

Modeling the effects of chemical exposure on avian seasonal productivity: Importance of differences in breeding strategies.

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Agencies that regulate the use of chemicals are increasingly interested in understanding the magnitude of effects of those chemicals on wildlife populations. While laboratory toxicity tests provide insights into the types of effects caused by chemical exposure, they do not always provide adequate information on how the use of a chemical would change the demographic parameters needed for population modeling. We present a Markov nest productivity model, a.k.a. MCnest, as a simulation model for estimating the effects of chemicals on avian seasonal productivity rates, expressed as the number of female fledglings produced per adult female per year. MCnest uses measured toxicity test endpoints as surrogates for potential chemical effects in the field in combination with information on avian life history parameters and the timing of chemical applications to estimate the effects on reproductive success in a simulated population. The results from MCnest illustrate that the risks from chemical exposure are influenced by differences in breeding strategies and the timing of chemical applications relative to breeding seasons. The presentation will demonstrate how MCnest can determine which avian species are at greatest risk, how changes in the timing of chemical applications changes risk, and how different types of effects on reproductive success affect estimates of risk. *This abstract does not necessarily reflect USEPA policy.*