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Sociality of Chimney Swifts (*Chaetura pelagica*) Nesting in a Colony

Ralph W. Dexter*

Department of Biological Sciences
Kent State University
Kent, Ohio 44242

This paper summarizes aspects of social behavior of Chimney Swifts (*Chaetura pelagica*) based on 40 years of study between 1944 and 1983 at Kent, Ohio. Dexter (1969) presented a general survey of this research program and methods. Altogether, 402 resident birds were banded; 88.8% of these returned during a year subsequent to their capture.

CHANGE OF MATE PRIOR TO NESTING

Normally, Chimney Swifts mate for life; birds continue to nest with the same mate of the previous year as long as both return (see diagrams in Dexter 1969:200-201). A new mate is sought if the former mate fails to return. For 20 years of observations, 85 of 171 pairs were already together when first noted each year. The interval between first observation and pairing for 101 other pairs averaged 5.6 days. Occasionally, changes do occur even if both members of a pair return. I observed 62 cases (involving 76 birds) where a swift roosted early in the season with one bird, but mated with another bird for nesting. Usually this second bird was its mate of the previous year. Males made this change 29 times; females did so 33 times. In five instances, a swift associated with two roosting partners before nesting; otherwise, only a single prospective mate was involved. In 17 cases, roosting partners were former mates (not of the previous year); and in 16 cases, a bird nested with a former mate (not of the previous year) after roosting with another bird.

FIDELITY TO MATE AND TENACITY TO NESTING SITE

Between 1945 and 1983, 84.4% of nesting swifts (294 pairs) retained the same mate when both

returned for nesting. In six cases, there was a reunion with a former mate after nesting with another bird in the interim (details given below).

Of 258 pairs that returned and nested together, 96% occupied the same air shaft as used in the previous year. Only 10 pairs changed nesting sites. In those cases when both birds of a former pair returned but with different mates, the female nested in her former nest site 42.1% of the time while the male nested in his former site 26.3% of the time.

FIDELITY OF VISITORS TO BREEDING PAIRS AND TENACITY TO VISITING SITE

Seasonal visitors ("helpers") are sometimes found in shafts with mated pairs of swifts, forming three- or foursomes. These visitors are mostly unmated males, usually immature birds in their first summer (Dexter 1952). Some birds continued as visitors for two or three years before getting a mate of their own. I found no evidence that visitors increased breeding success in spite of some aid given during the nesting process. Visitors apparently live in an air shaft with the tolerance of the hosting pair. Between 1944 and 1983, 79 birds were identified as visitors. Of 44 which returned to the campus colony, 63.6% were visitors for one season, 29.6% for two seasons, and 6.8% for three seasons. A total of 30 were males (68.2%) and only five birds were known to be females (11.4%). Eight birds (6 for 2 years; 2 for 3 years) continued as visitors with the same hosting pair at the same site. Three visitors continued for a second year with one member of a hosting pair in the same shaft. Four visitors changed both hosting pair and new site. Four former visitors nested with a previous host as

a mate in the same air shaft, each nesting for one, two, four, and six subsequent years. Eight swifts, which visited one or two years, later nested for one to eight years in the same air shaft, though not with either of the original hosting pair.

ROLES OF MALES, FEMALES AND VISITORS DURING NESTING

From 14 years of observations between 1953 and 1983 involving 117 nesting groups of 30 air shafts (98 pairs; 17 threesomes; 2 foursomes), data were obtained on sex role during incubation and brooding. The results are as follows.

A single bird observed on nest: by night, male 51.0% of the time, female 49.0%; by day, male 49.7%, female 50.3%; combined, 50.1% for male and 49.9% for female. Obviously the sexes share duties at the nest equally. During cool weather, both mates are often found together on the nest: by night 24.3% of the time, and by day 0.6% of the time.

For the threesomes, the visitor only was on the nest three times in the day and three times in the night. Twice the female parent with the visitor were together on the nest, and four times all three birds (the same threesome with a male visitor) were on the nest in the evening. For the foursomes, one visitor only was on the nest seven times by day and twice by night. Twice, all four birds were on the nest by night incubating the eggs.

REPLACEMENT AND SHARING OF MATES

Three instances of mate replacement are described:

(a) In 1950, pair M7 and F41 began a nest in shaft D1. The male (M7) disappeared after eggs in the nest were destroyed. F41 mated with M89 and produced a new clutch in the same nest. M89 and F41 continued nesting in shaft D1 the following three years.

(b) In 1971, M227 and F265 were using shaft A5. F265 died on 1 June from an injury. F303 left her mate in shaft C3 to join M277 in shaft A5. There was no further nesting.

(c) In 1982, M382 and F389 began building a nest in shaft E1. F389 disappeared when the nest was half finished. This nest was completed with F356, three eggs laid and two young produced. F356 did not return the following year; M382 nested in shaft D1 in 1983.

