

Heavy metals in the Peak District -- evidence from bugs in blanket bogs

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Bacteria that consume heavy metals have been found in some of the most contaminated parts of the Peak District in the Southern Pennines and may be changing the pollutants into more toxic forms that could leak out into reservoirs, scientists will hear tomorrow at the Society for General Microbiology's 162nd meeting being held at the Edinburgh International Conference Centre.

The U.K. has approximately 10 – 15 % of the total global area of blanket bog and it covers about 8% of our total land surface. Many of the water gathering areas in the UK are located in upland blanket peat environments. It is estimated that around 16 million people live within 1 hours travelling time of the park boundary.

“Millions of people rely both directly and indirectly on the health and conservation of the Peak District National Park,” says Dr Patricia Linton from Manchester Metropolitan University. “We have established which bacteria are dominant in the Southern Pennines. Any changes in the bacterial diversity could affect the delicate balance of the ecosystem and the health of the flora and fauna of the area.”

The inter-disciplinary team of researchers has found that there is a split in the types of bacteria present, with extreme bacteria dominating in areas with the highest levels of heavy metals. “Heavy metal pollution is likely to be a key factor in influencing bacterial species composition,” says Dr Linton. “Some of the bacteria we found in Peak District grow using iron and sulphur as an energy source. Some produce acid, which

may be further acidifying the bog environment.”

Many heavy metals become more soluble at low pH and therefore more toxic to plants and animals and more susceptible to leaching from the soil into waterways. Bacteria may be contributing to the release of toxic heavy metals and this may have severe implications for plant and animal health and water quality.

Climate change may make blanket bogs more susceptible to erosion and the release of stored carbon from these bog soils is of major global concern. “Bacteria in the soil increase the carbon stored in the bog environment and help protect against erosion processes,” says Dr Linton. “Changes in bacterial diversity make these areas more at risk from carbon release processes. This in turn may exacerbate climate change and change ecosystem functioning”

The high level of heavy metals is due to the history of atmospheric pollution in these areas. This work shows that historical contaminants are still having an effect many years after first being deposited. The researchers have started to quantify the effects of long-term historical heavy metal pollution on plants and animals in the area. Information about the bacterial species present could be used as an indicator of the health and fertility of peat bogs.

“Blanket bogs in the Peak District have significant international importance for nature conservation, and provide a habitat for many rare plants, such as Bog Rosemary and wild orchids, birds like the Golden Plover and animals including the rare Mountain Hare. They are also an important recreational resource,” says Dr Linton. “Future work will ensure that people can enjoy the beautiful Peak District National Park and all of its important natural resources for generations to come.”

Source: Society for General Microbiology

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