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MICROBIAL ECOLOGY OF HYDROCARBON -CONTAMINATED ANTARCTIC SITES

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Micro-organisms are an important part of the Antarctic ecosystem contributing to the biogeochemical cycling of nutrients. They are especially important in hydrocarbon-contaminated sites where they are responsible for the removal of hydrocarbons from the environment through the process of biodegradation. We used both culture-based and molecular methods to explore the microbial ecology of terrestrial and marine contaminated sites at several levels ranging from the overall community structure of microbial communities, to changes in functional groups of microbes and changes in the presence of catabolic genes. In this presentation the focus is on two studies: a marine in situ biodegradation experiment and a terrestrial bioremediation field trial. We have found that changes in the microbial community are evident within weeks of exposure to hydrocarbons and lubricating oils and last for over a year. These changes include increases in the number of culturable microbes, increases in the proportion of microbes containing genes for the degradation of hydrocarbons and changes in which microbes dominate the microbial community. Interestingly we also found evidence that denitrifying bacteria have a role in hydrocarbon biodegradation in anoxic regions of the soil. These findings have significant implications for the management of contaminated Antarctic sites.