

Strongly increasing blood concentrations of lipid-soluble organochlorines in high arctic common eiders during incubation fast

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Abstract

Female common eiders (*Somateria mollissima*) starve during the nesting stage and may lose 30–45% of their initial body mass, mostly through lipid mobilization. In this study, the effects of fasting on the blood concentrations of three lipid-soluble organochlorines (OCs: polychlorinated biphenyl [PCB]-153; 1-dichloro-2,2-bis (p-chlorophenyl) ethylene [p,p0-DDE]; and hexachlorobenzene [HCB]) were examined in eiders breeding in the high Arctic. Blood samples were taken from females (n = 47) at day 5 and day 20 of the incubation period. The mean wet weight concentrations of PCB-153 and p,p0-DDE increased strongly between day 5 and day 20 (3.6 and 8.2-fold, respectively), while HCB increased less (1.7-fold). There was a strong negative association between daily increase in PCB-153 and clutch size, and a weaker relationship for p,p0-DDE, suggesting that maternal transfer to the eggs is a significant pathway of elimination of OCs in eiders. Moreover, poor body condition (body mass controlled for body size) late in the incubation period was associated with strong daily increase of both p,p0-DDE and PCB-153, which may suggest that the release of these compounds increases when lipid reserves become depleted. For HCB, the increase was mainly associated with increase in blood lipid concentrations, and weakly to the amount of burned lipids. The causes for the differences between the compounds are, however, poorly understood. Although the absolute levels of OCs in eiders were relatively low, their rapid build up during incubation is worrying as it coincides with poor body condition and weakened immune systems.

Keywords: Seabird, Organochlorines, Lipids, Incubation, Starvation, Blood