

Original Article

Carbon and Nitrogen Stable Isotope Values for Plants and Mammals in a Semi-Desert Region of Mongolia

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Abstract

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Little information exists on the isotopic signatures of plants and animals in Mongolia, limiting the application of stable isotope analysis to wildlife biology studies. Here we present plant and mammal carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotope values from a desert-steppe region of southeastern Mongolia. We analyzed 11 samples from 11 plant species and 93 samples from 24 mammal species across Ikh Nart Nature Reserve, and compared these numbers to isotope values reported from other areas of Mongolia. Our plant and mammal ^{13}C and ^{15}N values were similar to those from a similar arid steppe region and more enriched than those from less arid habitats. Habitat variation within and between study sites has an important influence on $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ variation. Our results supplement current knowledge of isotopic variation in Mongolia and provide a reference for future stable isotope research in Mongolia and similar Asian steppe ecosystems.

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Introduction

Stable isotope analysis (SIA) is a rapidly developing method in wildlife studies that is efficient, cost-effective and minimally invasive (Ben-David & Flaherty, 2012). Since its potential applications were first explored in the late 1970s and early 1980s (DeNiro & Epstein, 1978, 1981), SIA has been used to address a variety of topics for many different ecosystems and organisms (Dawson *et al.*, 2002). In the wildlife field, it has primarily been used to investigate diet and

foraging behavior, movement patterns (including migration), and resource use (Gannes *et al.*, 1998; Ben-David & Flaherty, 2012).

Stable isotopes are isotopes (element forms with differing numbers of neutrons in the nucleus) that do not decay over time (Fry, 2006). SIA measures the relative amounts of target isotopes (reflecting the conditions of the environment) in individuals. For example, areas of low water availability are associated with a higher rate of