



Patuxent Science Meeting 2004 Poster Abstract

Sensitivity of Avian Embryos to Methylmercury

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In general, 95 to 99% of the mercury in fish is in the form of methylmercury, which is the most harmful form to birds. Aquatic birds, especially fish-eating species, are, therefore, especially vulnerable to methylmercury. In laboratory studies with chickens (*Gallus gallus*), ring-necked pheasants (*Phasianus colchicus*), black ducks (*Anas rubripes*), and mallards (*Anas platyrhynchos*) reproduction was harmed when methylmercury was added to the diet of breeding adults. No controlled laboratory studies have been done to examine the effects of mercury on the reproductive success of fish-eating or other aquatic birds. It is difficult to raise fish-eating birds in captivity in sufficient numbers to conduct a reproductive study with methylmercury. Most of these species take years to reach sexual maturity, and their care and breeding in captivity are poorly understood. Consequently, we developed an approach, to collect wild bird eggs and inject them with various doses of methylmercury. This approach bypassed the problems of breeding adults in captivity. With game farm chickens, pheasants, and mallards, full captive breeding studies with methylmercury have already been done, allowing us to compare the toxicity results from the full breeding studies to results from our injection studies with the same three species. Many factors, embryo age, place of injection in the egg, solvent used to dissolve the methylmercury, and method of incubating the egg, affect the toxicity of methylmercury to avian embryos. We developed a workable protocol in which the eggs of various species of birds could be compared in their sensitivity to methylmercury. This protocol involved injecting various doses of methylmercury dissolved in corn oil into the air cell of the egg when the embryo of that species was at the developmental equivalent of a 3-day-old chicken embryo. The embryos of chickens, pheasants, and mallards were of about the same relative sensitivity to methylmercury when eggs were injected as they were when the mother naturally deposited the methylmercury into her own eggs. The embryos of different species of birds differ in their sensitivity to methylmercury, suggesting that the thresholds of mercury set to protect laboratory species of birds may not protect all species of wild birds.