



Littoral energy mobilization dominates energy supply for top consumers in subarctic lakes

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ABSTRACT: We used stable carbon ($\delta^{13}\text{C}$) and nitrogen ($\delta^{15}\text{N}$) isotopes to assess the energy sources supporting the top consumer (Arctic char, *Salvelinus alpinus*) in nine subarctic lakes in northern Sweden. The $\delta^{13}\text{C}$ of littoral (epipellic algae) and pelagic (bacterioplankton and phytoplankton) energy sources were clearly separated in the lakes, as reflected in habitat-specific consumers (zoobenthos, zooplankton). Char were enriched in ^{13}C compared with pelagic energy sources and prey and isotopically more similar to littoral energy sources and prey. The contribution of littoral energy sources to char body carbon was estimated to range between 62% and 94% among the lakes. The reliance on littoral energy sources was independent of char size and did not change when char coexisted with a small-sized prey fish (nine-spined stickleback, *Pungitius pungitius*). The strong reliance of top consumers in subarctic lakes on littoral energy sources may be due to the higher energy mobilization and larger sizes of primary consumers in littoral than in pelagic habitats.

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