

Evidence for nutrient-specific foraging of invertebrate predators under field conditions

Jordan Cuff¹, Maximillian Tercel¹, Ian Vaughan¹, Lorna Drake¹, Shawn Wilder², James Bell³, Carsten Müller¹, Pablo Orozco-terWengel¹, and William Symondson¹

¹Cardiff University

²Oklahoma State University

³Rothamsted Research

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Abstract

Nutrient-specific foraging is the ecological theory that generalist consumers select food resources based on their nutritional content. While laboratory experiments support this idea, it has yet to be demonstrated in invertebrates in the field. We combined dietary DNA metabarcoding with prey availability data and macronutrient content in the field to analyze nutrient-based prey choice. We show that spider nutrient intake and prey choice deviates from what we would expect if individuals randomly chose their prey. Through a novel nutrient-based taxonomy and null modelling, we reveal a stable average macronutrient intake. There was disproportionate foraging for different macronutrients by individual spiders. Although, this might be expected as individual prey are biased toward particular nutrients and individual spiders were at different stages of nutrient balancing when collected. This finding suggests that spiders are redressing nutritional deficits to obtain a target nutrient intake, as would be expected of nutrient-specific foraging. This evidence for nutrient-specific foraging under field conditions is a significant advance, extending our understanding beyond lab-based behavioral assays to now resolving complex real-world systems.

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