
Observations on Breeding Site Fidelity and Pair Formation in American Avocets and Black-necked Stilts

Tex A. Sordahl
Dept. of Biology,
Luther College,
Decorah, IA 52101

The Eurasian Avocet (*Recurvirostra avosetta*) is the only member of the Recurvirostridae on which extensive banding studies have been conducted. Cadbury and Olney (1978) estimated first-year survival in a population in England at 41% and annual adult survival rate at 78 to 90%. In that population about 65% of the avocets first breed when 2 yr old, the remainder starting at 3 or 4. This suggests that recurvirostrids are relatively long-lived; the longevity record for the Eurasian Avocet is 24 yr 6 mo, and for the Eurasian Stilt (*Himantopus himantopus*) it is 12 yr 2 mo (Cramp et al. 1983). Attachment to the natal site is weak in Eurasian Avocets, but they tend to return to an area once they have bred there (Cadbury and Olney 1978).

Although the American Avocet (*Recurvirostra americana*) and Black-necked Stilt (*Himantopus mexicanus*) seem nearly identical in behavior to the Eurasian species (Hamilton 1975, Cramp et al. 1983), comparable information that could be derived from banding does not exist for them. There are no longevity records for either the American Avocet or the Black-necked Stilt (Clapp et al. 1982). Furthermore, their migration routes, age at first breeding, timing of pair formation, duration of pair bonds, breeding site and natal site fidelity, adult survival rates, and interactions between breeding success and the preceding parameters remain unknown. Here I summarize information available in the literature, and present observations made during a behavioral study of sympatric populations of American Avocets and Black-necked Stilts which provide preliminary information on the pair bond and site fidelity.

Methods

Observations were made at 2 sites in northern Utah. The principal study site was the Barrens Company Hunting Club in Cache County. This 205-ha area was the prime recurvirostrid habitat in a 16 km × 80 km valley; it supported breeding populations of about 85 avocet and 25 stilt pairs. During spring migration, peak numbers of avocets and stilts reached 361 and 85, respectively. The breeding schedules are summarized in Sordahl (1981). During 1977 and 1978 I captured 21 (15 males, 6

females) adult avocets and 9 (5 males, 4 females) adult stilts, either by nest-trapping (Sordahl 1980) or night-lighting (Potts and Sordahl 1979). Each was given a U.S. Fish and Wildlife Service band and a unique color-band combination on the tibio-fibula. I also captured 49 avocet chicks and 51 stilt chicks at the Barrens. Two of the avocet chicks and 6 of the stilt chicks were color-banded; the rest received only USFWS bands. At a secondary study site, the Bear River National Wildlife Refuge in Box Elder County, I banded (also during 1977 and 1978) 123 avocet and 69 stilt chicks with USFWS bands. The Bear River Refuge, located about 72 km south of the Barrens, contained relatively large populations of both species.

Field work was conducted almost daily from mid-March to mid-September in 1977 and 1978. Although no further banding was done, observations were made regularly in 1979 and on a few days in spring 1980. Color-bands of the overlapping type were used, and each was fused with acetone. Thus band retention was probably excellent during this study. Three-year-old bands on one bird were easily visible and appeared in good condition.

Results

Six of 21 (29%) adult avocets and 2 of 9 (22%) adult stilts color-banded at the Barrens were seen the following year (Table 1). One male avocet was seen during 3 different years. At least 5 of 8 (63%), and possibly as many as 7 of 8 (88%), returnees had nested successfully the year before. For comparison, only 7 of 22 (32%) banded individuals that did not return had nested successfully. In only 2 avocet pairs were both members of the pair color-banded. Each pair nested successfully. The following year members of one of these pairs were seen together, and the female of the other pair was seen associating with an unbanded male. Nesting was not confirmed at the Barrens for any of the avocet or stilt returnees.

A downy male stilt chick color-banded in 1977 returned to nest near its natal site in 1979 (Table 1). However, no other avocets or stilts banded as chicks, either at the Barrens or at the Bear River Refuge, were seen in subsequent years.

Discussion

Although the regular occurrence of supernumerary clutches (summarized in addendum to Yom-Tov 1980) might be due to occasional polygyny or cooperative breeding, American Avocets and Black-necked Stilts appear to be strongly monogamous. It is not clear when pair formation occurs or how long it takes. Most avocets seemed to be paired when I first observed them at the Barrens. However, the earliest arrivals in 1977 (3 birds) were unpaired males. The first stilt to arrive in 1977 was also an unpaired male. Trios and 3-bird chases seemed more common in stilts than in avocets, suggesting that stilts were less often paired on arrival. For the American Avocet some reports have suggested that pairing occurs before arrival at the breeding site (Wolfe 1931, Gibson 1971), whereas others (e.g. Brooks 1909) indicated pairing on the breeding grounds. Makkink (1936) believed that the Eurasian Avocet pairs both during the latter part of migration and immediately after arrival on the breeding grounds. Hamilton (1975) observed pairing in late winter at his California study site; but since avocets and stilts both breed and winter there, he could not determine whether the birds were pairing on their breeding or wintering site, or their migration route.

