Statistical Analysis of Cliff Swallow Population Dynamics

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Coloniality is a vertebrate social system, observed in 13% of avian species, occurring when individuals breed in densely clustered territories. It is known that coloniality provides species with many survival benefits, however, the specific mechanisms of colony choice remain unclear. Current knowledge of avian coloniality is largely based on an authoritative 10+ year study by Brown and Brown on colonies of Cliff Swallows (Petrochelidon pyrrhonota) in Nebraska. I replicated their investigations into colony selection patterns and survivorship using 7 years of data from a population of Cliff Swallows in Colorado (N=6054), to investigate the applicability of their findings to the species as a whole and the role of genetic and environmental factors on colony choice. Percentages of birds breeding in the same site for two consecutive years were found to be significantly similar between the total Nebraska population and a localized population within the Colorado study area (60%, N=51), suggesting that a genetic component contributes to site fidelity as well as site-specific factors. Differences between the two studies in how far birds which switched colonies tended to move indicates a high effect of environmental factors, specific to the study areas, on dispersal. Comparisons between survivorship ranges for the two studies yielded inconclusive results. Site fidelity and dispersal averages were significantly similar for males and females within both populations, signaling that sex has no effect on these aspects of the study, although differences in survivorship were observed between males and females. An improved understanding of Cliff Swallow coloniality will lead to advances in general knowledge of avian coloniality and habitat protection for colonial species.

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