

Digestibility of Foods and Anthropogenic Feeding of Black Bears in Virginia

by

Rachel Masterson Gray
Virginia Polytechnic Institute and State University
Department of Fisheries and Wildlife Sciences

ABSTRACT

For years, bear hunters have provided an unknown amount of food to black bears (*Ursus americanus*) in Virginia, supplementing their natural food supply. Possible effects of feeding bears can be negative, such as food conditioning and habituation to people, or positive, such as enhanced or sustained reproductive rates, especially in years of mast crop failure. In July 1999, the Virginia Department of Game and Inland Fisheries (VDGIF) adopted a regulation recommendation that prohibited the feeding of wildlife on national forest and department-owned lands. We mailed a survey to all members of the Virginia Bear Hunters Association (VBHA, $n = 459$) to determine the amount of food provided to bears by bear hunters in Virginia between 1 July 1998 and 30 June 1999. Survey response rate was 52%. One hundred thirteen of 238 (47.5%) survey respondents spent over \$18,000 on supplemental food in one year, averaging \$163/person. One hundred twenty-eight respondents reported cumulatively providing nearly 3 million kilograms of food to bears between 1 July 1998 and 30 June 1999. Whole-shelled corn, pastries, and grease accounted for 58% of the total food by weight; however, whole-shelled corn, pastries, and bread were the 3 most common foods offered. Feeding occurred in 25 counties in Virginia, primarily during July, August, and September. Rockingham County had the highest proportion of feeders (47%), followed by Giles (15%), Augusta (14%), Craig (9%) and Montgomery (9%) Counties. Accordingly, Rockingham County received the highest proportion of food (42%), followed by Craig (8%), Giles (7%), Montgomery (6%), and Tazewell (6%) Counties. The low survey response rate, coupled with the fact that 48% of sampled nonrespondents fed bears, suggests that the total amount of annual feeding in Virginia may exceed the total determined during this study. However, the possibility of an avidity bias, in which a higher response by the more avid feeders would erroneously inflate a total estimate

extrapolated to include feeding by nonrespondents, cannot be eliminated.

Little work has been done pertaining to digestibilities of black bear foods, particularly those in the eastern United States. We determined digestibilities for several important eastern black bear foods, including northern red oak (*Quercus rubra*), white oak (*Q. alba*), and chestnut oak acorns (*Q. prinus*), squawroot (*Conopholis americana*), high-protein dogfood, shelled corn, and doughnuts. All diets were evaluated for nutrient content as well as percent dry matter digestibility of crude protein, ether extract (a measure of fat), and gross energy. Diets we suspected were high in fiber were additionally evaluated for neutral detergent fiber or acid detergent fiber content and digestibility. Feeding trials were conducted with 1 male and 4 female captive bears during fall 1998, and 5 female captive bears during fall 1999, at the Center for Ursid Research, Blacksburg, Virginia. Acorns and squawroot were high in fiber (45-62%) and moderate to low in protein (5-7%). Fat content was high in doughnuts (24.7) and northern red oak acorns (12%), moderate in dogfood (8.2%) and white oak acorns (4.7%), and relatively low in shelled corn, chestnut oak acorns, and squawroot (1.3-3.5%). Crude protein was high in dogfood (29%) and moderate in all other diets (4.7-8.8%). Neutral detergent fiber content was high in squawroot and all acorn types (45-62.4%). Acid detergent fiber was high in squawroot (47%) and moderate in dogfood (9%). In 1998, crude protein digestibility was high in doughnuts (86%), moderate in shelled corn and white oak acorns (50-64%), and negligible in northern red oak acorns (-39%). Ether extract digestibility was high in doughnuts, red oak acorns, and white oak acorns (80-97%), and moderate in shelled corn (67%). Fiber digestibility was tested only on northern red oak and white oak acorns, and was moderate (62% and 68%, respectively). In 1999, crude protein digestibility was high in dogfood, dogfood mixed with squawroot, and doughnuts (75-85%); moderate in shelled corn, squawroot, and white oak acorns (43-58%); and low to negligible in chestnut oak and northern red oak acorns (-13-6%). Ether extract digestibility was moderate in shelled corn (64%) and squawroot (60%), and high in all other diets (79-97%). Neutral detergent fiber digestibility was moderately high in all acorn types (54-71%). Acid detergent fiber digestibility was moderate for dogfood (66%), and associative effects occurred between the fiber in squawroot and dogfood, resulting in negative fiber digestibility in squawroot

determined by difference (-19%).

A luxury not always realized in wildlife management is the ability to investigate possible effects of management or policy changes prior to their employment. The amount of food provided to bears by bear hunters in Virginia may have been more substantial than previously believed, and likely provided bears with a high energy, stable food source that supplemented their natural food supply. We did not have the opportunity to study the effects of removing that food source on public lands prior to the regulation change; however, the opportunistic feeding strategy of bears, coupled with sufficient mast production at the time of the regulation change, likely softened any negative effects that may have occurred as a result of the removal of supplemental food as a regular food source for some bears.

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