References


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Some Factors affecting Egg Production in Waterfowl Populations

Contrary to popular belief, egg production appears to be affected by factors in which we had previously overlooked. For example, studies of egg production in waterfowl have typically focused on factors such as food availability, body condition, and climate. However, new research has shown that other factors, such as predator pressure, may also play a role in egg production.

Climate

The impact of climate on egg production has been well-documented. Studies have shown that variations in temperature and rainfall can affect egg production in waterfowl. For example, a delay in egg laying by up to 10 days has been observed in species such as Ross's Goose (Anser rossii) and Lesser Snow Goose (Anser caerulescens), leading to a reduction in the proportion of laying females. These changes can affect both mean egg size and mean clutch size in some species. In extreme cases, when the season is very late, some species may not even attempt to nest—such as the Lesser Snow Goose.

Food and body condition

Egg production is highly dependent on food availability. In species such as the Whistling Swan (Cygnus cygnus), changes in habitat preference during the pre-laying and laying stages may indicate a change in food requirement rather than a change in the state of the food supply. Prior to egg-laying, Eider females feed at 2-3 times their 'normal' over-wintering rate, while Harlequin (Histrionicus histrionicus) females spend 30% more time feeding. Antelope Island's population of ducks and geese may require a change in food condition for better egg production. Dabbling ducks appear to be more affected than Anseriformes and dabbling ducks in some environments, while the effectiveness of large-scale measures may not always be as effective as previously thought.
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eight species of ducks breeding at Lake Mývatn, Iceland, showed that a decline in food supply (Chironomid larvae) to about 20% of its normal level in 1970 resulted in a drop by 20%–30% in mean body weight of adult females in four species, and clutch size in that same year was significantly lower in five of the eight species studied.

Such a link between food supplies, body weight of females, and mean clutch size has been incorporated in a hypothesis by Ryder (1970) in which it is claimed that clutch size in Ross’s Goose is largely determined by the fat reserves accumulated before getting to the breeding grounds. A similar system seems to operate in the Eider duck in which it has further been demonstrated that there is a direct relationship between mean weight of females in winter and mean clutch size the following spring (Milne 1976).

Many of the species breeding at higher latitudes are long distance migrants and must incorporate a moult between breeding and migrating south. The subsequent recovery of body condition occurs on their wintering grounds where the birds must also lay down extra reserves before a flight north in spring to breed. The quantity, quality and dispersion of the winter food supplies may well determine reproductive potential through physiological condition of the breeding birds.

Pesticides

Since waterfowl are so highly gregarious in winter in lakes and coastal waters, often close to human habitation and industrial development, the possible effects of chemical pollutants on reproduction is now a real threat. A study of the Long-tailed Duck *Clangula hyemalis* in North America only serves to underline the problem (A. Petersen, pers. com.). These birds, breeding in Arctic Canada and overwintering in Lake Michigan, follow the same general pattern in body weights and fat levels described for Eiders and several arctic breeding geese. Whilst accumulating fat, prior to going north in spring, they also accumulate high levels of DDE residues and PCB’s from the polluted muddy substrates via their invertebrate food. Adult females held only 2.8 ppm in DDE residues on arrival at their wintering grounds in the autumn but had 32.05 ppm in their fat store by spring. The utilization of these fat reserves in the formation of eggs has repercussions. DDE residues found in eggs ranged from 0.1–16.0 ppm and were closely related to the amounts found in the adult females. Such levels of chemical pesticides are known to affect both hatching success of eggs, through shell-thinning, and survival of the adult birds.

Bird density

At high bird densities on winter feeding grounds social interactions can act to reduce food intake and may affect the eventual body weights achieved before migration.

In Eiders an inverse relationship between bird density and mean body weight in winter again implies that the overwintering situation may well hold the key to the spring breeding performance of many of our northern species of waterfowl. To date too little significance has been given to the relationships between bird density, social behaviour in winter flocks, food quality and quantity in winter and the reproductive potential of breeding populations. Further studies linking winter feeding ecology with breeding output should be given high priority.

References


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