Abstract

Sensitivity of avian embryos to methylmercury.

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Contamination of the environment with mercury is especially dangerous to fish-eating birds because methylmercury accumulates in the food chains of these species and is then deposited in their eggs. Avian embryos are especially sensitive to methylmercury, and one of the goals of mercury research with birds has been to determine how much mercury in eggs is harmful to various species. Laboratory studies with mallards (*Anas platyrhynchos*) have shown that reproductive success declines when mercury accumulates in eggs. Unfortunately, virtually nothing has been learned about the reproductive effects of mercury on fish-eating birds, largely because of the great difficulty and expense of breeding fish-eating birds in captivity and the difficulty in assessing the effects of mercury in the field. As a practical substitute for captive breeding studies, we developed a technique for injecting the eggs of wild birds with methylmercury and measuring the effects on embryo survival. The eggs of several fish-eating birds were collected in the field, shipped to us, and incubated in artificial incubators. Various doses of methylmercury, dissolved in corn oil, were injected into the air cell of the egg and embryo survival was followed. When mallard eggs were injected with increasing concentrations of methylmercury, hatching success was 76% for controls, and 56, 62, 53, 44, and 29% for eggs injected with 0.1, 0.2, 0.4, 0.8, and 1.6 ppm mercury, respectively. Some fish-eating birds seemed to be more sensitive than mallards. For example with white ibis (Eudocimus albus) eggs, hatching success was 62% for controls and 10, 25, and 20% for eggs injected with 0.2, 0.4, and 0.8 ppm mercury, respectively. Our results suggest that the embryos of some species of fish-eating birds may be more sensitive to methylmercury than are the eggs of mallards and that estimates of harmful levels of mercury in eggs, which have been based on reproductive trials with mallards in the lab, may have to be re-evaluated.