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RECENT BREEDING RECORDS AND STATUS REVIEW OF THE RUDDY DUCK (*OXYURA JAMAICENSIS*) ON ST. CROIX, U. S. VIRGIN ISLANDS

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Abstract: The Ruddy Duck (*Oxyura jamaicensis*) has previously nested once on St. Croix, United States Virgin Islands, during the first half of the 20th century at Rust-op-Twist Salt Pond. We document recent breeding records (2005-2006) of the Ruddy Duck on St. Croix, at Southgate Pond. These breeding records strengthen the argument that Southgate Pond, and formerly Rust-op-Twist, are the two most productive seasonal salt ponds on St. Croix for rare waterbirds.

Key words: breeding record, nests, non-breeding status, *Oxyura jamaicensis*, Ruddy Duck, St. Croix, salt pond, Southgate Pond, subspecies, surveys, US Virgin Islands, waterbirds

Resumen: REGISTROS RECIENTES DE CRÍA Y REVISIÓN DEL ESTADO DE *OXYURA JAMAICENSIS* EN SAN CROIX, ISLAS VÍRGENES DE EEUU. El Pato Chorizo (*Oxyura jamaicensis*) ha nidificado una vez anteriormente en San Croix, Islas Vírgenes de EEUU, durante la primera mitad del siglo 20 en Rust-op-Twist Salt Pond. Documentamos registros recientes de cría (2005-2006) del Pato Chorizo en Southgate Pond, San Croix. Estos registros apoyan fuertemente que Southgate Pond, y anteriormente Rust-op-Twist, son dos de los humedales estacionales más productivos en San Croix para especies de aves acuáticas raras.

Palabras clave: aves acuáticas, estado no reproductivo, humedal, muestreos, nidos, Islas Vírgenes de EEUU, *Oxyura jamaicensis*, registros de cría, San Croix, Southgate Pond, subespecie

Résumé : OBSERVATIONS RÉCENTES DE NIDIFICATION DE L'ERISMATURE ROUSSE À ST. CROIX, ILES VIERGES AMÉRICAINES. L'Erismature rousse (*Oxyura jamaicensis*) avait niché une seule fois à St. Croix, Iles Vierges Américaines, dans la première moitié du 20 ème siècle à Rust-op-Twist Salt Pond. Nous fournissons des données récentes de nidification (2005-2006) de l'espèce à St. Croix, Southgate Pond. Ces observations appuient l'hypothèse que Southgate Pond, et autrefois Rust-op-Twist, sont les deux salines temporaires les plus riches à St. Croix pour les espèces rares d'oiseaux d'eau.

Mots-clés : Erismature rousse, études, Iles Vierges américaines, nidification, nids, oiseaux d'eau, statut non nicheur, *Oxyura jamaicensis*, St. Croix, saline, Southgate Pond, sous-espèce

NEWTON AND NEWTON (1859; see Wetmore 1927) probably first reported Ruddy Ducks (*Oxyura jamaicensis*; rather than the Masked Duck *Nomonyx dominicus*) on St. Croix at Southgate Pond during spring 1857 (9 March to 15 June), when in May as many as 20-25 birds were seen, the largest number reported in the United States Virgin Islands. Other than at Rust-op-Twist Salt Pond, Seaman (1973, 1993) also stated that Ruddy Ducks were "fairly common" at Southgate Pond in the 1920s. Ruddy Ducks have regularly occurred at Southgate Pond (Beatty 1930, Danforth 1935), although with only three reports they were scarce there and at another site (Granard South Pond, a man-made freshwater pond) on St. Croix during the 1980s (Norton 1984, 1987, Sladen 1992, Sladen unpubl. data).

