

Biology Seminar



Western
UNIVERSITY · CANADA

12:30 - 1:30 pm
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BGS 0153



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(1) Using isotopic analysis of breath H₂O and CO₂ to measure energy expenditure and fuel use of migratory birds

Measuring energy expenditure and the mix of metabolic fuels used by animals during various activities is of keen interest to physiologists and ecologists. This information allows us to understand how animals budget their energy and nutrients. New spectroscopic analyzers measure stable isotope ratios of hydrogen, oxygen and carbon in gas streams making it possible to measure energy expenditure and to trace nutrient metabolism non-invasively in real time by injecting isotopically enriched water, sodium bicarbonate and nutrients and subsequently measuring breath. The goal of my sabbatical research was to develop these methods for use with birds flying in a wind tunnel to better understand the physiology of long-distance migration. I will give a brief introduction to the methods and illustrate their use in research.

(2) Reduced precipitation = drier or colder? A multi-site perspective

The International Drought Experiment (IDE) is a globally-coordinated multi-site experiment designed to explore the potential effects of multi-year drought events across a range of ecosystems. The main infrastructure component of the experiment, the rain-out shelter, blocks a portion of the rain, but it also blocks snow. What are the implications of the latter for soil temperature and the fate over overwintering plants? I will describe an add-on experiment to the IDE designed to test the relative contributions of snow removal vs. rain sheltering effects on plant production. The outcome was that, for sites where snow removal increased soil freezing intensity, the effects of snow removal on plants were more influential than those of reduced rain. This result suggests that snow reduction may be the most important component of reduced precipitation effects in northern temperate ecosystems. Bonus material: while on sabbatical I had the opportunity to visit several of the sites that participated in the IDE add-on experiment. Interesting experiences ensued!



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