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NOTES

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FREQUENCY OF ADDLED EGGS OF NESTING WOOD STORKS IN NORTH AND CENTRAL FLORIDA

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The Wood Stork (*Mycteria americana*) breeds in the southeastern United States and throughout Central and South America. Wood Storks once were a common breeding species throughout the southeastern United States (Kushlan and Frohring 1986, Ogden et al. 1987), but reproductive failure, population declines, and habitat loss resulted in the United States population being listed as endangered in 1984 (USFWS 1984). Herein, I analyze the frequency of addled Wood Stork eggs to determine the effect on hatching success of birds nesting at 11 colonies in north and central Florida. I defined addled eggs as eggs that did not hatch in clutches that hatched at least one egg.

The following Wood Stork colonies were monitored for one or more years during 1981-1985: Ochlockonee (no. 592003), Chaires (no. 592001), Dee Dot (no. 594004), Lake Yale (no. 612027), Moore Creek (no. 612007), Grant Farm Island (no. 616004), Pelican Island (no. 616007), Little Gator Creek (no. 611024), and San Antonio (no. 611148). NE Mulberry (no. 616039), Brewster (no. 615032), and Pleasant Grove (no. 615009) were monitored infrequently due to their inactivity during most years. The specific locations, general vegetation characteristics, and other nesting species of these colonies are described in Nesbitt et al. (1982), Rodgers et al. (1987), or Runde et al. (1991) by colony number.

Wood Stork colonies were visited every 1-2 weeks. Nests were individually marked with numbered, colored flagging tape. Care was taken to reduce researcher effects on the breeding storks. Monitoring nests early in the breeding cycle was minimized to reduce disturbance during courtship, pair-formation, and early egg-laying. Colonies were visited during the early morning and late afternoon hours and not during inclement weather. Time spent at each nest was minimized by using two people to observe and record data.

The frequency of addled eggs could not be determined for all stork nests because many were located at heights that precluded viewing eggs with a 10-m mirror pole. Water levels at the Chaires colony during 1982 and 1985 dropped nearly 1.5 m below other years and storks nested in taller trees that prevented clutch data collection for most of these nests. These nests were not used to analyze the hatching rates. Analysis of addled eggs was made on a subset of the data that excluded nests where the entire contents were abandoned before the approximate hatching time of 28 days.

The overall percent of addled eggs among Wood Stork eggs was 1.13%; addled eggs were present in 3.39% of nests (Table 1). Both 1983 (1.82% eggs) and 1981 (1.60% eggs) nests exhibited higher percent of addled eggs than found in 1982 (0.42%), 1984 (0.51%), and 1981 (0.66%) nests. Most often one egg was addled (87.9%), less often two (10.8%), rarely three (1.2%) eggs (n=83 nests). Distribution of addled eggs among clutch sizes (2-eggs=6.0%, 3-eggs=74.7%, 4-eggs=18.1%, 5-eggs=1.2%) was similar to the distribution of each clutch size ($X^2=1-24$, $P>0.50$, $df=3$). Thus, no clutch size effect was detected.

Girard and Taylor (1979) reported the greatest period of nesting mortality for Wood Storks was during the first 2-weeks of age after hatching. The largest decrease in survi-

Table 1. Frequency of addled Wood Stork eggs at colonies in north and central Florida, 1981-1985. Data are represented as addled eggs/total eggs/total nests surveyed.

Colony	1981	1982	1983	1984	1985	Total percent ^d
Brewster	2/56/19	NA ^a	F ^b	NA ^a	NA ^a	3.57/5.26
Chaires	1/292/90	0/15/5	0/223/72	1/279/89	0/20/7	0.32/0.08
Dee Dot	4/205/76	2/406/135	6/402/118	0/208/63	4/363/118	1.01/2.79
Grant Farm	3/243/88	1/116/39	13/447/139	1/235/79	F ^b	1.73/4.35
Little Gator	NM ^c	NM ^c	6/330/102	2/352/111	2/270/97	1.05/2.90
Lake Yale	NM ^c	1/109/40	0/41/13	0/73/24	2/249/78	0.64/1.94
NE Mulberry	2/132/19	0/21/7	NA ^a	NA ^a	NA ^a	1.31/7.69
Moore Creek	NA ^a	F ^b	1/174/60	1/268/88	0/295/98	0.27/0.81
Ochlockonee	NM ^c	NM ^c	NM ^c	NM ^c	3/368/120	0.82/2.50
Pelican Island	8/325/116	0/295/100	11/427/134	2/358/117	4/396/132	1.39/3.84
San Antonio	NA ^a	NM ^c	8/377/123	3/180/55	NA ^a	1.97/4.49
Total percent ^d	1.60/4.76	0.42/1.23	1.82/5.12	0.51/1.28	0.66/2.00	1.13/3.39

^aNA = colony not active.

^bF = colony failed during early breeding season.

^cNM = colony not monitored.

^dPercent of total eggs/total nests.

vorship in my study occurred prior to hatching (Rodgers and Schwikert, in press). Zero hatching success occurred when the entire colony abandoned nesting before hatching of the eggs ($n=3$ colony-years: see Table 1). Overall, nest abandonment and predation were responsible for combined mortality of 10.7% to 54.9% for individual colony-years that fledged young ($n=36$ colony-years, 4,131 eggs, 1,391 nests). Most hatching failure involving all or most of the eggs was due to abandonment by parent storks.

I do not know if addled eggs of Wood Storks were due to infertility or embryonic death. A previous study found pesticides and heavy metals were not present at elevated levels in stork eggs from north and central Florida that would cause breeding failure (Fleming et al. 1984). I conclude that addled eggs are not an important factor contributing to nesting failure of Wood Storks in north and central Florida.

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