Pasture production after sewage sludge and liming application on highlands in North West Spain

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Introduction In recent years, a sewage sludge surplus has been created in the EU countries, due to the Urban Waste Water Treatment Directive 91/271/CEE. Therefore, it is necessary to find adequate disposal for these residues in accordance with EU policy. Organic matter and nutrient sewage sludge contain principally N, indicating that it could be used as fertiliser. The main risk of this residue is its heavy metal content, whose solubility is usually increased as soil pH declines. The objective of this experiment was to determine the effect of liming and sewage sludge application on pasture production in a silvopastoral system located on acid soil

Materials and methods The experiment was located in Lugo (NW Spain) at 510 m.a.s.l. on very acid soil. In autumn 1997, a pasture mixture of *Lolium perenne*, *Dactylis glomerata* and *Trifolium repens* was sown under a 5-yr old *Pinus radiata* stand. Treatments consisted of no fertilisation (NF), three sewage sludge doses (L1: 160 kg total N/ha; L2: 320 kg total N/ha; L3: 480 kg total N/ha, the same treatments with lime (2.5 t CO_3 Ca/ha), which was applied in autumn 1997, and mineral fertilisation (MIN: 500 kg/ha 8:24:16). Fertilisation treatments were applied in spring 1998 and 1999. In the second year of the experiment, three cuts took place in May, July and November.

Results In the first two years, pasture production increased with sewage sludge doses in May and July (figure 1). Mineral fertilisation had no effect on production because this treatment reduced the pH significantly from 5.3 with sewage sludge to 4.3. No statistically significant differences were detected in pasture production in July due to liming. In the last cut, there were no differences between treatments.

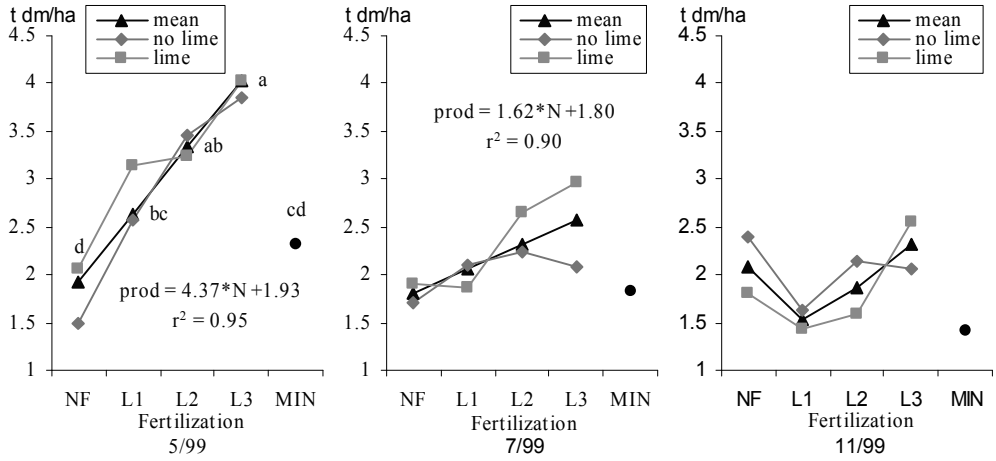

Figure 1 Pasture production (prod) (t DM/ha) after fertilisation treatments in May, July and November 1999. N: N doses (t/ha); NF: no fertilisation; L1: low sewage sludge doses (0,16 t total N/ha); L2: medium sewage sludge doses (0,32 t total N/ha); L3: high sewage sludge doses (0,48 t total N/ha); MIN: 500 kg/ha 8:24:16; lime: 2,5 t CO_3Ca/ha. Different letters indicate significantly differences between fertilisation treatments.

Conclusions In the first two cuts, sewage sludge application increased pasture production proportionally to doses applied. In the third cut, no response was detected among treatments due to the lack of sewage sludge residual effect as a result of low temperatures. Mineral fertilisation had no effect on pasture production due to pH reduction from sewage sludge application