

SHORT COMMUNICATIONS

POTENTIAL ECOTOXICOLOGICAL SIGNIFICANCE OF ELEVATED CONCENTRATIONS OF STRONTIUM IN EGGSHELLS OF PASSERINE BIRDS

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Abstract. We investigated the occurrence and potential ecotoxicological significance of elevated concentrations of strontium (Sr) in eggshells of nine passerine birds from four regions in Arizona. Concentrations of Sr in eggshells ranged from 70 to 1360 $\mu\text{g g}^{-1}$ dry weight (overall mean = 684 ± 345 SD $\mu\text{g g}^{-1}$ dw) for the four regions. 23% of the eggshells had Sr concentrations greater than 1000 $\mu\text{g g}^{-1}$ dw. To our knowledge, these are among the highest levels of Sr that have been reported in bird eggshells in North America. Of the nine species, Brown-headed Cowbirds (*Molothrus ater*) had the greatest concentrations of Sr. There was a significant positive correlation between Sr and calcium (Ca), and between barium (Ba) and Ca. Ca, Sr, and Ba interact with each other and can exert similar chemical and pharmacological effects. Mean ($n \geq 3$) eggshell:egg ratios for Sr varied with species and ranged from 6.1:1 to 40.2:1; ratios for individual eggs reached 92.7:1. Mean Sr/Ca values ranged from 1.3×10^{-3} to 3.0×10^{-3} and mean eggshell thickness ranged from 83 ± 6 to 120 ± 9 μm for all species. Eggshell thickness was not significantly correlated with Sr for any species but tended to increase with Sr concentrations. We postulate that high concentrations of Sr in the shell could affect later-stage embryos by possible interference with Ca metabolism and bone growth, resulting in reduced hatching success and potential minor beak deformities.

Key words: Arizona, birds, ecotoxicology, eggshell, metals, strontium.