Stable isotopes in ecological research

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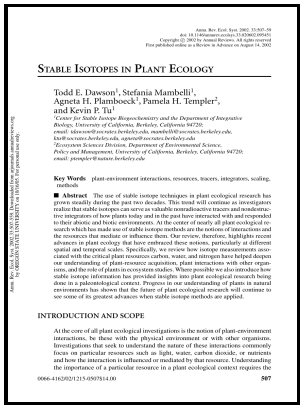

STABLE ISOTOPES IN PLANT ECOLOGY

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Key Words plant-environment interactions, resources, tracers, integrators, scaling, methods

■ Abstract The use of stable isotope techniques in plant ecological research has grown steadily during the past two decades. This trend will continue as investigators realize that stable isotopes can serve as valuable nonradioactive tracers and nondestructive integrators of how plants today and in the past have interacted with and responded to their abiotic and biotic environments. At the center of nearly all plant ecological research which has made use of stable isotope methods are the notions of interactions and the resources that mediate or influence them. Our review, therefore, highlights recent advances in plant ecology that have embraced these notions, particularly at different spatial and temporal scales. Specifically, we review how isotope measurements associated with the critical plant resources carbon, water, and nitrogen have helped deepen our understanding of plant-resource acquisition, plant interactions with other organisms, and the role of plants in ecosystem studies. Where possible we also introduce how stable isotope information has provided insights into plant ecological research being done in a paleontological context. Progress in our understanding of plants in natural environments has shown that the future of plant ecological research will continue to see some of its greatest advances when stable isotope methods are applied.

INTRODUCTION AND SCOPE

At the core of all plant ecological investigations is the notion of plant-environment interactions, be these with the physical environment or with other organisms. Investigations that seek to understand the nature of these interactions commonly focus on particular resources such as light, water, carbon dioxide, or nutrients and how the interaction is influenced or mediated by that resource. Understanding the importance of a particular resource in a plant ecological context requires the

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. Things are further complicated when sources of nitrogen and carbon are numerous, although describes how equation can be expanded to account for 2 nitrogen sources 1 with a fraction α and the other with a fraction 1 —α.

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Findings from this work are providing valuable insight into the foraging ecology of species of management or conservation concern. Nonetheless, although they are a great improvement on previous tools , these models still fall short of capturing the dynamic nature of isotopic incorporation.

Stable isotopes in mammalian research: a beginner's guide

At these temperatures we are less likely to cause preferential volatilization of the compounds containing the lighter isotopes. . Windham-Myers, Lisamarie; Fleck, Jacob A.

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Second, stable isotope analysis has been successfully applied to systems where the problems associated with incorporation rate and variable discriminations could not significantly alter the conclusions. Similar variations in discrimination factors have been described for tissues such as bone collagen, apatite as in tooth enamel , and dentin. Dieser Artikel ist ein Print on Demand Artikel und wird nach Ihrer Bestellung fÃ¼r Sie gedruckt.

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As a result, past studies assumed that the Everglades provides a classic example of an originally oligotrophic, P-limited wetland that was subsequently degraded by.

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