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DOUBLE-CLUTCHING AND DOUBLE-BROODING IN RED-COCKADED WOODPECKERS IN FLORIDA

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Throughout the Red-cockaded Woodpecker's *(Picoides borealis)* range, successful double-brooding has previously been documented in only two states, North Carolina and South Carolina (Franzreb 1997, Labranche et al. 1994). In 1996, a Red-cockaded Woodpecker group on Eglin Air Force Base (EAFB), Florida, successfully fledged one young from their second brood after fledging two young from their first brood. This observation represents the first report of successful double-brooding in Red-cockaded Woodpecker's in Florida. To put this observation into a larger context, we summarized data from other studies of Red-cockaded Woodpeckers from throughout Florida, North Carolina, and South Carolina (Table 1).

The study site, historical background of the Red-cockaded Woodpecker project on EAFB, and methods employed were described by Hardesty et al. (1995), Hardesty et al. (1997), Phillips and Gault (1997), and Schillaci and Smith (1994). A total of 87 active Red-cockaded Woodpecker cavity tree clusters were monitored on EAFB during the 1996 reproductive monitoring season. The group of interest (0906B) was comprised of one breeding male, one helper male, and the breeding female. All three had been banded as adults in cluster 0906B on 13 July 1995.

On 30 April 1996 LFP and JT found a nest of four eggs in the breeding male's cavity tree. This nest produced two 7 to 8-day-old hatchlings, which were banded on 16 May, and fledged one male and one female by 7 June. The three banded adults tended both the nest and the fledglings. The cluster was checked for a second clutch (double-clutch) on 13, 18, 25 June and 2 July. On 2 July, we heard hatchlings vocalize from the previous nest cavity. On 3 July we climbed the tree and found one egg and two 2-day-old hatchlings in the cavity. On 4 July we confirmed that the group composition had not changed since the first brood. We also observed the male, but not the female fledgling from the first brood. All three adults fed the hatchlings of the second brood. The male fledgling from the first brood (now approximately 57 to 58-days-old) stayed on or near the nest tree containing the hatchlings of the second brood and approached the cavity but did not enter. He begged for the food that the adults were delivering to the hatchlings, as M.S. LaBranche (pers. comm.) also observed in North Carolina. We banded the two hatchlings on 9 July, and checks on 1 and 6 August 1996 revealed that one male fledged. During these checks, we also observed the three adults and the male fledgling from the first brood.

The significance of this observation is that it indicates that successful double-brooding can occur in the southern portion of the Red-cockaded Woodpecker's range as well as the northern. Double-clutching and double-brooding appear to be rare rangewide phe-

Table 1. Detection of double-clutches or double-broods in monitored Red-Cockaded Woodpecker populations in Florida, North Carolina, and South Carolina.

Location	Year Monitored	Number of potential breeding groups[d]	Number (%)[e] of double-clutches observed	Number (%)[f] of double-broods observed	Sources
Florida					
Apalachicola NF	1994-1997	860	8 (0.9)	6 (0.7)	G. Hagan (pers. comm.) and C.A. Hess (pers. comm.)
Avon Park Air Force Range	1994-1997	121	1 (0.8)	1 (0.8)	D. Leonard (pers. comm.)
Big Cypress National Preserve	1979-1997	22-46[a]	0	0	D. Jansen (pers. comm.); Jansen and Patterson (1983)
Camp Blanding	1995-1997	40	0	0	J. J. Kappes Jr. (pers. comm.)
Eglin Air Force Base	1992-1997	339	2 (0.6)	1 (0.3)	Univ. of Florida and Virginia Tech, unpubl. data; Schillaci and Smith (1994)
Goethe State Forest	1995-1997	44	0	0	J. J. Kappes Jr. (pers. comm.)
Ocala NF	1992-1997	37	0	0	L. Lowery (pers. comm.)
Oceola NF	1994-1997	197	0	0	J. Monaghan (pers. comm.)
St. Marks NWR and nearby locations	1980-1997	3-15[b]	0	0	J. P. Reinman (pers. comm.); Reinman (1995)
Various sites in Florida	1981-1997	133	0	0	R. S. DeLotelle (pers. comm.)
Total		1771[c]	11 (0.6)	8 (0.5)	

[a]Monitoring effort and intensity varied in 22-46 known clusters.
[b]The number of clusters monitored each year fluctuated between 3-15.
[c]Total excludes Big Cypress National Preserve and St. Marks NWR and nearby locations.
[d]The total number of potential breeding groups during the years monitored.
[e]The percentage equals the number of double clutches observed divided by the number of potential breeding groups.
[f]The percentage equals the number of double broods observed divided by the number of potential breeding groups.

Table 1. (Continued) Detection of double-clutches or double-broods in monitored Red-Cockaded Woodpecker populations in Florida, North Carolina, and South Carolina.

