

SHORT COMMUNICATIONS

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MAINTENANCE OF PAIR-BONDS IN THE HOUSE FINCH¹

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The cardueline finches have been described as a group that does not maintain multiyear pair-bonds (Newton 1973). In concurrence with this, House Finches (*Carpodacus mexicanus*) in the western United States were noted as not maintaining pair-bonds between years (Thompson 1960). However, earlier work by Bertold (1913) suggested that House Finches may maintain multiyear pair-bonds, while studies in which birds were individually marked (Hirai 1975, van Riper 1976) made no mention of pair-bond maintenance. During my investigation of the breeding behavior of the House Finch, I found that bonds were maintained for pairs in which both members survived to the next breeding season.

I conducted observations on Año Nuevo Island, located 1 km off the central Californian coast (37°07'N, 122°22'W), between December 1980 and September 1983. The island is covered with a low dune vegetation that overhangs bluffs. House Finches nest in the overhanging vegetation and in buildings on the island. All breeding birds and their offspring on the island were individually marked with unique combinations of colored leg bands.

A total of 39 different pairs was observed. In 17 (43%) of these pairs both members survived at least two breeding seasons. Maintenance of a pair-bond for longer than 1 year occurred in 16 out of the 17 possible pairs (94%). In the pair that did not remain together, the male was the most promiscuous bird in the study population (greatest number of extra-pair copulations). This pair had failed to produce offspring in 1980 and in the following year the female paired with another male. There were six cases of individuals losing their mates, and forming bonds with new mates, typically (83%) with individuals older than 2 years. A brief visit to the island in 1983 indicated that at least four pairs maintained pair-bonds for 3 years.

House Finch pairs on Año Nuevo Island also main-

tained a high degree of association outside of the breeding season. In tests of association using methods described by Fernald (1973) and Trillmich (1976), pairs perched together (32 χ^2 tests; all P -values < 0.001) and were found in the same flock (32 χ^2 tests; all P -values < 0.001) significantly more than was expected by chance. Courtship feeding was observed on two occasions during the nonbreeding season; the males regurgitated seeds to their mates after being solicited with a begging posture. Of the six cases of remating after the death of a member, five of the surviving pair members were found to be in association with another individual before the first egg of the season was laid. All five of these pairs fledged at least one offspring. Individuals on Año Nuevo Island were sedentary; recapture rates were high (0.24 recaptures per trap-hour for males, 0.15 for females) and most individuals were observed on a daily basis. The philopatry of House Finches has been described in several other studies (Thompson 1960, Aldrich 1978).

I was unable to quantify any significant differences in nest-site choice between multiyear and single-year pairs (Mann-Whitney U -tests all $P > 0.05$). Nest-site variables tested included: height of nest, vegetation cover (type, density, and height), wind velocity (using a hand-held wind gauge in nest), temperature (thermometer in nest), and nearest-neighbor distance. No nests were reused by the same pair within a single breeding season but in the next season, birds reused their old nests in seven out of 24 (29%) cases. Seventy-four percent of all nests had been used previously. Outside of the breeding season, I observed no territorial defense or attachment to a breeding site.

Pairs that maintained bonds bred earlier and achieved higher reproductive success (Table 1) than those that did not. I was able to follow postfledging young and so determined reproductive success as the number of offspring surviving 1 month after fledging. Three broods in a single breeding season were recorded for nine pairs; seven of these pairs (78%) had maintained a pair-bond from the previous season. Although no significant difference in clutch size was observed, the mean number of broods was significantly higher for pairs maintaining pair-bonds (Table 1).

Previous studies have shown that if both individuals survive, reproductive output can be increased by re-

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TABLE 1. Reproductive success of pair-bonds of different durations.^a Reproductive success was determined as the number of young surviving 1 month after fledging.

Category	Multiyear pairs <i>n</i> = 16		Single-year pairs <i>n</i> = 23
First egg date of first brood	10.8 ± 11.5 ^b	***	35.0 ± 12.7
Number of successful broods	2.5 ± 0.42	***	1.7 ± 0.59
Clutch size (all broods)	4.3 ± 0.37		4.2 ± 0.46
Reproductive success	2.9 ± 0.49	*	1.8 ± 0.65

^a All tests by two-tailed Mann-Whitney *U*.

^b Days after first egg of breeding season.

*** = *P* < 0.001.

* = *P* < 0.05.

mating with the same individual (Coulson 1966, Rowley 1974). House Finches which maintained pair-bonds had both an earlier first egg date and higher reproductive success. Rowley (1983) noted that: (1) birds that abandon the breeding territory once the young fledge face greater difficulties maintaining pair-bonds, and (2) high mortality should preclude the presence of long-term pair-bonds or force individuals to decide whether to find a replacement if their mate does not return or is late. For birds, such as the House Finch, which abandon the breeding territory but remain in sedentary flocks, the cost of maintaining the pair-bond throughout the year is probably low compared to the cost of finding a new mate. The constant association of pair members would also allow an individual to recognize the loss of a mate and find a replacement before the breeding season started, as was seen in five of the six pairs in which mates were lost between breeding seasons. Maintenance of pair-bonds may be found to occur in other philopatric finches as their breeding biology is studied in detail.

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