris*, but this requires further study.

In this description of the holotype, which is in mostly fresh plumage, capitalized colors are from Smithe (1975), with the color number in parentheses. Crown Dusky Brown (19), supraloral stripe Cream Color (54), lores Dark Neutral Gray (83), throat white, cheeks Dark Neutral Gray (83) extending slightly down neck, upper breast Smoke Gray (45), lower breast Cinnamon (39), belly and undertail coverts white, flanks thickly barred white and Fuscous (21), leg feathers white and Fuscous (21), back feathers Dusky Brown (19) and edged with Medium Neutral Gray (84), primary coverts light brown but very worn, tail Fuscous (21). Iris bright orange, maxilla dark brown with bright orange base, mandible bright orange with brown tip, legs bright orange (Figure 5). Specimens other than the holotype were molting more heavily. In 650 base pairs of the mitochondrial gene ND2, *berryorum* has one apparently fixed nonsynonymous substitution in which it differs from sequences of birds from South America (Figure 2). At base 502 all eight Honduras specimens have a cytosine, whereas Peruvian and Venezuelan birds have a thymine.

Etymology

This subspecies is named in honor of Robert and Carol Berry, who have made significant contributions to avian conservation, particularly of Central American birds, and citizen science via www.eBird.org. We suggest the common name Fonseca Mangrove Rail, to reflect the known distribution of this taxon.

Figure 5. A Fonseca Mangrove Rail at a shrimp farm ~2 km southeast of Cedeño, Departmento Choluteca, Honduras, 13 August 2013.

Photo by John van Dort

Habitat

The Fonseca Mangrove Rail appears to be most common in low, scrubby Black Mangroves, although it is sometimes also found in taller mangrove forest (Figure 3). We encountered Fonseca Mangrove Rails at many localities where low mangrove scrub bordered on shrimp ponds or salt ponds, and observed them foraging and reproducing in small strips of mangrove scrub inside these areas. Worldwide, mangrove forests are among the most highly threatened ecosystems. While the mangrove forests of the Gulf of Fonseca are under threat of deforestation from aquaculture, our observing high densities of Fonseca Mangrove Rails near aquaculture suggests that the

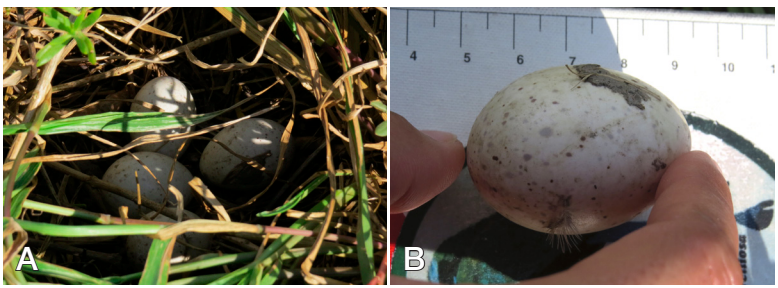

Figure 6. (A) Mangrove Rail nest with four eggs and (B) one egg in hand for representation of size.

Photos by John van Dort

subspecies is relatively tolerant of habitat alteration, as are other members of the Clapper Rail complex.

Nest

On 23 July 2013, a shrimp-farm custodian alerted Maley and van Dort to an inactive nest at the edge of a levee and a strip of Black Mangrove scrub 5 m wide within a shrimp farm 1.5 km west of San Lorenzo, Departamento Valle. The nest was placed inside dense mangroves 1 m tall with a natural, unmodified canopy of thick vegetation. The nest was loosely constructed with vegetative matter approximately 50 cm above the ground. We collected eggshell remains from the nest, which are deposited at UWYMV. On 13 August 2013 van Dort and Juárez found an active nest containing four eggs, also in a shrimp farm, 2 km southeast of Cedeño, Departamento Choluteca (Figure 6A). This nest was located in a strip of short, Black Mangrove scrub, 1.5 m wide and 50 cm tall, mixed with grasses on a levee. The clutch may not have been complete, as incubation had not started. The eggs were whitish with small dusky-brown spots and smudges. One egg measured 44 × 33 mm (Figure 6B).

Molt

All eight specimens collected during the last week of July were undergoing body molt, even while actively nesting. None of the adults was in the flightless stage of wing molt. One of the juveniles (UWYMV 2766) was at the beginning

Figure 7. Juvenile Fonseca Mangrove Rail at Salinera La Ostia near San Lorenzo, Departamento Valle, Honduras, 23 July 2013.

