

Incubating Common Eiders (*Somateria Mollissima*) in Three Baltic Colonies were measured for Body Mass, Mercury Exposure

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Introduction

The common eider population in the Baltic/Wadden Sea Flyway has decreased over the last three decades. Multiple variables have been proposed to explain the drop, including pollutant exposure, global warming, hunting, white-tailed eagle predation, decreasing agricultural eutrophication, and infectious illnesses. To investigate incubating birds' metabolisms and energy balance, we gathered data on body mass, mercury (Hg) concentration, biochemistry, and untargeted metabolomics in two colonies in the Danish Straits [1].

In the Northern Hemisphere, the common eider is the largest and heaviest sea duck. Danish eiders are a biological subgroup of the Baltic/Wadden Sea Flyway population, which numbers over 900,000 birds. Breeding populations from Finland, Sweden, Denmark, southern Norway, and Germany make up the flyway. The second largest eider duck colony in Denmark is on the island of Christians, which is located in the southern portion of the Baltic Proper. The eiders on Christians travel from their wintering grounds in the western Baltic Sea to the Wadden Sea in the Netherlands. From late February to early April, they return to their summer mating habitats [2].

The Christians' colony, like the rest of the flyway, has seen population loss in recent decades. Long-term monitoring has showed that the population expanded from about 1,000 to about 3,000 breeding eiders but that the number has fallen by around 50% from 1990 to date for unexplained reasons. Despite the fact that the causes of these variations are unknown, a number of theories have been proposed. Changed access to food in winter areas and breeding locations, eutrophication of agriculture, infectious diseases such as fowl cholera, parasitic burdens, and blooming toxic algae, to name a few, as well as predation from the Baltic population of white-tailed eagles. Which has increased significantly in recent decades [3].

Starvation as a result of fishery activities, food web changes as a result of global warming, and rising winter temperatures affecting blue mussel stocks have also been proposed as potential causes of population decline, though these factors cannot fully account for the mortality of healthy birds. Furthermore, eider mortality has been linked to a high incidence of acanthocephalan parasites. Furthermore, candling of eggs revealed that at least 14% of eggs at Christians failed to fertilize.

Starvation and organ failure were the leading causes of death, with substantial endoparasite burdens of the acanthocephalan parasitic *Polymorphous* and *Echinostoma* spp. (intestinal flukes) causing severe damage to the intestinal mucosa. It's been suggested that Swedish eiders suffer from thiamine (Vitamin B1) deficiency, which lowers reproduction rates and increases chick mortality. Exposure to chronic

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