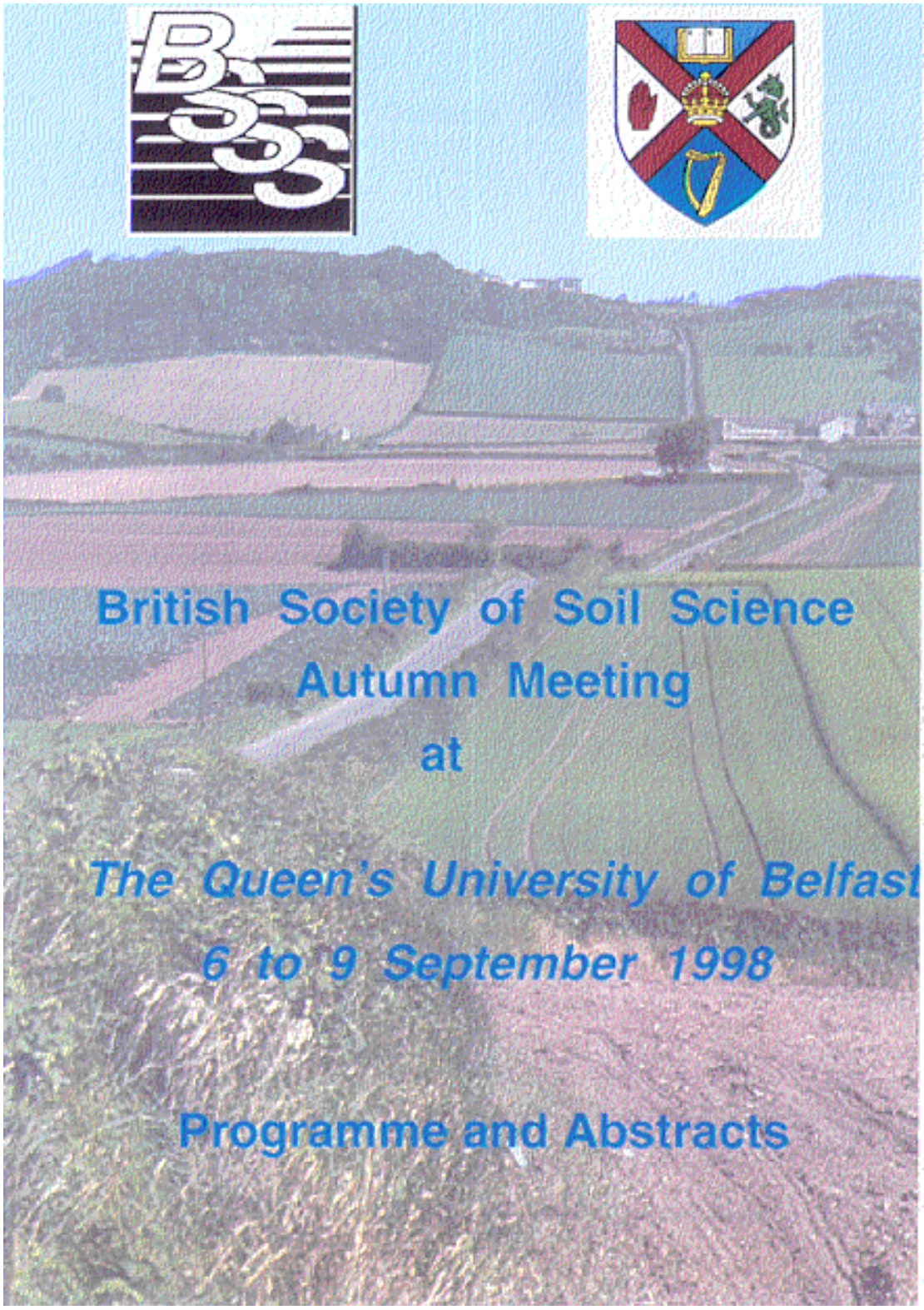

British Society of Soil Science
Autumn Meeting
at
The Queen's University of Belfast
6 to 9 September 1998

Programme and Abstracts

Monday 7 September 1998. 11.00 - 12.30
Session: Pollutant transport from soil to water
Chairman: Professor David Powlson, IACR, Rothamsted

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THE ROLE OF DOC ON CADMIUM MOBILITY IN SLUDGED SOILS

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INTRODUCTION

Dissolved organic carbon (DOC) may control Cd solubility and thus increase its mobility in the soil. As DOC can be the product of decomposition of organic matter, there is concern that it may increase Cd mobility in sludged soils.

