NATURAL ENVIRONMENT RESEARCH COUNCIL

SOIL BIODIVERSITY

The world beneath our feet

Waxcap grasslands at Sourhope

Waxcap fungi (*Hygrocybe spp.*) grow in nutrient-poor semi-natural grasslands. With their large brightly-coloured fruiting bodies they are highly visible members of the soil community. Intensified farming since World War Two has destroyed many waxcap habitats. Several UK species now have *Biodiversity Action Plans*, and we urgently need more information about habitat requirements.

We used a differential Global Positioning Satellite system to produce a very detailed map of fruiting bodies from 11 species of waxcap at Sourhope during 2001-2003. We found waxcaps are severely affected by soil treatments. On plots treated with lime, and with nitrogen and lime, there were 20-fold fewer fruiting bodies. We have found similar responses to nutrient treatments at several other long-term grassland field experiments.

We also examined the natural abundance levels of stable isotopes of carbon and nitrogen in waxcaps, earth tongues (*Geoglossaceae*) and fairy clubs (*Clavariaceae*). These three groups of fungi, which are unrelated but which are all typical of nutrient-poor grasslands, had significantly elevated levels of ^{15}N and low levels of ^{13}C compared to other decomposer fungi found at Sourhope. This suggests that they feed on similar soil compounds, and that their nutritional behaviour is different to that of other fungi. As such they represent a distinct ecological grouping.

A genetic fingerprinting technique (microsatellite-based ISSR) has allowed us to map the extent of individual fungal colonies, some of which may form extensive 'fairy rings'. We found some that extended over several square metres, making waxcaps possibly the largest soil organism at Sourhope.

Our field studies are continuing with $^{13}C0_2$ and ^{15}N labelling experiments, whilst laboratory experiments are focusing on genetic diversity within/between sites. Our investigations of spore germination suggests that the spores of the rarer waxcap species are more difficult to germinate.

Further information

You can find out more at www.aber.ac.uk/waxcap, or contact Gareth Griffith, gwg@aber.ac.uk