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Natal philopatry, site tenacity, and age of first breeding of the Semipalmated Sandpiper. —

There is a tendency for male-biased dispersal in birds and female-biased dispersal in mammals (Greenwood 1980). Considerable debate has centered on the reasons for such sex biases, primarily whether sex-biased dispersal exists as a means of avoiding harmful effects of extreme inbreeding (Greenwood et al. 1979, Greenwood 1980), or whether it results from intraspecific competition (Gauthreaux 1978, Moore and Ali 1984, Shields 1984, Liberg and von Schantz 1985). Pusey (1987) reviews both arguments.

Adults of many species of birds usually return to breed in areas where they have bred previously (Greenwood 1982). Therefore, in these species one would expect more obvious sexual biases in natal, compared to adult, dispersal, if sex-biased dispersal functions in inbreeding avoidance (Greenwood 1982), or to minimize intraspecific competition. It should, then, be most useful to examine sex biases in natal, rather than adult, dispersal. However, relatively few studies have examined sex biases in natal philopatry of birds (e.g., Greenwood 1980, Oring and Lank 1984).

The present note examines the effect of sex on natal philopatry, site tenacity, and age of first breeding from an eight-year study of a breeding population of Semipalmated Sandpipers (*Calidris pusilla*). The Semipalmated Sandpiper is a small, migratory shorebird with a monogamous, male-territorial mating system. I studied sandpipers at La Pérouse Bay, 40 km east of Churchill, Manitoba, in the summers of 1980 through 1987. During this period, I gradually increased the study area from 2 to 3 km². Approximately 40 to 130 pairs nested in the study area each year. Nests were mapped on 10× enlargements of aerial photographs (scale 1:2500, allowing accuracy to at least 3 m; Abraham 1980). Adult birds were given individual color-band combinations, while young nestlings were banded with one stainless steel band, and often a single color band. Adults were sexed by bill length and behavior (see Gratto and Cooke 1987). For a more complete description of the study site and methods see Gratto et al. (1985).

I defined natal philopatry as the return of birds banded as nestlings to breed in the study area. Natal site tenacity was defined as the distance from a bird's natal nest to the nest where it was first found breeding. Age of first breeding refers to the age a bird was first found with a nest. I might have missed the first breeding of a few individuals if their nests had been depredated very early, or if they had nested at the extreme edge of the study area (as did one female first found breeding at age 6). This should not have affected differences between sexes.

Because some individuals were first found breeding at age 4, returns of nestlings banded from 1980 to 1983 should be most complete (Table 1). Average return from these four years was 7 percent. Over all years, almost 90% of all young hatched in the study area were banded as nestlings. However, only 33.3% (8/24) of all yearling breeders from 1981 to 1987 (identified by the presence of partial postjuvinal wing molt, Gratto et al. 1983), were banded in

TABLE 1
RETURN RATES OF SEMIPALMATED SANDPIPER NESTLINGS BANDED AT LA PÉROUSE BAY
FROM 1980 TO 1986 AND LATER FOUND BREEDING THERE, 1981 TO 1987

Year	Nestlings banded	Found breeding in a subsequent year			Percent return
		Males	Females	Total	
1980	60	1	3	4	6.7
1981	56	3	1	4	7.1
1982	142	4	2	6	4.2
1983	117	8	6	14	12.0
1984	198	1	5	6	3.0
1985	166	1	0	1	0.7
1986	31	0	0	0	0.0
Total	770	18	17	35	4.5

the study area as nestlings, suggesting that more than half of all new breeders must emigrate into the study area from elsewhere.

Assuming a 1:1 sex ratio at hatch, there was no sex bias in the return of nestlings breeding in the study area (G-test, $P > 0.05$, see Table 1). Similarly, there was no significant sex difference in natal site tenacity (males: $N = 15$, median = 603 m, range 128–1425 m; females: $N = 14$, median = 742 m, range 145–1492 m; Mann-Whitney U -Test, $P > 0.05$).

There may be a tendency for females to begin breeding at an earlier age than males, although the difference was not significant (Table 2). Most females bred first at age 2, while equal proportions of males first bred at ages 1 to 4. There are indications that adult females may have slightly higher mortality rates than males, with an easier entrance into the breeding population (C. L. Gratto, unpubl. data). In fact, 69.7% (23/33) of all yearling breeders from 1980 to 1987 (identified by the presence of partial postjuvinal wing molt) were females, and only 30.3% (10/33) males.

TABLE 2
AGE AT WHICH SEMIPALMATED SANDPIPERS BANDED AS NESTLINGS WERE FIRST FOUND
BREEDING AT LA PÉROUSE BAY, 1980 TO 1987

Age (years)	Females (N)	Males (N)
1	4	4
2	10	5
3	2	5
4	0	4
5	0	0
6	1 ^a	0
Total	17	18

^a Found at extreme edge of study area, and not included in statistics.

TABLE 3
NATAL SITE TENACITY OF SEMIPALMATED SANDPIPERS WHEN FIRST FOUND BREEDING AT
LA PÉROUSE BAY, 1981 TO 1987

Age (years)	Distance from natal nest (m)	Range	N
1	379 ^a	128–615	6
2	638	350–1378	13
3	742	823–1436	10

^a Significantly different from 2-year-old birds and birds ≥ 3 years old, $P \leq 0.05$, Mann-Whitney U -test.

Yearlings bred closer to their natal nest than did those first breeding at age 2, or older (Table 3). It is not known why this should occur, unless birds first breeding as two year olds or older, many of which apparently do not migrate north as yearlings (Gratto and Morrison 1981, Spaans 1984), are less able to obtain territories near their natal site.

In conclusion, the results of this study indicate no sex bias in natal philopatry. This finding disagrees with the ideas of Greenwood (1980), and Liberg and von Schantz (1985), who predicted male-biased natal philopatry in monogamous birds due to greater advantages of site familiarity for males, in territory acquisition. However, since Semipalmated Sandpipers show near-equal parental investment (both parents incubate and young are precocial), and sexes are monomorphic and of near-equal size (Prater et al. 1977), neither dominance (Gauthreaux 1978) nor sexual selection (Oring and Lank 1982) are likely to be a cause of sex-biased dispersal. Additionally, in such short-lived, nonsedentary birds, the potential for close inbreeding is reduced (Redmond and Jenni 1982). Therefore, neither of the suggested ultimate causes of sex-biased dispersal are likely to be important in this species, so it is perhaps not surprising to find a lack of sex bias in natal philopatry. Results from other small calidridine sandpipers with equal parental investment are similar (Dunlin [*C. alpina*] Soikkeli 1970; Temminck's Stint [*C. temminckii*] Hildén 1979; and Western Sandpiper [*C. mauri*] R. T. Holmes in Oring and Lank 1982).

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