The Ruddy Duck (*O. j. jamaicensis*) has previously nested once on St. Croix, during the first half of the 20th century at Rust-op-Twist Salt Pond where Seaman (1973) stated it was "fairly common" during the 1920s, probably when a nest with seven very large eggs was discovered (Seaman 1993). Ruddy Ducks also nested in "small numbers" from 1936-1943 in the northern U. S. Virgin Islands at salt ponds on some of the cays, the St. Jameses cays and Dog Island (Nichols 1943); Nichols observed adults with dependent young on several occasions and he reported second-hand information from fishermen that as many as twelve eggs were laid in a clutch.

We recently documented breeding records of rare and uncommon waterbirds on St. Croix (McNair *et al*. 2005, 2006). Of 24 species of waterbirds that have nested at least once on St. Croix since the late

1850s (excluding three extirpated species), we failed to confirm only one species since 2002, the Ruddy Duck. Therefore, we document herein recent breeding records (2005-2006) of the Ruddy Duck from St. Croix at Southgate Pond, the first in the U. S. Virgin Islands since the first half of the 20th century. This information includes the first detailed description of Ruddy Duck nests in the Caribbean. We also review available taxonomic information, even though subspecies designations are disputed, and provide additional information on their current non-breeding status on St. Croix since 2002.

STUDY AREA AND METHODS

Southgate Pond (17°45'29.6"N, 64°39'45.9"W) is the largest (17.9 ha) seasonal brackish pond on St. Croix, U. S. Virgin Islands. Most manglars (islets of one or more manglars without solid land) occur in the eastern end of this mangrove-ringed pond, which has little emergent herbaceous vegetation (see McNair and Cramer-Burke 2006 for a detailed site description). The water level decline was nearly constant throughout the study period in 2005 ($\bar{x}$ = 0.58 cm/d; McNair and Cramer-Burke 2006). We obtained monthly salinity measurements at Southgate Pond by using a temperature-compensated refractometer (accurate to within ± 1 ppt).

Bimonthly counts and nest surveys of Ruddy Ducks in 2005 otherwise roughly followed protocols for coots (*Fulica* spp.) in McNair and Cramer-Burke (2006), but ground surveys in 2006 were less frequent and more opportunistic. Ruddy Duck nests were marked with numbered flagging and the location of each nest was recorded with a global positioning system (GPS) unit. After adjusting for steadily falling water levels, water depth below the nest for nests in 2005 was adjusted to the estimated date of clutch initiation. For abandoned nests that still contained clutches, we crudely estimated dates of clutch initiation by backdating from the time the lowest eggs in the clutch must have been just above water level, allowing for one egg laid per day and an incubation period of 23-24 d (Brua 2002). Ruddy Ducks require access to nests at or just above water level because they are helpless on land (Brua 2002). We also crudely estimated the date of clutch initiation from the age of young, assuming juvenile plumage is complete at 8-9 wk and young first fly between 7.5-9.5 wk post-hatch (Hochbaum 1944, Siegfried 1973, Joyner 1977a). For nests and broods in 2006 we simply present breeding information from the dates of discovery.

The bright plumage of adult male ducks was traditionally considered to represent alternate plumage, which is derived from the prealternate molt (e.g., Humphrey and Parkes 1959, Palmer 1972, 1976). However, Pyle (2005) recently provided evidence that bright male (and female) plumage is derived from the prebasic rather than prealternate molt, and should be considered to represent basic plumage. Pyle (2005) noted that the Ruddy Duck is the one exception where the bright plumage is the alternate plumage; thus, our terms for molt are consistent with both the traditional and alternative interpretations.

