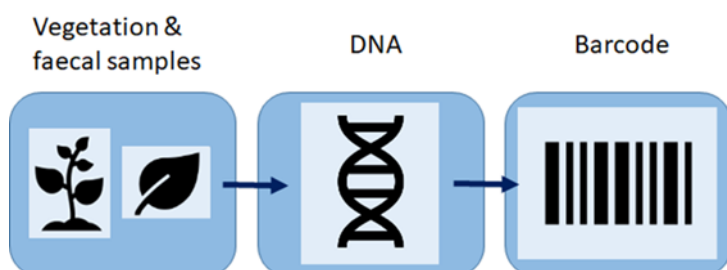


The Ecology Within: The impact of gut ecosystem dynamics on host fitness in the wild

Researchers from Pwllpeiran are working with scientists from the University of Sheffield and the James Hutton Institute to study the feeding habits of an ancient rare breed of wild sheep as part of a new NERC project led by the University of Edinburgh. By gaining a better understanding of what the animals eat, they hope to learn lessons that could benefit the feeding of domesticated flocks. Wild Soay sheep live on the St Kilda archipelago, where they have been left to roam unmanaged since the last human inhabitants left in the 1930s; they receive no supplementary feed or other interventions. Designated both as a National Nature Reserve and a World Heritage Site, the islands lie 40 miles west of the Outer Hebrides and are the remotest part of the British Isles. The current study is the latest phase of a long-term research programme which started in the 1980s. While past research has focused on population ecology and evolution genetics, this new research study will address the extent to which diet choice and immunity shape host fitness and population dynamics in the wild.



As part of the research at Pwllpeiran, a small research flock of 15 Soay sheep has been created from animals sourced from mainland flocks that can trace their lineage back to the islands. These will be used to develop, validate and deploy DNA meta-barcoding techniques which use the latest next-generation sequencing technologies to build

up a profile of plant DNA in the animals' faeces. This approach could revolutionise our ability to monitor diet composition in free-ranging grazers, and, in turn, our understanding of gut community dynamics of parasites and microorganisms. During diet trials at Pwllpeiran faecal samples and corresponding forage samples are being collected to enable diet reconstruction. The results will then be compared with known reference diets, to provide correction factors to adjust barcode sequence frequencies to accurately represent proportional intake of each component species. The application of this approach will then be integrated with new vegetation survey work and Soay faecal sample collections on St Kilda to follow the diet choices of the wild sheep and relate these to their health status.

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