MATERIALS AND METHODS

A loamy sand (LS) and a sandy clay loam (SCL) soil were mixed with sewage sludge at 0, 10 and 50 t ha^{-1}. The mixtures were watered with deionised water (DOC-0), with 235 mg L^{-1} DOC (DOC-1) and with 470 mg L^{-1} DOC (DOC-2). DOC was naturally extracted from a grassland soil. Pots of the mixtures were sown with ryegrass (*Lolium perenne* L.).

RESULTS AND DISCUSSION

It was found that as the levels of added DOC increased, the Cd mobility also increased, as shown by the plant uptake and DTPA data (combining both soils and all 3 sludge application rates) (Fig. 1).

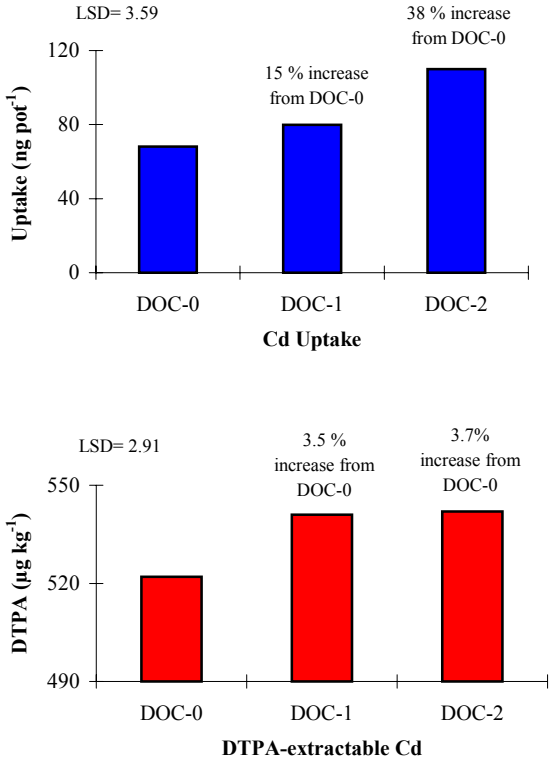

Figure 1: ***Cd mobility affected by DOC addition***

Cadmium uptake increased with sludge application and this rate of increase was further enhanced as DOC additions increased from DOC-0 to DOC-2 (Fig. 2).

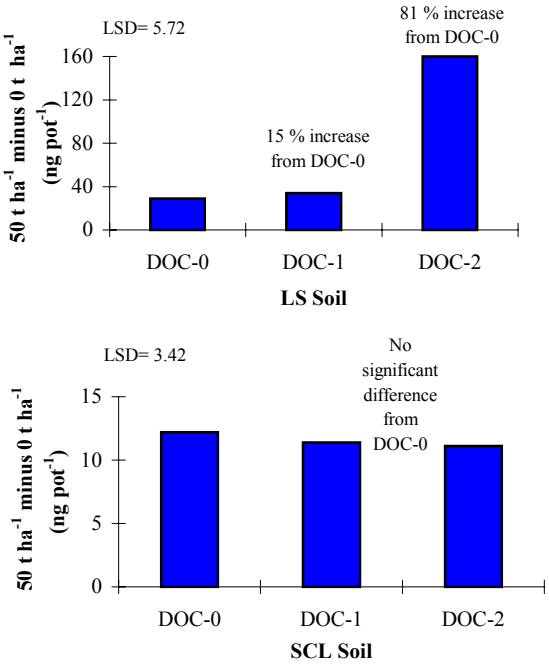

Figure 2: ***The effect of DOC addition in Cd uptake by reygrass on 2 soils***

DOC had a stronger effect in the LS soil probably due to less competition of DOC for Cd adsorption with the solid phases. At 50 t ha^{-1} mobility increased substantially more in the LS than in the SCL soil as DOC increased from DOC-0 to DOC-2 (Fig. 3).

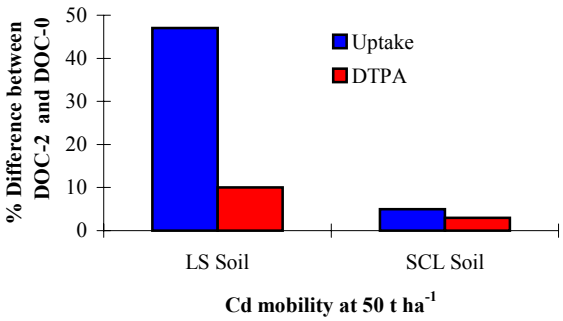

Figure 3: ***Cd mobility at 50 t ha^{-1}***

CONCLUSIONS

- Elevated DOC increased Cd mobility.
- As sewage sludge application increased, DOC further enhanced mobility in the LS soil. In the SCL soil, however, where the clay content is higher, the rate of increase in plant availability was not significantly affected by the additions of DOC.