Location	Year Monitored	Number of potential breeding groups[d]	Number (%)[e] of double-clutches observed	Number (%)[f] of double-broods observed	Sources
North Carolina					
Camp LeJeune	1986-1997	409	0	0	J.R. Walters (unpubl. data)
Croatan NF	1989-1997	438	2 (0.5)	1 (0.2)	J.R. Walters (unpubl. data); LaBranche et al. (1994)
North Carolina Sandhills	1980-1997	3578	6 (0.2)	6 (0.2)	Walters et al. (unpubl. data); LaBranche et al. (1994)
Total		4425	8 (0.2)	7 (0.2)	
South Carolina					
Savannah River Site	1985-1996	91	1 (1.1)	1 (1.1)	Franzreb (1997); LaBranche et al. (1994)

[a]Monitoring effort and intensity varied in 22-46 known clusters.
[b]The number of clusters monitored each year fluctuated between 3-15.
[c]Total excludes Big Cypress National Preserve and St. Marks NWR and nearby locations.
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[e]The percentage equals the number of double clutches observed divided by the number of potential breeding groups.
[f]The percentage equals the number of double broods observed divided by the number of potential breeding groups.

nomena. Our observation of double-brooding is consistent with several conclusions drawn by LaBranche et al. (1994). The number of young fledged from the second brood was smaller than the number fledged from the first brood in the same group. The group had initiated their first nest relatively early (last week in April) in the reproductive season. In fact, it was among the first eight to nest in the monitored portion of the population. Also, the second clutch was initiated (approximately 17 June) within the double-clutch and double-brood initiation range reported (7-23 June) by LaBranche et al. (1994). Because the age of the breeding female in cluster 0906B was unknown, we could not determine whether the double-brood was produced by one of the older females in the population, as suggested by LaBranche et al. (1994).

LaBranche et al. (1994) suggested that double-brooding occurs in years of extreme nesting effort. However, Schillaci and Smith (1994) concluded that the year in which the previous double-clutch occurred on EAFB was not characterized by extreme nesting effort, nor was 1996 when this double-brood occurred. Out of six years, 1993 ranked fifth and fourth, respectively, for two measures of nesting effort: the proportion of groups attempting to nest and the probability of renesting after failure. 1996 ranked third for both. We propose that double-clutching and double-brooding are anomalies that have the potential to occur in any given year, regardless of nesting effort. Thus, causation should be investigated at the level of the group rather than the population.

In the many studies of the Red-cockaded Woodpecker, few double-broods have been observed. Both at EAFB (1992-1997) and in other populations monitored in Florida, North Carolina, and South Carolina (1979-1997), groups have been monitored closely enough for double-clutching and double-brooding to be detected reliably. Groups on EAFB (1993-1997) and in North Carolina (1992-1997) were checked specifically for double-clutching and double-brooding. Low detection in most years confirms that double-clutching and double-brooding are rare in the Red-cockaded Woodpecker (Table 1; see also Franzreb 1997, LaBranche et al. 1994, Schillaci and Smith 1994). With only one exception (Savannah River Site, South Carolina), the proportion of groups in a population that produce double-clutches and double-broods was less than 1% (Table 1). All the double-clutches observed in Florida occurred from 1993 through 1996. Six of eight double-clutches observed in North Carolina occurred in one year (1991).

Recent data from North Carolina and South Carolina confirm that the seven double-clutches reported in 1991 (LaBranche et al. 1994) represented an exceptional event, rather than an initial report of a previously overlooked, regular phenomenon. The rate of double-clutching in 1991 in the Croatan National Forest (2.3%) and the North Carolina Sandhills (2.5%) populations was greater than 2% (LaBranche et al. 1994), but has been 0.3% and 0.1% in these two populations since. Similarly, there have been no additional instances of double-brooding at the Savannah River Site in South Carolina (Franzreb 1997) since the single instance observed in 1991 (LaBranche et al. 1994).

Double-clutches are often successful when they occur. Out of 11 double-clutches observed in Florida (1993-1996) (Schillaci and Smith 1994, Table 1), eight (72.3%) became successful double-broods, fledging one or two young in each case. Of the nine double-clutches that have now been observed in North Carolina and South Carolina, (Franzreb 1997, LaBranche et al. 1994, Table 1), eight (88.9%) became successful double-broods, each fledging one or two young. In all cases of double-clutching and double-brooding, the group initiated their first nest relatively early (all in April) in the nesting season and second clutches were initiated between extreme late May and late June. As suggested by LaBranche et al. (1994), researchers throughout the Red-cockaded Woodpecker's range should check all groups that successfully fledge young by 15 June for this rare, but apparently widespread and regular phenomenon.

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