

Stable isotopes provide “signature” for researchers to study animals

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Researchers have many tools available in studying and observing mammals. One is quite small—the stable isotope. Exploring ecological questions through analysis of stable isotopes is a rapidly developing area of research.

A Special Feature in the *Journal of Mammalogy* offers an introductory explanation of the use of isotope analysis in the study of mammals’ migration, diets, and body conditions. The introductory article explains the processes that govern isotopic incorporation into animal tissues. The Special Feature’s 10 topical articles then apply this knowledge to explore a variety of animals and their use of resources

Organisms have their own isotopic “signatures.” These are made from the ratios of heavy to light [isotopes](#) of substrates, such as food, that they consume, and physiological processes, such as enzymatic reactions, that they employ in using the substrate and discarding the rest. For instance, the differences in carbon values among plants can be used to track the diets of herbivores.

In this Special Feature, these concepts are applied in a variety of innovative studies. One article uses multiple isotopes to study resource use in bats, while another infers nutrient use in brown bears from breath isotope analyses. Isotopic data on California sea otter populations is presented in another study to illustrate the advantages and disadvantages of statistical and quantitative approaches of resource and habitat use. The effects of dietary nutrient composition and mass changes on isotopic

incorporation in mink are discussed.

Articles also describe the application of isotope analyses for animal migration and to track dispersal of free-ranging animals. One study looks at the biomineralization processes that result in isotopic variation in fossils, discusses proper sample processing, and reviews the use of calcium isotopes. Other articles in the issue discuss how mathematical mixing models are used to estimate the contributions of food sources to the isotopic composition of the tissues of a consumer, and offer suggestions for designing isotopic incorporation experiments.

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