

## ECOLOGICAL NOTES ON MIXED POPULATIONS OF KING RAILS AND CLAPPER RAILS IN DELAWARE BAY MARSHES

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THE closely related King Rail (*Rallus elegans*) and Clapper Rail (*Rallus longirostris*) are characteristic of distinct types of habitat in the coastal plain along the Atlantic and Gulf coasts. Ordinarily, King Rails are found in both fresh and brackish tidal marshes, and Clapper Rails in tidal salt marshes. In a few areas, however, intermediate brackish-salt marshes occur where King and Clapper rails may be found together.

Robert E. Stewart (pers. comm., 3 May 1960) observed a King Rail and Clapper Rail together with a brood at Chincoteague Island on the coast of Virginia in June 1951. Also, on numerous occasions he has observed King and Clapper rails together in the same tidal marsh along Ape Hole Creek, a tributary of Pocomoke Sound, Somerset County, Maryland. In April 1956 Meanley collected a King Rail and a Clapper Rail from the same small pond at Grand Chenier, Cameron Parish, Louisiana. In this area, the narrow chenier (stranded rim of the sea) serves as a partial barrier between the fresh and salt marsh so that these two species of rails merely have to walk a hundred meters or so to be together.

Ivan R. Tomkins (*The Birdlife of the Savannah River Delta*, Occ. Publ. No. 4, Ga. Orn. Soc., 68 pp., 1958) found a similar situation on the south Atlantic coast near Savannah, Georgia. He writes: "This brackish area, a place of transition from fresh to salt, has some peculiar situations in respect to bird habitats. In the middle of Elba Island I have seen both King and Clapper rails on territory so close together that both birds were in view at the same time."

On 18 May 1960 Meanley, accompanied by John S. Webb, biologist at the Patuxent Wildlife Research Center, observed a King Rail and Clapper Rail together in a brackish tidal marsh along the Delaware bay near Fleming's Landing, Kent County, Delaware. Meanley observed the mated pair on its nesting territory on numerous occasions thereafter, and collected them on 11 June. The eggs of the pair were collected on this date by Wetherbee. This clutch of eggs was a replacement clutch, as the first clutch produced by this pair was destroyed by a predator.

Subsequent observations revealed that King and Clapper rails occurred together, commonly in the brackish bay marshes of the Taylor's Gut area between Fleming's Landing and Woodland Beach. This extensive marsh area is known as the Broadway Meadows.

Specimens for plumage study and water samples for salinity determination were collected at three stations in the study area; plant composition was studied at the same places. The stations were: the upper reaches of



Figure 1. Breeding habitat of King and Clapper rails in Broadway Meadows, Kent County, Delaware. (Photograph by Frederick C. Schmid.)

TABLE 1  
SALINITY DETERMINATIONS AT THREE STATIONS IN BROADWAY MEADOWS

<i>Fleming's Landing</i>	<i>Taylor's Gut</i>	<i>Woodland Beach Causeway</i>
Low tide — 4,380 ppm*	Low tide — 7,190 ppm	Low tide — 7,600 ppm
High tide — 3,700 ppm*	High tide — 5,670 ppm	High tide — 7,480 ppm

\* Sea strength is 32,000–35,000 parts per million.

the brackish marsh at Fleming's Landing, where only King Rails were collected or observed; the outer brackish marsh at Woodland Beach on the Delaware Bay, where only Clapper Rails were observed; and the intermediate area between these two stations at Taylor's Gut, where both species occur. Bird specimens were collected during the months of May, June, and July 1960 and 1961. Sight records referred to in the text were made at distances of less than 15 meters. Water samples were collected in June 1960 at high and low tides. Salinity determinations were made by the Section of Biochemical Investigations at the Patuxent Wildlife Research Center, Laurel, Maryland (Table 1). The plant composition of habitats was based on percentage estimates made in five, three-meter-square (10-foot-square) quadrats at each station (Table 2).

#### CHARACTERISTICS OF HABITATS

The section of marsh at Taylor's Gut, where the mixed populations of rails occur, appears to be more typical of the usual habitat of Clapper Rails than of King Rails. The predominant vegetation is saltmarsh cordgrass (*Spartina alterniflora*) and saltmarsh bulrush (*Scirpus robustus*). Hightide-bush (*Iva frutescens*) borders the tidal guts.

Approximately 3.2 km landward, at Fleming's Landing, only King Rails were observed, and they were quite common. The salt meadow marsh type (*Spartina patens* and *Distichlis spicata*) is dominant at this station. Occasional patches of Olney's three-square (*Scirpus olneyi*), big cordgrass

TABLE 2  
PLANT COMPOSITION AT THREE STATIONS IN BROADWAY MEADOWS

<i>Fleming's Landing</i> (King Rails only)		<i>Taylor's Gut</i> (King and Clapper rails)		<i>Woodland Beach</i> <i>Causeway</i> (Clapper Rails only)	
<i>Spartina patens</i>	50%	<i>Spartina alterniflora</i>	50%	<i>Spartina alterniflora</i>	70%
<i>Scirpus olneyi</i>	25%	<i>Scirpus robustus</i>	30%	<i>Scirpus robustus</i>	20%
<i>Spartina alterniflora</i>	15%	<i>Iva frutescens</i>	10%	<i>Spartina cynosuroides</i>	10%
<i>Spartina cynosuroides</i>	5%	<i>Spartina cynosuroides</i>	10%		
<i>Iva frutescens</i>	5%	<i>Spartina patens</i>	tr.		
<i>Baccharis halimifolia</i>	tr.	<i>Distichlis spicata</i>	tr.		