RESULTS

Ruddy Ducks were first observed at Southgate Pond during autumn 2004 on 14 October, when birds were in basic plumage, but by late November birds were in alternate plumage (Table 1). In 2005, we observed three flightless young accompanied by an adult female along the west end of Southgate Pond from 22 March to 9 April 2005, when the young were mostly feathered (ca. 60% grown). We discovered three abandoned clutches of seven, 10, and 12 eggs (Fig. 1) nestled at the bottom of bowl-shaped bases of dense "peg roots" (Jenik 1967) of white mangroves (*Laguncularia racemosa*) from 30 March to 6 April. The approximate clutch initiation dates for these three clutches were probably 1-25 February, when the salinity at Southgate Pond was 5-6%. The nests did not contain any nest materials and were placed away from the shoreline in separate areas of the largest clump of manglars (see McNair and Cramer-Burke 2006), which had greater overhead cover and reduced light infiltration compared to other manglars at Southgate Pond. The mean nearest internest distance was 6.49 m (range: 2.55-8.53 m). Water depth (from the bottom of the lowest eggs in each nest to the pond bottom) when egg-laying was probably initiated was approximately 38, 25, and 23 cm for each nest. Up to 13 adult Ruddy Ducks of both sexes (seven males, six females including the adult with young) in full alternate plumage were present at Southgate Pond when the water was turbid and submerged aquatic vegetation scarce. The three young were not seen at Southgate Pond after 9 April, but were soon located thereafter at Granard South Pond. Some adults remained at Southgate Pond through 6 July.

Ruddy Ducks were first observed at Southgate Pond during autumn 2005 on 17 December, when birds were in alternate plumage. We discovered four abandoned nests with incomplete clutches in white mangroves at Southgate Pond in 2006. The first nest was discovered on 28 January in the same large

Table 1. Occurrences of Ruddy Duck (*Oxyura jamaicensis*) on St. Croix, United States Virgin Islands, from 2002 to June 2006.

Site	Habitat	Year	Date(s)	No. of months	No. of birds	Sex	Age	Plumage
Fredensborg Pond	Fresh	2002	23 Feb	1	5	?	?	basic
Fredensborg Pond	Fresh	2002	24 Jun	1	1	M	ad	alternate
Granard South Pond	Fresh	2002	13 Jul–2 Sep	2	1	F	?	?
Fredensborg Pond	Fresh	2003	13-28 Jan	1	1-2[a]	M, F	ad	alternate
Fredensborg Pond	Fresh	2003	27 Apr	1	1	M	?	?
Fredensborg Pond	Fresh	2003	1 Jun	1	1	F	?	?
Southgate Pond	Brackish	2004	25-31 Jan	1	1	F	imm	basic I
Fredensborg Pond	Fresh	2004	25 Feb–25 Mar	1	1	M	ad	alternate
Granard South Pond	Fresh	2004	3 Apr–10 Jul	3	1-3[b]	3M, 1F	ad	alternate
Schuster Lower Pond	Fresh	2004	5 Aug–2 Oct	2	1-2	M, F	ad	basic (M)
Southgate Pond	Brackish	2004-2005	14 Oct–6 Jul	9	2-13	7M, 6F	ad, ?	alternate[c]
Diamond Pond	Fresh	2004	19 Dec	1	1	M	ad	alternate
Granard South Pond	Fresh	2004	30 Dec	1	1	M	ad	alternate
Fredensborg Pond	Fresh	2005	31 Jan	1	1	M	ad	alternate
Granard South Pond	Fresh	2005	30 Mar–15 Sep	6	5-12	7M, 5F	ad, imm	alternate, basic[d]
Schuster Lower Pond	Fresh	2005	12 Apr–14 May	1	1-6	2M, 4F	ad	alternate
Manning Bay East	Brackish	2005	3 May	1	1	F	?	?
Schuster Lower Pond	Fresh	2005	9 Jul–22 Sep	3	1-2	2M	ad	alternate
Schuster Lower Pond	Fresh	2005	21 Jul–4 Aug	1	1-3	3F	ad	?
Southgate Pond	Brackish	2005-2006	17 Dec–17 Jun	7	1-15	8M, 7F	ad	alternate
Rust-op-Twist	Brackish	2006	17 Jan	1	2	M, F	ad	alternate[e]
Fredensborg Pond	Fresh	2006	30 Apr	1	1	F	ad	?
Granard South Pond	Fresh	2006	1 Jun	1	1	F	?	?
Schuster Upper Pond	Fresh	2006	22 Jun	1	1	M	ad	basic

