Notes on Incubation by Male Kestrels in West Virginia, Pennsylvania, and Southern Quebec.

Thomas J. Wilmers
Fish & Wildlife Branch
DEH
Fort Sill, OK 73503

Reed Bowman
Macdonald Raptor Research Centre of McGill University
21,111 Lakeshore Road
Ste-Anne-de-Bellevue, P.Q.
Canada H9X 1C0

David E. Samuel
Division of Forestry and Wildlife
West Virginia University
Morgantown, WV 26506

Introduction

Both sexes of the American kestrel *(Falco sparverius)* possess well-developed incubation patches (Willoughby and Cade 1964). In captive pairs, the female does nearly all of the incubating (Willoughby and Cade 1964, Porter and Wiemeyer 1972). Only brief mention of incubation by male kestrels is given in the literature, with available information consisting of a few observations made at 2 or fewer nests in Iowa (Sherman 1913), Oregon (Roest 1957), California (Willoughby and Cade 1964), and Minnesota (Field and Field 1980). In California, Balgooyen (1976) and Rudolph (1982) observed incubation by male kestrels, but neither author reported the number of observations. Nocturnal incubation by males has been observed (Roest 1957, Willoughby and Cade 1964), but its frequency is unknown (Balgooyen 1976). This report documents instances of incubation by male kestrels during a 4-year period at 2 study sites. Nests were checked at night during a single season at one of the sites.

Study Area and Methods

During 1980-1982, 84 active kestrel nests (clutch of 1 or more eggs laid) were found in nest boxes erected on 24 reclaimed surface mines in northern West Virginia and southern Pennsylvania (hereafter referred to as WVPA). A second study area in southern Quebec (both nest boxes and natural cavities) produced 71 active kestrel nests during 1981-1983. All WVPA sites are within a 42 km radius of Morgantown, WV (see Wilmers 1982 for a detailed description of the study area). All Quebec sites are within a 15 km radius of the Macdonald Raptor Research Centre, Ste-Anne-de-Bellevue, Quebec (see Spiegel 1975 for a detailed description of the study area).

Whenever possible, the sex of kestrels found on or flushed from nests containing eggs was recorded. The clutch size of kestrels is normally 4-5 eggs (Brown and Amadon 1968), but incubation of 5-egg clutches does not usually begin until laying of the fourth egg (Porter and Wiemeyer 1972). Therefore, birds were considered to be incubating only when they were found on or flushed from nests containing 4 or more eggs. In the WVPA study area, onset of incubation by kestrels ranged from 12 April to 21 June, but most pairs began incubating during the third or fourth week of April (Wilmers 1982). Nest visits (with 1 exception) in WVPA were made after 4 May to avoid the early stages of incubation, a sensitive period for raptors. Behavioral observations of Quebec pairs indicated approximate laying dates, and nest visits were timed to coincide with the mid-incubation period (14 days post-laying of the fourth egg). In both study areas, most nests were inspected only once during the incubation period. Most nests were checked between 1230 hr and dusk in WVPA, and between mid-morning and afternoon (1000-1659 hr) in Quebec. The time of each diurnal instance of incubation was compared to the time of sunset for that day using sunset tables for Montreal, Quebec (Thomsen 1972) and Morgantown, WV (GRC 1977).

During 1982, 16 active nests in WVPA were visited at night. Nests were approached as quietly as possible, and a towel attached to a telescopic pole was raised to obstruct the nest entrance. One of us then climbed to the nest and sexed (by plumage) and banded the bird.

Results

The sex of an incubating kestrel was recorded 173 times at 123 nests during daylight hours, and an additional 12 instances were recorded at nests visited after dark. Incubation by a male kestrel was not observed during 1980 (12 active nests). Twenty-six instances of incubation by male kestrels were recorded at 24 nests during 1981-1983. Of these, 5 males were captured in nest boxes, 5 males flew from nests as we climbed nest trees, and 16 males flew from nests as we approached nest trees. In 2 instances both the male and female were found in a nest box.

With 2 exceptions, incubation by males in WVPA was observed 2.8 hours or less before sunset, but in Quebec, instances of incubation by males occurred more uniformly among several periods (Table 1). Exclusive of instances of nocturnal incubation and 2 nests where both male and female kestrels were found in the same box, females were found incubating at 84% and 86% of nests in Quebec and WVPA, respectively.

Of 16 nests visited after dark, incubating females were captured on clutches at 12 nests. Kestrels at 4 other nests escaped before their sex was determined. When these 16 nests were revisited more than 2 weeks later during daylight hours, only 1 box was deserted, and it contained 5 starling *(Sturnus vulgaris)* eggs.

