

Drought-caused delay in nesting phenology of Sonoran Desert birds

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In the Sonoran Desert, annual rainfall occurs in a bimodal pattern, with gentle, soaking rainfall in the winter and locally intense rainfall in the summer. Winter rainfall is correlated with variation in primary production, the amount of 'greening up' of the deserts in the spring. In southwestern North America, there is a consensus among climate models that seasons of below-average winter rainfall will occur more frequently in coming decades, resulting in more springs with diminished primary production.

From 2004-2008, Point Blue found a negative relationship between winter rainfall and the timing (or "phenology") of nesting the following spring for all 13 bird species studied. Drought-caused delay in nesting was often severe, sometimes spanning several weeks.

While this correlation has been found in other arid habitats, it is contrary to substantial evidence from non-arid habitats, where

earlier nesting corresponds with warmer temperatures.

Further, for all 4 species with sufficient sample size in our study, the later a nest's initiation date, the lower its probability of surviving long enough to fledge young.

To find the mechanisms behind this time-dependent decrease in nesting success, we teamed with the U.S. Geologic Survey to conduct a novel experiment that recreated delayed nesting phenology observed during past droughts during a wet winter rainfall season in 2010.

We found that delayed pairs experienced lower nesting success than early-nesting pairs, even during a wet year. This was due to increased rates of depredation and Brown-headed Cowbird parasitism later in the season. For Sonoran Desert bird species, each day of nesting lost to drought increases a pair's exposure to higher nest depredation and brood

parasitism across the remainder of the breeding season.

Main Points

Nesting phenology was negatively correlated with winter rainfall for Sonoran Desert species from 2004-2008. Nesting delay of several weeks was evident in some cases.

Nesting success was time-dependent: nests with later initiation dates had lower survival, due to higher rates of nest depredation and brood parasitism later in the season.

Low productivity resulting from low survival of later nesting attempts raises concerns for what the future holds, given that climate change projections signal that drought and associated late nesting will occur more frequently in arid habitats of southwestern North America.

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