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LIFETIME NESTING AREA FIDELITY IN MALE COOPER'S HAWKS IN WISCONSIN[1]

ROBERT N. ROSENFIELD
Department of Biology, University of Wisconsin, Stevens Point, WI 54481

JOHN BIELEFELDT
Park Planning, Racine County Public Works Division, Sturtevant, WI 53177

Key words: Lifetime nesting area fidelity; mark-recapture; breeding dispersal; Accipiter cooperii; *Cooper's Hawk; congeners.*

Some researchers have speculated that individual Cooper's Hawks (*Accipiter cooperii*) exhibit long-term fidelity to the same nesting areas over many years (Meng 1951, Schriver 1969), but mark-recapture data on fidelity are scant (Rosenfield and Bielefeldt 1993). Studies of congeneric hawks (*A. nisus, A. gentilis*) have been able to detect inter-year movements between disjunct nesting areas in both sexes (Newton 1986, Detrich and Woodbridge 1994), even in short-term (2 year) studies (Reynolds et al. 1994). Our objective here is to document male fidelity in Cooper's Hawks based on a 16-year study in Wisconsin.

STUDY AREA AND METHODS

During 1980–1995 we trapped breeding Cooper's Hawks at 86 nesting areas on two intensive study sites in Wisconsin (Fig. 1), one near Stevens Point (SP) and one in the Kettle Moraine State Forest (KM). We also captured adults at 28 additional nesting areas (see below) throughout the state (Fig. 1). The 56 nesting areas on the SP site were distributed over an area about 70 km by 50 km. The 30 nesting areas on the KM site were found over an area about 50 km by 30 km.

Adult hawks were trapped near their nests by a variety of techniques (Rosenfield and Bielefeldt 1992a, 1993). Captured adults (n = 386) were individually marked with U.S. Fish and Wildlife Service (USFWS) aluminum bands, and in 66 cases with color bands as well. We also marked 1,355 nestlings with USFWS bands only. Recapture of adults refers to birds (n = 160) re-trapped and identified by an aluminum band number in one or more years subsequent to initial capture, or to untrapped birds (n = 9) visually identified by alphanumeric codes on color bands.

A nesting area is defined as an area about 800 m in diameter that is occupied by birds in one or more years (Rosenfield and Bielefeldt 1992b). A nesting area was considered reoccupied when we found a new nest in a subsequent year within a 400-m radius of the original nest on the area. Fidelity is thus defined as reoccupancy of the same nesting area by the same marked adult in later years. We were unable to capture both adults at all nesting areas in each year. If the same marked bird was recaptured on the same nesting area two or more years after initial capture, we assume that it also occupied that nesting area in interim years. Breeding dispersal is defined as movement between nesting areas across years, and natal dispersal as movement between birthplace and first breeding site (Greenwood 1980).

RESULTS

For male Cooper's Hawks, we made 274 captures of 176 different individuals, including 98 recaptures of

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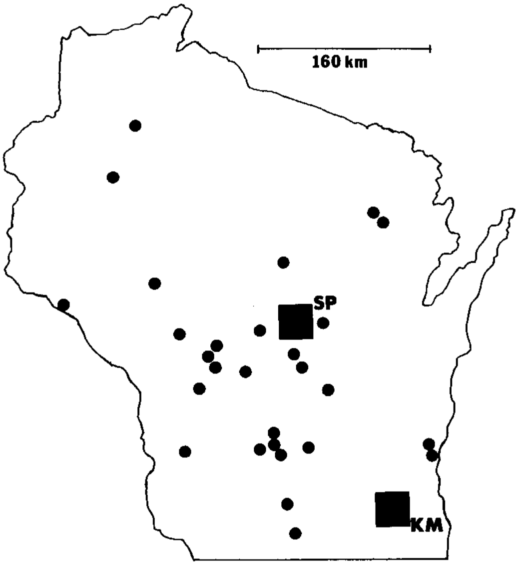

FIGURE 1. The distribution of the Stevens Point (SP) and Kettle Moraine State Forest (KM) intensive study sites and 28 additional nesting areas in Wisconsin.

65 different individuals (Table 1). For females we made 281 captures of 210 different individuals, including 71 recaptures of 40 different individuals (Table 1). Number of captures for both sexes was similar in most of the 13 years after 1982 (Table 1). We detected no breeding dispersal in males. All of the 98 recaptures of 65 different males occurred on the same nesting areas where they were initially caught. Individual males showed long-term fidelity to nesting areas. One male occupied the same nesting area for 8 years. Five individual males (8%) occupied the same nesting areas for 6 years, 7 males (11%) for 5 years, 4 males (6%) for 4 years, and 14 males (22%) for 3 years. Recaptures demonstrated 2-year occupancy of the same nesting areas among 34 individual males (52%).

In contrast, we did detect breeding dispersal in females. Among 40 recaptured individuals, six females (15%) moved to different nesting areas a total of seven times (one moved twice); median distance for these seven dispersals was 4.3 km (range 1.7–14.6 km).

