

Bacteria, fungi and protozoa in Signy Island soils compared with those from a temperate moorland

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During the past 100 years many papers have been published on Antarctic microbiology in general and that of the soil, snow and ice in particular. However, there are still contradictory statements in the recent literature concerning the scarcity or abundance of micro-organisms in Antarctic soil, the similarities and differences in the composition of the soil microflora and microfauna of Antarctic and temperate soils, and the extent to which the Antarctic micro-organisms are adapted to grow at low temperatures. Many of the microbiological studies of the Antarctic lack detailed information concerning the habitat and detailed comparisons with temperate soils. As a result of opportunities provided by the British Antarctic Survey, microbiological investigations have been made on Signy Island in the South Orkneys and on soil samples and cultures transported to England. The results of these studies are compared here with similar studies made on soils of the Moor House National Nature Reserve in northern England. The paper also draws on the considerable information available concerning the climate, vegetation and soils of the two areas.

Three groups of heterotrophic micro-organisms, bacteria, fungi and testate amoebae, have been studied to obtain information on their species composition, distribution and abundance in the soils. An examination of the temperature tolerance of some of the isolates was also made. Full results of these studies have been published or are in preparation (Heal 1965; Bailey in prep.; Latter & Heal in prep.; Latter & Cragg 1967; Latter, Cragg & Heal 1967).

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Signy Island is approximately 8×5 km rising to 280 m above sea level. Its temperature regime and vegetation are typical of the maritime Antarctic zone and are described by Holdgate (1964) and in other papers in this Discussion. Six soils have been examined on Signy Island, including *Deschampsia* grassland, moraine, marble soil and peats under moss.

Moor House N.N.R. is an area of Pennine moorland approximately 550 m above sea level dominated by mixed moor vegetation (*Calluna-Eriophorum-Sphagnum*) on blanket peat with outcrops of Carboniferous limestone which bear grassland. It has a cold temperate climate (Manley 1936) with mean monthly air temperatures ranging from -1 to 11 °C compared with -12 to 1 °C at Signy Island. The geology and soils have been described by Johnson & Dunham (1963) and some aspects of animal ecology by Cragg (1961). The microbiology of four soil and vegetation types has been examined.

Although six sites have been examined on Signy Island and four at Moor House, the present paper concentrates on grassland sites on the two areas because they are most closely comparable in vegetation and soil type. The Signy Island grassland consists of a

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