

Project No. T01069a5

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INSTITUTE OF TERRESTRIAL ECOLOGY

**MASQ: MONITORING AND ASSESSING SOIL QUALITY**

NERC/DETR/EA funded : ITE Project Number T01069a5

Module 6: Soils and Pollution

Progress Report 3 to The Environment Agency

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## 1. Work Programme 1/4/99 to 1/7/2000

- ◆ Development and population of the database for soil acidity and loss-on-ignition, and associated supporting data.
- ◆ Laboratory examination of soil fauna and microbiology
- ◆ Analysis of heavy metals and organic compounds

## 2. Progress

### 2.1 Development and population of the databases

***Soil acidity and loss-on-ignition, and associated supporting data:*** Soil samples collected from the remaining X-plots in CS2000 during 1999 are being processed. Wet pH has been measured on all samples delivered to date (50%). A target date of 31/10/99 has been established for the completion of all analyses of the 1999 soil samples.

***Soil microbial data recording:*** The following information has been added to BIOLOG Excel workbooks for each batch of samples processed; timetable for experimental work, plate inoculations and plate readings, 5g dry wt. equivalent for each sample (for use in BIOLOG test), weight of sieved, refrozen sample, dry weight equivalent of refrozen sample.

### 2.2 Laboratory examination of soil fauna and microbiology

***Soil faunal diversity:*** During this period, staff have established data management and identification procedures to ensure quality control. Protocols have been established both for faunal identification and for management of the resulting data. To ensure accurate and consistent faunal identification a series of quality control procedures have been established. All protocols and procedures are currently being tested on an ITE project involving the identification of a smaller number of samples before the complete processing of MASQ faunal samples begins.

***Soil Microbial Diversity:*** Protocols for sample processing and microbiological analyses have been developed and Table 1 summarises progress to date.

**Table 1: Summary of BIOLOG samples processed to end of June 1999**

Number of samples	Processed	analysed	re-frozen
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Batch A (March-April 1999)	113	108	109
Batch B (April-May 1999)	35	33	34
Batch C (May-June 1999)	73	72	73
Batch D (June-July 1999)	133	In progress	
Total	354 (35.8%)	213	216

### 2.3 Laboratory evaluation of chemical properties

**Heavy Metals:** All soil samples from England and Wales are stored in standard pots in a secure location at ITE Merlewood. Details on sample weight are available from the Access database on soil chemistry. The analytical list has increased in discussion with the Agency. It now includes Cd, Cr, Cu, Pb, Ni, Zn, V, Hg and As.

**Organic Pollutants:** The CS2000 X-plot data files have now been examined to determine which soil and vegetation types would be most useful to analyse. It seems national coverage would be achieved most effectively if grasslands were to be the focus of attention in the first instance. ITE are investigating the possibility that all three groups of compounds could be analysed by one extraction, clean-up and analytical method. Soil sampling procedures are being examined by ITE from an analytical perspective to determine the influence the method may have on analytical outcomes using grassland and woodland vegetation and soil types close to ITE Monkswood.

There has been agreement that the determinands of greatest interest are PCBs, OC pesticides, and PAHs. It has been agreed that PAHs should be analysed by an MSD method, as outlined in the scoping study. As requested at the 2<sup>nd</sup> MASQ project meeting, ITE have assessed the sensitivity of their MS method for PCB (previously applied mostly to animal material). Sensitivity appears more than adequate for the MASQ project. There is no agreement as yet on the method to analyse PCBs and OC pesticides.

### 2.4 A scoping study for metals/metalloids and organics

The Environment Agency (EA) requested that the Institute of Terrestrial Ecology carry out a Scoping Study for the analyses of metals, metalloids and organic compounds as part of the jointly funded MASQ project (CS2000 Soils module 6: Soils and Pollution; NERC, EA and DETR funded). This study was to assess these substances for priority in analyses from the soils collected in the Countryside Survey 2000. These analyses will be used to produce

baseline datasets for metals/metalloids and organic pollutants from a uniform, stratified and distributed sampling of the range of soil and land cover types in UK which have detailed supporting vegetation and environmental data. This study has been completed and the Agency has commented on the draft report.

## **2.5 Meetings timetable**

A meeting has been arranged between EA analysts at Nottingham and ITE Monks Wood for the 3<sup>rd</sup> September to increase understanding between EA labs and ITE labs on approaches to sampling constraints, analytical procedures (extraction, clean-up, instrumentation and chromatography, quantification, and data interpretation). It is anticipated that an appreciation of differing approaches to QA and QC issues will also be developed.