Discussion

Our data suggest that incubation by males occurs infrequently. Nearly all of our observations of incubation by males in WVPA occurred 2.8 hours or less before sunset, but even during this period, 25 of 34 (74%) of the incubating birds were females. In Quebec, a relatively high percentage of birds incubating 0559-0300 hours before sunset were males, but 20 nests visited during this same period in WVPA contained only females.

Several possible reasons could account for the variation observed between our study areas. First, the extent to which males incubate might be an individual characteristic, as suggested by Porter and Wiemeyer (1972), who found that male kestrels of some captive pairs incubated but other did not. Second, some environmental correlate, such as food supply, may have differed markedly. Rudolph (1982) reported that a pair of kestrels that fed almost exclusively on insects shared incubation and foraged individually, a pattern not observed in 3 other pairs that fed primarily on vertebrates. He hypothesized that the insectivorous pair had partitioned incubation and foraging differently than the other pairs to offset higher energy costs of procuring smaller prey. Data collected in a systematic, quantitative way at a large sample of nests are needed to assess incubation patterns in a wild population.

Incubation at night by male kestrels was not recorded, but a more substantive data base is needed. Capture and banding of kestrels in a wild population has not been previously documented. Our method of capture was effective, easy to use at nests less than 7 m above ground, and resulted in virtually no nest desertion. Nearly all kestrels we captured at night remained silent during banding, few struggled vigorously or attempted to bite when lifted off their nests, and only 1 bird flew from its nest when the towel was removed from the entrance. None of the males of these nests was heard or seen.

Nightly visits to a large sample of active kestrel nests during a period of a week or more would yield valuable information on nocturnal incubation patterns. Only a brief glance into an active kestrel nest box is necessary to confirm the sex of an incubating bird. We do not know if most nests could be visited nightly for 2 or more nights without causing nest desertion, but we think that abandonment would be minimized if: (1) nest visits were brief and made during the later stages of incubation (21 days or more after the laying of the fourth egg); and (2) incubating kestrels were not handled. Gessaman and Findell (1979) found that kestrels often abandoned nests that were disturbed daily during incubation. However, they did not note the number of days that nests were visited before desertion occurred, and failed to mention if nests were visited during the early stages of incubation. Raptors are less prone to nest desertion ". . . the longer incubation is allowed to progress." (Fyfe and Olendorff 1976).

Table 1. Number of instances of incubating kestrels by study area, sex, and interval (hr) before sunset.

Interval before sunset	Number of females			Number of males		
	WVPA	Quebec	Total	WVPA	Quebec	Total
14:59 - 12:00	0	5[1]	5	0	1[1]	1
11:59 - 09:00	5	33	38	1	7	8
08:59 - 06:00	9	26	35	1	3	4
05:59 - 03:00	20	14[1]	34	0	5[1]	5
02:59 - 00:00	25	0	25	9	1	10
After sunset, before dark	8	0	8	0	0	0
After dark	12	0	12	0	0	0
Total	**79**	**78**	**157**	**11**	**17**	**28**

[1]Includes one nest containing both sexes.

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Renesting Of A Black Tern

Bruce A. Eichhorst and Jeffrey R. Reed
Department of Biology,
University of Wisconsin-Oshkosh
Oshkosh, Wisconsin 54901

During the evening of June 26, 1984, while conducting night-lighting on Rush Lake, Winnebago County, Wisconsin, we caught a Black Tern *(Chlidonias niger)* which was nesting on an artificial nest platform. This was one of nine platforms placed on the lake for use by Forester's Terns *(Sterna forsteri).* Black Terns, however, were using the nest platforms. We placed band number 512-81458 upside down on the tern's left leg. The bird was incubating when we caught it with a hand net.

On July 2 we found that nests on all but one of the platforms had been destroyed, probably due to severe weather. On July 18, while I (senior author) was using a floating blind to photograph birds, I came across a Black Tern which had constructed a nest on a deserted Red-necked Grebe *(Podiceps grisegena)* nest. The incubating tern was wary of my blind as I slowly approached, and would repeatedly fly off the nest for a minute or two and then return. I noticed that the bird had a band on it's left leg which was upside down. Each time the bird stood up I tried to read the band numbers through my camera's macro zoom lens. The nest was only about two feet from my blind. I could not read all the numbers, so I took several photographs of the banded leg.

Later we were able to read the band numbers from the slide film using a microscope. It was the same tern that we had banded on June 26. This was then a documented case of a Black Tern renesting in an area other than it's initial site. The new site was approximately one mile southeast of the initial site. Bailey (M.S. Thesis, Univ. of Wisconsin-Oshkosh, 1977) in a study of the breeding biology of this species on Rush Lake, noted that renestings in areas other than the initial sites probably occured, but without marked birds identification of such renestings was not possible.