Photo by John van Dort

stages of growing primaries and secondaries, with a large bursa and a short bill (38.8 mm versus an average of 49.4 mm for the two adult females). Figure 7 shows a bird in fully juvenile plumage. The breast is much more extensively tawny in UWYMV 2766, suggesting wide variation in the juvenile plumage or possibly a rapid transition from juvenile to adult plumage.

DISCUSSION

It is surprising that in Central America a large population of birds could go undiscovered by ornithologists for so long. While rails are secretive and often difficult to see, these birds are very noisy and live in close proximity to humans. We asked a local shrimp farmer (~75 years old) about the rails, and he claimed to have known them all of his life, suggesting that this population does not represent a very recent range expansion. The Fonseca population appears to occur in mangroves around the entire gulf, including the Nicaraguan and Salvadoran parts (Figure 1). In El Salvador, Mangrove Rails were first discovered by Juárez, van Dort, and Oliver Komar on 6 April 2013, documented by a recording (www.xeno-canto.org/128920). In Nicaragua, they were first discovered on 10 November 2012 (van Dort 2013).

The species was first reported from the Pacific coast of Costa Rica on 16 June 1997 (Sandoval et al. 2010), surprisingly recently given how heavily that country is birded relative to Honduras. The first nest for Costa Rica was discovered in 2015 and described by Garrigues and Garrigues (2016); it was very similar to the nest we discovered. In the field, Costa Rica birds look and sound like Honduras birds, but it is not clear if they are more similar morphologically to the Fonseca population or to some South American population. Specimens are needed to determine if the disjunct Costa Rica population differs morphologically or genetically.

The large rails of the Gulf of Fonseca are confirmed as Mangrove Rails through morphology, vocalizations, and DNA sequences. They represent a new allopatric subspecies substantially larger than the Mangrove Rails of South America and have one unique nucleotide of mtDNA. Their discovery should result in addition of the Mangrove Rail to the American Ornithologists' Union Check-list of North American Birds and extends the known distribution of this species ~1500 km northwest along the Pacific coast.

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LITERATURE CITED

Chesser, R. T., Banks, R. C., Cicero, C., Dunn, J. L., Kratter, A. W., Lovette, I. J., Navarro-Sigüenza, A. G., Rasmussen, P. C., Remsen, Jr., J. V., Rising, J. D., Stotz, D. F., and Winker, K. 2014. Fifty-fifth supplement to the American Ornithologists' Union *Check-list of North American Birds*. Auk 131:CSi–CSxv.

Del Hoyo, J., Elliot, A., Sargatal, J., Christie, D. A., and de Juana, E. (eds.). 2016. Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona; www.hbw.com.

Drummond, A. J., and Rambaut, A. 2007. Beast: Bayesian evolutionary analysis by sampling trees. BMC Evolutionary Biology 7:214.

Garrigues, R., and Garrigues, L. 2016. First documentation of Mangrove Rail *Rallus longirostris* breeding in Costa Rica. Cotinga 38:33–34.

Jones, H. L., and Komar, O. 2011. Central America. N. Am. Birds 65:174–181.

Maley, J. M., and Brumfield, R. T. 2013. Mitochondrial and next-generation sequence data used to infer phylogenetic relationships and species limits in the Clapper/King rail complex. Condor 115:316–329.

R Core Team. 2016. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria.

Ripley, S. D. 1977. Rails of the World: a Monograph of the Family Rallidae. M. F. Feheley, Toronto.

Sandoval, L., Sánchez, C., Biamonte, E., Zook, J. R., Sánchez, J. E., Martínez D., Loth, D., and O'Donahoe, J. 2010. Recent records of new and rare bird species in Costa Rica. Bull. Br. Ornithol. Club 130:237–245.

Smithe, F. B. 1975. Naturalist's Color Guide. Am. Mus. Nat. Hist., New York.

Taylor, B., and Christie, D. A. 2016. Mangrove Rail (*Rallus longirostris*), in Handbook of the Birds of the World Alive (J. del Hoyo, A. Elliot, J. Sargatal, D. A. Christie, and E. de Juana (eds.), Lynx Edicions, Barcelona; www.hbw.com/node/53619.

Van Dort, J. 2013. Clapper Rail breeding in Honduras. El Esmeralda 2:23–26.

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