It is common for birds without marked sexual dimorphism to have an extended courtship (Mayr 1965:126–127). Hamilton (1975) described a rather lengthy period of pair formation in both avocets and stilts during which a female selects a male and associates herself with him despite initial rebuffing. A “pairing prior to arrival” hypothesis should not be accepted uncritically (Jehl 1968). This phenomenon has not been adequately documented for any shorebird. However, it is possible that pair formation in the American Avocet and perhaps also the Black-necked Stilt begins on the wintering grounds or at migration stopovers and continues until shortly after arrival at the breeding grounds, at least for the population as a whole. This was the interpretation of Cramp et al. (1983) for information available on the Eurasian Avocet and the Eurasian Stilt. Variation in age, experience, and hormonal state probably influences the timing of pairing for each individual. Dinsmore’s (1977) report of possible pairing behavior in American Avocets in late March—early April in Florida, where the species does not breed, supports the idea that some pairing occurs on the wintering grounds.

The duration of the pair bond is not well-known, but my observations suggest that members of a pair commonly do not remain together after the breeding season. In both avocets and stilts, one or both parents frequently abandon the brood late in the fledgling care period

(pers. obs.). After a nest or brood loss I often saw adult avocets feeding alone, apparently no longer associated with their mates. The relatively small size of the study area makes it unlikely that abandoning parents or unsuccessful pairs were maintaining a loose association that I could not detect. Of 11 avocet pairs in which at least one member was color-banded and that suffered nest or brood loss, 6 banded birds (3 males, 3 females) were later observed and judged to be alone, and 4 (all males) were later observed in close association with conspecifics of the opposite sex. Of the 4 that remained paired (or that re-paired), at least 2 renested that season. Four stilt pairs in which one member was color-banded lost their nests, but none of the banded individuals was seen subsequently.

Despite these indications that avocet and stilt pairs frequently do not remain together during fall migration and the likelihood that it would be difficult for a pair to maintain contact in winter flocks, I observed an avocet pair together in 2 successive years. And Gibson (1971) saw a color-marked avocet pair together 2 yr after they had nested successfully on his study area. This means that some pairs either (1) remain together throughout the year, or (2) exhibit fidelity to the breeding site and/or migration route. A mechanism facilitating re-pairing of mates from previous seasons that invokes site/route fidelity must be coupled with individual recognition by the pair; the different locations of nesting colonies from year-to-year (pers. obs., Hamilton 1975:78–79) are evidence that any site fidelity in recurvirostrids is not highly specific.

The return records for American Avocets and Black-necked Stilts presented here are consistent with the generalization that individuals tend to return to an area once they have bred there, especially if they were successful. However, I have no evidence that returnees actually nested at the Barrens in the second year. The low return rate for banded chicks may be a result of: (1) weak natal site fidelity, (2) high mortality on the young, and/or (3) termination of the study 1–2 yr before some chicks would have begun to breed.

Summary

Observations that relate to timing of pair formation, duration of pair bonds, age at first breeding, and breeding and natal site fidelity, are presented for small color-banded populations of American Avocets and Black-necked Stilts in northern Utah. Six of 21 (29%) adult avocets and 2 of 9 (22%) adult stilts returned the following year, although they may not have nested; a high per-

centage of returnees had nested successfully the year before. One male stilt chick returned to nest near its natal site at 2 yr of age; it was the only returnee of 51 stilt and 49 avocet chicks.

An extended period of pair formation may occur in American Avocets and Black-necked Stilts, with some birds beginning on the wintering grounds or at migration stopovers, and others after arrival at the breeding grounds. Members of a pair probably do not remain together after the breeding season. However, 2 return records of avocet pairs suggest that some pairs do winter together or that some mechanism like site fidelity reunites them.

Acknowledgments

I thank J. B. Parson for allowing me to work at the Barrens, and N. Peabody for permitting me to work at the Bear River National Wildlife Refuge. K. L. Dixon, J. J. Dinsmore, J. A. Jackson, and J. R. Jehl, Jr. made helpful comments on the manuscript, and K. G. Smith provided banding assistance. Financial support was provided by the Frank M. Chapman Memorial Fund of the American Museum of Natural History and by Sigma Xi, The Scientific Research Society.