[a]pair photographed on 13 January by F. E. Hayes.
[b]pair photographed on 6 April and two males photographed on 23 June; all photos by C. Cramer-Burke; the female disappeared after 23 June, when one more male appeared from 29 June to 1 July.
[c]one male was in full alternate plumage on 3 November; all birds except possibly one male and several females were in full alternate plumage by 27 November.
[d]up to seven males and five females were present; by 2 August, four males were still in full alternate plumage, and three males were in basic plumage; the three fledged juveniles from the brood at Southgate Pond were also present on 19 April, when they appeared to be 80% grown, and remained until at least 23 June.
[e]pair in full alternate plumage, male displaying.

clump of manglars where Ruddy Ducks nested in 2005. This nest had a clutch of 11 eggs; one young ca. 20% grown was also present, but the fate of this bird was unknown. The second nest was found on 8 March in a large manglar in the northeastern section of the pond. It had a clutch of 10 eggs (five in the nest, five outside the cup created by the crotch and rootlets of white mangroves). The third and fourth nests were found on 22 March in a row of manglars along the south shore of Southgate Pond. These nests had clutches of six and eight eggs, respectively, with some eggs from each nest outside the cup. By 6 April some eggs were still present in all nests, but more were present in mangrove roots outside the nest cup or further out into the water. Five young ca. 20% grown from a presumptive fifth nest that was not located were seen on 19 April, whereas four young were present from 21 April to 10 May. The fate of these young was unknown. The mean nearest internest distance was 78.7 m (range: 23.9-113.7 m, $n = 3$). One to 15 adult Ruddy Ducks (up to eight males and seven females) in full alternate plumage were present on the above dates and remained through at least 30 June 2006.

Since 2002 approximately 75% of all Ruddy Duck observations on St. Croix have been of birds in full alternate plumage (Table 1). Historically, Ruddy Duck specimens collected at Southgate Pond

Fig. 1. Ruddy Duck (*Oxyura jamaicensis*) nest (RD3) discovered on 30 March 2005 with an abandoned clutch of 12 eggs (one egg hidden in photo). Note that the eggs are in layers. However, the concavity of the nest site was probably too small to have allowed the female to align all the eggs into one layer, which typically occurs once incubation begins (Low 1941; also see Joyner 1977b). Photo by C. Cramer-Burke.

included (1) four birds (whereabouts unknown) from a flock of ten on 5 October 1922 (Beatty 1930), (2) adult male *O. j. jamaicensis* in alternate plumage on 28 August 1933 (USNM 353616; Danforth 1935), and (3) a female *O. j. jamaicensis* in basic plumage on 11 February 1956 (ANSP 169876). The only specimen on St. Croix collected away from Southgate Pond was nearby, on the road to Green Cay Marina (formerly part of Southgate Pond), where an adult female *O. j. jamaicensis* in full alternate plumage was found dead on 9 December 1983 (UMMZ 228331).

In addition to Southgate Pond, we detected Ruddy Ducks at five man-made freshwater ponds (Diamond Pond, Fredensborg Pond, Granard South Pond, Schuster Lower Pond, Schuster Upper Pond) and two other salt ponds (Manning Bay East and Rust-op-Twist) on St. Croix since 2002 (Table 1; see McNair 2005 and McNair *et al.* 2005 for site-specific geographical coordinates). Although Ruddy Ducks have been present on St. Croix during every month of the year, observations across sites since 2002 have not overlapped except for short-term observations (≤ 2 months) at four freshwater ponds and at Manning Bay East when Ruddy Ducks were present at Southgate Pond from October 2004 to July 2005 and at three freshwater ponds when Ruddy Ducks were present at Southgate Pond from December 2005 to June 2006. Otherwise, the longest time Ruddy Ducks have been continually present at any site was at Granard South Pond from March to September 2005. Ruddy Ducks did not breed at this site, or at any other freshwater pond.

