



A Diet of Wild Celery Is Better Than Baltic Clams for Wintering Canvasbacks

The Baltic clam (*Macoma balthica*) is the dominant food of canvasbacks (*Aythya valisineria*) on the Chesapeake Bay; however, when compared with a diet of wild celery tubers (*Vallisneria americana*), we found clams to be a poor diet for canvasbacks for regaining body mass following a period of fasting. This finding could explain why the Chesapeake Bay population of canvasbacks declined at the same time submerged aquatic plants were decimated in the Bay.

The diet of canvasbacks wintering on Chesapeake Bay has changed in response to a decline in water quality and loss of submerged aquatic vegetation. Formerly dominated by plant foods, especially wild celery, canvasback diets now contain more than 90% Baltic clams. The consequences of this dietary change on the ability of canvasbacks to survive periods of food deprivation and severe winter weather are unknown. We studied the influence of diets of Baltic clams, wild celery, and whole corn (*Zea mays*) on rate of recovery of body mass by captive canvasbacks in a series of fasting and feeding trials.

Clam and Tuber Diets Contrasted

We conducted six trials, three per winter, in 1990 and 1991. Trials were conducted in identical pens designed for complete control of food available to the ducks. Two males and two females, randomly selected from the captive ducks, were placed in each

of the eight pens. Each pen was randomly assigned a control (nutritionally balanced commercial duck feed), wild celery, Baltic clam, or whole corn diet (two pens each diet). We selected wild celery and Baltic clams because they represent the traditional and current foods dominating the diets of wintering canvasbacks, and corn because of its widespread availability and use by canvasbacks. Each trial consisted of three parts: (1) fasting (body mass loss), (2) feeding (body mass gain), and (3) maintenance (body mass stable). Foods were fed ad libitum three or four times each day during the feeding part of trials. Ducks were weighed at 2–3 day intervals during fasting and recovery periods.

Body Mass Recovery Better on Wild Celery

During fasting, canvasbacks were not allowed to lose more than 20% of their body mass—45–50% is thought to be a lethal level. Mean loss of body mass was 26 g/bird per day. The rate of body mass loss was greatest during the first 2 days of fasting; the loss of body mass decreased by one-third during the following 4 days as the birds adjusted to food deprivation.

Recovery of body mass differed among diets in 1990 ($P = 0.003$) and 1991 ($P = 0.0111$), and among 2–3-day periods in 1990 ($P = 0.0001$) and 1991 ($P = 0.0001$) within trials. Ducks fed the control diet gained 42 g/bird per day body mass whereas birds fed treatment diets gained less—32 g/bird per day on

celery tuber diet, 24 g/bird per day on corn diet, and 23 g/bird per day on clam diet. Canvasbacks fed the control diet regained 98–111% of their lost body mass during the first 2 days of feeding. Birds fed wild celery regained 66% of their body mass during the first 2 days and an additional 17–24% during the following 2–3 days—regaining 83–90% of total mass lost during the fasting event. Birds fed corn and clam diets only regained 52–71% of their lost body mass during a 4–5-day recovery period. Corn by itself is believed to be a nutritionally deficient food that waterfowl must supplement with other foods.

Our results indicate that fasting endurance and survival probability of captive canvasbacks has been diminished by the diet shift from tubers to Baltic clams. Although the effect of this dietary change on free-ranging canvasbacks in Chesapeake Bay is unknown, it could affect survival, winter distribution, and even breeding performance. It is

highly probable that the recent decline in numbers of canvasbacks on the Bay has been in response to reduced availability of quality food resources. It is likely that further degradation of the Chesapeake Bay would lead to further decline in canvasback use. Our findings underscore the need for restoration of canvasback migration and winter habitats—in particular, restoration of historical plant food resources important to the species.

For further information contact:

Dennis G. Jorde or G. Michael Haramis
Patuxent Wildlife Research Center
11410 American Holly Drive
Laurel, MD 20708
(301) 498-0271