Abstract

Individual variation and fitness are cornerstones of evolution by natural selection. The niche variation hypothesis (NVH) posits that when interspecific competition is relaxed, intraspecific competition should drive niche expansion by selection favoring use of novel resources. Population-level niche expansion could be achieved by all individuals using all available resources, or by each individual using a unique combination of resources, thereby increasing among-individual variation in dietary niche. Although individual variation can lead to species-level evolutionary and ecological change, observed variation does not ensure a beneficial outcome. Here, we used a Bayesian mixing model to estimate the summer (July–September) assimilated diet of individual female black (*Ursus americanus*) and brown (*U. arctos*) bears, evaluated the extent of interspecific dietary overlap, quantified variation in dietary niche is both populations, and assessed diet in relation to percentage body fat. We hypothesized that if the NVH held, percentage body fat would be similar for individuals of the same species across much of the dietary range observed in regards to differences in the proportional contributions of different food sources to the diet of individual bears. Our results show that greater differences in dietary niche exist between than within populations, although substantial intrapopulation dietary variation was observed in both populations. Moreover, percentage body fat was independent of dietary niche for the range of proportional contributions of the three major food sources observed in individual diets in both populations, providing support for the NVH. Linking individual dietary niches to measures of physiological condition related to fitness can offer new insights into eco-evolutionary processes related to food resource use.

Keywords: dietary analysis, percentage body fat, stable isotopes, bears