Examination of mercury in life stages and body regions of dragonflies from Big Dam Lake, Kejimkujik National Park

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Dragonflies (Odonata:Anisoptera) emerge from the water containing significant amounts of methylmercury (MeHg) which can be transferred to their aquatic and terrestrial predators, contributing to mercury biomagnification. This study seeks to understand the influence of mercury sequestration in differing body regions and life stages of the dragonfly in order to fill knowledge gaps in the literature regarding mercury bioaccumulation in dragonflies. Dragonfly naiads, adults, and exuviae were collected from Big Dam East and West Lakes in Kejimkujik National Park, Nova Scotia in the summer of 2010. Mean whole body concentrations of MeHg were substantial in dragonfly naiad (232±112 ng g⁻¹ dry wt, n=66), emerging adults (236±50 ng g⁻¹ dry wt, n=10), and mature adults (231±74 ng g⁻¹ dry wt, n=20). Mean MeHg concentrations in exuviae (5.6±4.3 ng g⁻¹, n=32) were 40-fold lower than in naiads and adults. MeHg concentrations did not differ significantly between naiads and adults. Emerging adults had 2-fold to 2.5-fold higher inorganic mercury (Hg(II)) concentrations than naiads, mature adults, and exuviae. In body regions of both naiads and adults, some abdomens contained significantly higher concentrations of Hg(II) than heads or thoraces, and this trend was consistent across families. Mercury concentrations differed significantly between families suggesting that this variable is important when looking at mercury in dragonflies. Shedding of exuviae presents a possible mechanism for mercury detoxification, but mercury concentrations and burdens in exuviae are low in comparison with naiads and adults. Dragonfly adults retain a high potential for transferring substantial amounts of MeHg to their predators.