We detected 12 cases of natal dispersal on our study areas (Rosenfield and Bielefeldt 1992b; Rosenfield and Bielefeldt 1993, unpubl. data). Median natal dispersal distance for 10 males was 6.4 km (range 2.4–35.2 km). Two females showed natal dispersal distances of 14.4 km and 79.0 km.

DISCUSSION

Despite our detections of seven breeding dispersals among females and 12 natal dispersals among both sexes on the same study sites, we found no evidence of adult breeding dispersal in 98 recaptures of 65 individual males. We conclude that male Cooper's Hawks in Wisconsin show lifetime nesting area fidelity.

TABLE 1. Number of captures and recaptures of male and female Cooper's Hawks, 1980–1995.

	Males		Females	
Years	Captures[a]	Recaptures	Captures[a]	Recaptures
1980	4	—	8	—
1981	7	0	11	2
1982	4	0	13	3
1983	19	4	16	6
1984	17	7	17	4
1985	18	8	19	5
1986	20	10	20	6
1987	17	6	18	6
1988	19	6	17	7
1989	20	8	24	8
1990	24	16	19	6
1991	27	8	25	6
1992	17	9	23	4
1993	21	7	12	3
1994	18	5	17	2
1995	22	4	22	3
Total	274	98	281	71

[a] Includes recaptures.

We believe that our chances of detecting breeding dispersal in males were at least equal to and probably greater than opportunities to discover breeding dispersal in females for the following reasons. Annual and total captures during 1980–1995 were similar for both sexes, while total recaptures were 38% more numerous in males (Table 1). Moreover, the number of individual males recaptured (65) was 63% greater than the number of individual females recaptured (40).

Because mortality rates for first-year birds are probably higher than those of adults in our population (Rosenfield and Bielefeldt, unpubl. data), we believe that our opportunity to detect breeding dispersal in males was probably at least as great as our chance of detecting natal dispersals. Nevertheless, we did find 12 instances of natal dispersal, otherwise undocumented in Cooper's Hawks, and no cases of male breeding dispersal.

Among band recoveries reported to us by USFWS of adults we trapped and marked at previous nests (n = 7 females, n = 5 males), three females were known to be alive elsewhere (and potentially breeding) in years when a new female occupied their prior nesting areas. These data again show that *detectable* inter-year movements between nesting areas occur in females. No recoveries with comparable implications were obtained for males, and all breeding-season recoveries for males (n = 2) came from the same areas where they were originally marked, 2 to 6 years after initial capture. Recoveries (albeit few) also support the thesis that male Cooper's Hawks in Wisconsin exhibit lifetime tenacity to nesting areas while females do not.

The 16-year duration of our study exceeds the known longevity (12 years) of the Cooper's Hawk (Rosenfield and Bielefeldt 1993). If male breeding dispersal does exist in our population, it seems that our study sites provided ample size, time, and opportunity to detect it.

Lifetime nesting area fidelity in male Cooper's Hawks, as evidenced by the population in Wisconsin, contrasts with the results of other studies of fidelity in congeners, especially the work by Newton (1986) and Newton and Wyllie (1992) on *A. nisus.* These studies did, however, show greater breeding site fidelity in males than in females.

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COMMUNITIES OF CLOACAL BACTERIA IN TREE SWALLOW FAMILIES[1]

MICHAEL P. LOMBARDO, PATRICK A. THORPE, R. CICHEWICZ, M. HENSHAW,
C. MILLARD, C. STEEN AND T. K. ZELLER
Department of Biology, Grand Valley State University, Allendale, MI 49401-9403

Key words: Bacteria; cloacal bacteria; disease; Tachycineta bicolor; *Tree Swallow.*

Bacteria are well-known causes of disease and mortality. However, bacterial infections are not usually considered in studies of wild bird populations. This is surprising for two reasons. First, numerous pathogenic bacteria species have been isolated from the pharynxes and cloacae of domestic and wild birds (e.g., Petrak 1982, Brittingham et al. 1988, Calnek et al. 1991, Sheldon 1993). Second, infectious diseases can be important sources of mortality and reduced fitness in wild bird populations (Anderson and May 1979, Hudson and Dobson 1991). Thus, bacterial infections have the potential to be important selective forces in the evolution of many aspects of avian biology (Hamilton and Zuk 1982, Hamilton 1990, Zuk 1991, Sheldon 1993) yet we know little about the epidemiology and prevalence of these microparasites in wild birds (Zuk 1991, Sheldon 1993). Our lack of information about the prevalence, epidemiology, and pathogenicity of bacterial infections in wild bird species has hindered our understanding of the importance of bacteria as causes of natural selection and in the formulation of satisfactory theories that incorporate parasites into models of sexual selection (Zuk 1991, Sheldon 1993).

The pathogenicity of some bacteria are well known

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