Three instances of shared mates were observed:

(a) Male M2 nested with F1 in shaft E6 and F11 in shaft D4 in 1947. M2 and F1 had been mates in shaft A1 in 1944. M2 disappeared after 1947.

(b) Female F121 paired with M130 and M131 in 1954. M130 was a visitor in shaft G4. After pairing with F121 in shaft L3, M130 and F121 separated. M130 may have been immature since no eggs were laid. F121 then nested with M131 in shaft L1.

(c) Male M308 possibly nested with both F299 in shaft M1 and F307 in shaft L3 in 1971. M308 and F299 continued as mates in shaft M1 in 1972.

SHIFTING, EXCHANGE, AND REUNION OF MATES

Two cases of shifting of mates during the nesting process have been published already (Dexter 1971). Two other cases are described here:

(a) M211 and F221 began nesting in shaft R2 in 1964. M211 disappeared after eggs were laid and the nest fell. M240 then nested with F221 in shaft R2 (after abandoning F241 in shaft I1). M240 nested with F242 in shaft N9 in 1965.

(b) M295 and F311 began the 1972 season together in shaft A5. M295 disappeared as did F313, the first mate of M312. M312 then joined F311 in shaft A5. M312 and F311 continued nesting together in shaft A5 in 1973 and 1974, but changed mates in later years.

Between the nesting season of 1981 and 1982, the males in air shafts A1 and Q2 exchanged places after nesting in those shafts for two years, and nesting with the females which then continued to nest in their respective shafts with the exchanged

mate for the ninth season (shaft A1) and second season (shaft Q2). While the new combination of mates in Q2 continued in 1983, the female in A1 did not return, and the male got a new mate in shaft A5 nearby.

Table 1 gives six cases of mates which were reunited for nesting, after nesting with other birds during the interval.

INCOMPATIBILITY, WANDERING, AND FAILURE TO NEST

Between 1944 and 1983, there were 11 cases of incompatibility observed in which a pair of swifts was repeatedly together during certain nights, but separated during intervening nights, usually ending in a failure to nest successfully. Four such cases have been published in detail (Dexter 1951, 1967). Altogether, 34 birds were involved. As far as sex could be determined, 17 were females, 12 were males, and five were unknown. Seven cases occurred for a single season, two continued for two years, one for three years, and one case extended over a period of nine years.

Nine cases of "wandering Chimney Swifts" were observed where individual birds or pairs moved from site to site, often not settling down to a permanent place for nesting. Four case histories of individuals have been traced from two to four years without nesting success, and two cases have been traced for five and seven years, respectively, which eventually met with nesting success (Dexter 1982).

NON-NESTING ASSOCIATIONS

Over a period of 20 years, 192 swifts were banded from 36 air shafts on 4 buildings and traced until they no longer returned. Birds were recaptured over 1-14 years (mean 4.4). A total of 125 (65%) was found to roost with other resident birds at some time in small groups (1-3) other than nesting associates. After seven years of capture, no swift (with one exception) failed to have contact at least once with up to three associates other than nesting groups.

SUMMARY

Certain social relations of Chimney Swifts nesting in a colony were noted over a period of 40 years (1944-1983) of banding at Kent, Ohio. Altogether, 84.4% of the nesting birds retained the same mate when both returned for nesting, and 96% occupied the same nesting site (air shaft) as used during the previous year. Sixty-two cases were observed where a swift roosted early in the season with a prospective mate, but changed to another bird, usually its mate of the previous year, for nesting. Of 79 swifts which lived as visitors, eight continued as visitors with the same hosting pair at the same nesting site, three continued for another year with one member of a former hosting pair, and only four changed both hosting pair and nest site. The mates shared equally the duties of incubation and brooding. Occasionally, visitors were observed on the nest. Three cases are given of replacement of a lost mate, and three cases of sharing of a mate. Three cases of shifting of mates during the nesting season are known, one case of an exchange of mates for one year to the next were observed, and six cases of reunion of former mates after nesting with other birds are recorded. Eleven cases of incompatibility of prospective mates, and nine cases of "wandering" of unsettled birds in the colony have been traced. Nearly all swifts after a period of seven years have had some contact with up to three associates other than nesting groups.

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Table 1. Reunions of mates by nesting Chimney Swifts after nesting with others.

<u>Pair</u>	<u>Year/Shaft</u>	<u>Reunion Year/Shaft</u>
M2 - F1	1944 A1	1947 E6
M14 - F13	1944 E1	1946-1949 E1
M43 - F92	1950 H5	1952 H5
M88 - F87	1950-1952 A5	1956-1958 G4
M178 - F191	1959 A5	1963-1965 Q2
M373 - F384	1980-1981 N9	1983 N9

