

Strong evidence for terrestrial support of zooplankton in small lakes based on stable isotopes of carbon, nitrogen, and hydrogen

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Cross-ecosystem subsidies to food webs can alter metabolic balances in the receiving (subsidized) system and free the food web, or particular consumers, from the energetic constraints of local primary production. Although cross-ecosystem subsidies between terrestrial and aquatic systems have been well recognized for benthic organisms in streams, rivers, and the littoral zones of lakes, terrestrial subsidies to pelagic consumers are more difficult to demonstrate and remain controversial. Here, we adopt a unique approach by using stable isotopes of H, C, and N to estimate terrestrial support to zooplankton in two contrasting lakes. Zooplankton (*Holopedium*, *Daphnia*, and *Leptodiptomus*) are comprised of ≈ 20 –40% of organic material of terrestrial origin. These estimates are as high as, or higher than, prior measures obtained by experimentally manipulating the inorganic ^{13}C content of these lakes to augment the small, natural contrast in ^{13}C between terrestrial and algal photosynthesis. Our study gives credence to a growing literature, which we review here, suggesting that significant terrestrial support of pelagic crustaceans (zooplankton) is widespread.

allochthony | terrestrial subsidy