Literature Cited

- Brooks, A. 1909. Some notes on the birds of Okanagan, British Columbia. *Auk* 26:60-63.
- Cadbury, C. J., and P. J. S. Olney. 1978. Avocet population dynamics in England. *Br. Birds* 71:102-121.
- Clapp, R. M., M. K. Klimkiewicz, and J. H. Kennard. 1982. Longevity records of North American birds: Gaviidae through Alcidae. *J. Field Ornithol.* 53:81-124.
- Cramp, S., K. E. L. Simmons, D. J. Brooks, N. J. Collar, E. Dunn, R. Gillmor, P. A. D. Hollom, R. Hudson, E. M. Nicholson, M. A. Ogilvie, P. J. S. Olney, C. S. Roselaar, K. H. Voous, D. I. M. Wallace, J. Wattel, and M. G. Wilson. 1983. *Handbook of the birds of Europe, the Middle East and North Africa: the birds of the Western Palearctic. Vol. 3: waders to gulls.* Oxford Univ. Press, New York.
- Dinsmore, J. J. 1977. Notes on avocets and stilts in Tampa Bay, Florida. *Fla. Field Nat.* 5:25-30.
- Gibson, F. 1971. The breeding biology of the American Avocet (*Recurvirostra americana*) in central Oregon. *Condor* 73:444-454.
- Hamilton, R. B. 1975. Comparative behavior of the American Avocet and the Black-necked Stilt (*Recurvirostridae*). *Ornithol. Monogr.* 17:1-98.
- Jehl, J. R., Jr. 1968. Review: The shorebirds of North America. *Auk* 85:515-520.

- Makkink, G. F. 1936. An attempt at an ethogram of the European Avocet (*Recurvirostra avosetta* L.), with ethological and psychological remarks. *Ardea* 25:1-62.
- Mayr, E. 1965. *Animal species and evolution.* Belknap Press of Harvard Univ. Press, Cambridge, Massachusetts.
- Potts, W. K., and T. A. Sordahl. 1979. The gong method for capturing shorebirds and other ground-roosting species. *N. Am. Bird Bander* 4:106-107.
- Sordahl, T. A. 1980. A nest trap for recurvirostrids and other ground-nesting birds. *N. Am. Bird Bander* 5:1-3.
- Sordahl, T. A. 1981. Phenology and status of the shorebirds in northern Utah. *West. Birds* 12:173-180.
- Wolfe, L. R. 1931. The breeding Limicolae of Utah. *Condor* 33:49-59.
- Yom-Tov, Y. 1980. Intraspecific nest parasitism in birds. *Biol. Rev. Camb. Philos. Soc.* 55:93-108.

Dept. of Biology and The Ecology Center, Utah State University, Logan UT 84322 (current address: Dept of Biology, Luther College, Decorah, IA 52101).



Table 1. Banding dates, breeding history, and sight records of returning color-banded American Avocets and Black-necked Stilts at The Barrens, Cache County, Utah.

	USFWS Band Number	1977	1978	1979	1980
AVOCETS					
adult males	634-43401	caught by nightlighting 14 May; breeding status unknown; not seen again.	seen 26 March - 3 April, associating with a female; exhibited precopulatory displays; seen alone 10 May.	-----	seen 1 May; associating with a female, and defending feeding territory with her; bands appear in good condition.
	634-43405	nest-trapped 28 May; mate is USFWS # 634-43406; eggs hatched 2 June.	seen 23 April; associating with mate of previous year; not seen again.	-----	-----
	*634-43413 or 634-43415	nest-trapped 9 June; eggs hatched 20 June. nest-trapped 17 June; eggs hatched 9 July.	seen 27 March; associating with a female.	-----	-----
adult females	634-43404	nest-trapped 25 May; mate nest-trapped and banded 1 June; eggs hatched 3 June.	seen 5 April; associating with an unbanded male.	-----	-----
	634-43406	nest-trapped 29 May; mate is USFWS # 634-43405; eggs hatched 2 June.	possibly seen alone 19 April; seen 23 April, associating with mate of previous year; not seen again.	-----	-----
	634-43483	-----	nest-trapped 7 June; associated with nest containing 8 eggs; nest depredated 24 June.	seen 14 April; associating with a male.	-----
STILTS					
adult male	1293-13860	-----	nest-trapped 15 June; eggs hatched 29 June.	seen 5 May; associating with a female.	-----
adult female	*1293-13802 or 1293-13804	caught by nightlighting 14 May; breeding status unknown; not seen again. nest-trapped 10 June; nest deserted 14 June.	seen feeding alone 19 May.	-----	-----
chick	1293-13810	hatched and was banded 19 June; recaptured and color-banded 16 July.	-----	seen 19 May; identifiable as a male; distraction behavior indicative of nearby nest.	-----

*color-band combinations difficult to read in the field; sight record may be of either of 2 individuals.