
Trophic ecology of eighty freshwater fish from French Guiana, South America, and their response to stream habitat alteration by gold mining

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Abstract

The Guiana Shield is a hotspot of freshwater fish diversity in South America. Scientific knowledge on the ecology of most of the species is limited, however, preempting efficient management policies for conservation. The trophic ecology of 80 fish species commonly met in small streams of French Guiana was studied by means of stable C and N isotope analyses on muscle samples. When available, connections were made with published information on their diet, allowing to depict major trophic groups with unambiguous isotopic values. Based on the spread of isotopic values, trophic niche breadths, trophic positions (from primary consumer to predator) and energetic pathways (aquatic primary producers vs. terrestrial plant and detritus) were estimated for each species. We observed that 75% of the species had a mean trophic position of 2.6-3.6, and that carbon in their tissue mostly originated (95%) from terrestrial sources, suggesting a high competition for food within communities. Phylogenetic analyses of feeding strategies (trophic position and energy pathway) showed that a strong heterogeneity prevailed between and within families, preventing extrapolation of the results to other related species. Finally, values of biomass per species indicated that trophic position might be relevant for detecting functional changes in fish communities when streams are subjected to habitat alteration by gold mining.

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