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A 20-year Study of Barn Owl (*Tyto alba*) Reproduction in Northern Utah

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*Expanded Abstract.*—I studied reproduction of the Barn Owl (*Tyto alba*) in northern Utah from 1977 through 1996 documenting 451 nesting attempts by at least 500 individuals. The study site was a narrow valley bounded by the Wasatch Mountains and the Great Salt Lake. This area was formerly shrubsteppe desert, but that community is now entirely supplanted by irrigated agriculture and urban development. Hot dry summers and cold winters characterize the region; mean temperatures for July and January are 23.9°C and -3.5°C. No natural nest sites suitable for Barn Owls exist on the area, and all Barn Owls nested in artificial structures, mostly nest boxes. Winter weather had a strong influence on the population's reproduction. Persistent snow cover and cold temperatures significantly delayed onsets of egg laying and reduced the number and success of breeding attempts. Clutch size, however, did not differ significantly among years or among nest sites. Complete first clutches averaged 7.25 eggs ( $n = 360$ ). Replacement ( $\bar{x} = 5.63$ ,  $n = 19$ ) and second clutches ( $\bar{x} = 5.69$ ,  $n = 39$ ) were significantly smaller than first clutches, but replacement and second clutches were not significantly different. Sizes of first ( $\bar{x} = 5.51$ ,  $n = 314$ ) and second broods ( $\bar{x} = 5.69$ ,  $n = 32$ ) did not differ significantly, but replacement broods ( $\bar{x} = 4.00$ ,  $n = 12$ ) were significantly smaller than both first and second broods. Of all nesting attempts, 93 per cent produced full clutches and 76 per cent yielded at least one fledgling. Successful nests on average produced 5.10 ( $n = 298$ ) fledglings per first brood, 5.35 ( $n = 34$ ) per second brood, and 3.56 ( $n = 9$ ) per replacement brood. Number of fledglings per nest was not significantly different between first and second broods, but both first and second produced significantly more fledglings than did replacement broods. Second clutches were more likely to produce fledglings than either first or replacement clutches. Sixty-six per cent of all eggs laid hatched and 58 per cent produced fledglings. Of eggs that hatched, 87 per cent survived to fledging. 13 March was the mean date for initiation of egg laying and latest second clutches hatched on 4 October.

I documented lifetime reproductive success (LRS) for 262 owls. Mean age of first breeding by marked individuals was 1.06 years (range <1-3), mean number of years breeding was 1.30 (range 1-7), and mean number of years breeding successfully was 1.03 (0-6). Eleven per cent of these owl pairs produced two broods in one year. Mean number of eggs produced in a lifetime was 9.76 (range 1-66) and mean number of young fledged was 5.58 (range 0-50). Eight per cent of the females laid 25 per cent of the population's eggs and 55 per cent laid 75 per cent. Of females that laid eggs, 22 per cent produced no fledglings. Twelve per cent of females left breeding descendants in the population with up to four generations traced; the number of direct descendants from these females ranged from 3-69. The number of eggs laid in lifetimes was significantly correlated with life spans and with the number of fledglings produced. Breeding age of females did not strongly affect clutch size nor the number of fledglings produced in a breeding season. Habitat variability did not affect LRS, but nest sites used often had higher nesting success. Severity of winter weather had a strong influence on LRS through mortality of adults, reduction in clutch size and in the likelihood of producing two broods in one season. Age that breeding began and the sex of Barn Owls had very little influence on individual LRS.

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