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Aluminium and iron burdens of aquatic biota in New Zealand streams contaminated by acid mine drainage: effects of trophic level.

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Abstract

Concentrations of Al and Fe were determined in samples of filamentous algae, bryophytes and invertebrates from 24 stream sites in North Westland, South Island, New Zealand. Sites were variably contaminated by acid coal mine drainage and ranged in pH from 2.6 to 6.2. Conductivity of stream water ranged from 16 to 944 $\mu\text{S cm}^{-1}$ and maximum concentrations of total dissolved Al and total Fe measured in two successive years were 35.5 and 32.6 mg l^{-1} , respectively. Metal burdens of algae and bryophytes were not correlated with pH, conductivity or the concentrations of Al and Fe observed in stream water. Metal concentrations in invertebrates were significantly lower than those in plants (mg per g dry wt.), and were similar in herbivore-detritivores (mainly mayfly larvae) and carnivorous species. No evidence was found for the biomagnification of either metal within aquatic food webs. However, invertebrate species exposed to very high concentrations of Al and Fe varied considerably in body burdens, suggesting that groups of insects differ considerably in their physiological or morphological ability to exclude potentially toxic metals.

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MeSH Terms, Substances

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