(*Spartina cynosuroides*), and saltmarsh cordgrass are distributed through the marsh. Hightide-bush borders the tidal guts.

Approximately 3.2 km toward the Bay from the intermediate marsh, along the Woodland Beach Causeway, Clapper Rails are abundant. King Rails were not observed. Saltmarsh cordgrass and saltmarsh bulrush are the dominant vegetation at this station. Hightide-bush is absent in this marsh. This station is only 1.6 km from Delaware Bay.

Breeding birds in the Taylor's Gut area, in addition to the King and Clapper rails, are: Least Bittern (*Ixobrychus exilis*), Black Duck (*Anas rubripes*), Long-billed Marsh Wren (*Telmatodytes palustris*), Red-winged Blackbird (*Agelaius phoeniceus*), Seaside Sparrow (*Ammodramus maritima*), and Song Sparrow (*Melospiza melodia*). Raccoons (*Procyon lotor*) and Muskrats (*Ondatra zibethica*) are common. The Red-jointed Fiddler Crab (*Uca minax*) and a clam (*Macoma balthica*) are abundant in the tidal guts, and form the main food of the rails.

#### SPECIMENS COLLECTED AND BIRDS OBSERVED

*Intermediate area (Taylor's Gut)*. 1960: The mated subadult female King Rail and adult male Clapper Rail referred to above were collected on 11 June. A subadult female King Rail was collected on 30 June. An adult Clapper Rail was collected on 25 June. Two separate King Rails and a pair of Clapper Rails were seen but not collected on 30 June. 1961: An adult female of a Clapper Rail pair and an adult male King Rail were collected on 13 May. One King Rail and three individual Clapper Rails were observed on 13 May.

*Landward brackish tidal marsh (Fleming's Landing)*. 1960: A subadult (?) male King Rail was collected on 28 May. One King Rail was seen on 11 June, and another on 25 June. No Clapper Rails were observed this far up the Smyrna River. 1961: A male King Rail was collected and a King Rail pair was observed on 13 May.

*Delaware Bay brackish marsh (Woodland Beach Causeway)*. 1960: An adult male Clapper Rail was collected on 11 June. Twelve typical Clapper Rails were observed between 11 June and 7 July. 1961: Five Clapper Rails were observed on 13 May, and two on 3 June.

#### INCUBATION OF EGGS

The five eggs of the mated King Rail and Clapper Rail pair collected 11 June 1960 were placed in an incubator. The embryos died between the 17th and 19th day of incubation.

Despite the fact that optimal incubation conditions were maintained (64 per cent relative humidity and 37.8° C forced draft; cf. Wetherbee, *Artificial Incubation of Wild Birds' Eggs and Developmental Condition of*

*Neonates*, pp. 1-153, University Microfilms, Ann Arbor, Michigan, 1959), the death of the embryos of the mixed pair is believed to be accidental rather than indicative of genetic incompatibility. The embryos appeared to be normal.

#### PLUMAGES

All specimens collected appear to be typical of their species. No variation in plumage was observed that would suggest hybridization or intergradation.

#### DISCUSSION

Due to the paucity of information on the distribution and ecology of the King Rail, there has been some misunderstanding of the habitat in which this species occurs. From accounts in the literature, generally we are led to believe that the King Rail inhabits only fresh-water marshes. Recent observations, however, indicate that in some coastal-plain marshes only King Rails occur in what appears to be prime Clapper Rail habitat.

In addition to the localities mentioned, there are undoubtedly other such areas in brackish marshes of the Atlantic and Gulf Coastal plains where mixed populations of King Rails and Clapper Rails occur. In fact, virtually any Atlantic Coastal Plain embayment that has extensive brackish marshes, particularly where fiddler crabs occur, is a potential King Rail and Clapper Rail mixing ground. Similar conditions occur in the Louisiana coastal marshes, especially in the vicinity of cheniers.

The King Rail-Clapper Rail relationship in the Broadway Meadows where the above observations were made has undoubtedly existed for a long time. We plan further study to attempt to interpret the taxonomic significance of this situation.

#### SUMMARY

King and Clapper rails may be found together in certain brackish marshes of the Atlantic and Gulf coasts. Several records of mixed pairs are cited. The eggs of a mixed pair found in a Delaware brackish marsh were placed in an incubator. The embryos died between the 17th and 19th day of incubation (incubation period approximately 22 days).

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