DISCUSSION

American Coot and Ruddy Duck densities tend to be inversely related on the breeding grounds (Nudds 1981), especially around coot nests and after their young hatch (Gullion 1953, Ryder 1959, Ryan and Dinsmore 1979). Ruddy Ducks did not attempt to breed at Southgate Pond in 2005 until after coots had stopped nesting and coot young had vacated the area, when water levels were lower and less favorable. Estimated water depths at two of the three Ruddy Duck nests (23 and 25 cm) were less than normal (in emergent vegetation; Low 1941, Siegfried 1976, Brua 1999) and the mean nearest internest distance was less than the typical minimum of 10 m (Siegfried 1976), suggesting that suitable nest-sites were limited. Ruddy Ducks probably abandoned these three nests because water levels receded further (Low 1941, Joyner 1977b). In 2006, Ruddy Ducks nested at Southgate Pond when coots were breeding in the same areas (C. Cramer-Burke unpubl. data). The reasons Ruddy Ducks abandoned four nests in 2006 is unknown. Coots, even though locally distributed and uncommon, are more numerous than Ruddy Ducks on St. Croix, where Southgate Pond is the best saline breeding site for coots and Granard South Pond the best freshwater site (McNair and Cramer-Burke 2006). Other than Southgate Pond, Ruddy Ducks are probably most likely to currently nest at Granard South Pond, although they did not breed there in 2004 when coots nested (McNair and Cramer-Burke 2006). Seaman (1955) stated that he occasionally saw small Ruddy Duck flocks on farm ponds, but presented no breeding information.

Breeding records of Ruddy Ducks may be scarce on St. Croix due to direct interference from coots, which can be especially intense toward Ruddy Ducks when in the same habitat (Gullion 1953, Ryder 1959, Ryan and Dinsmore 1979), scarcity of alternative nesting areas even though Ruddy Duck and coot nest-sites are different (McNair and Cramer-Burke 2006, this study), or unfavorable ecological conditions such as shallow water levels or lack of suitable food. Unlike Seaman (1993), we did not locate an active Ruddy Duck nest although we did confirm Nichol's (1943) second-hand information that as many as 12 eggs comprise a clutch in the

U. S. Virgin Islands; however, more than one female may have contributed to these larger clutch sizes (Siegfried 1976).

The basis for subspecies-level taxonomy of Ruddy Ducks is unclear (*contra* Raffaele *et al*. 1998, Brown and Collier 2004); most authorities don't treat *jamaicensis* and *rubida* as separate subspecies and genetic analyses have not been conducted (Brua 2002, J. P. Dean and M. D. Sorenson pers. comm.). Regardless, the majority of birds at Southgate Pond and elsewhere on St. Croix appear to be the nominate West Indian form (*O. j. jamaicensis*) in breeding condition or readiness, including in winter when *rubida* could be expected to be present.

Future surveys for nesting Ruddy Ducks on St. Croix should continue to focus on Southgate Pond because the species is a benthic invertebrate specialist, favoring chironomid larvae (Woodin and Swanson 1989, Alisauskas and Ankney 1994) which thrive in turbid water. Rust-op-Twist Salt Pond may no longer be a suitable breeding site, unless ecological restoration activities occur, although one pair briefly occupied this salt pond in 2006. Breeding at these seasonal salt ponds would most likely occur from autumn to spring, based on water levels from the typical hydrological year, not from June through August (also see Molinares 1981; *contra* Raffaele *et al*. 1998) when water levels are generally low. Despite considerable field effort on St. Croix since 1857 (McNair *et al*. 2005) and documentation of Ruddy Ducks at only eight sites (three salt ponds, five freshwater ponds), further efforts are needed to determine the true breeding status of Ruddy Ducks at Southgate Pond and other sites on St. Croix.

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