

Long term trends associated with use of superphosphate on pasture. II. spatial distribution of pasture yield and composition.

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Most fertilizer experiments are concerned with primary effects on plants, soils and sometimes animals. Secondary influences, such as excretal returns, have received scant attention, especially in relation to their uneven distribution e.g. > 30% total sheep excreta on camps of 6% paddock area (1, 2). In this paper this effect of sheep behaviour is examined in relation to long term superphosphate usage.

Methods

The experiment on 2 ha with 5 rates of superphosphate on a new phalaris sub-and white clover pasture is described in Paper I. For the first 13 years, 1948-1960, all plots were grazed in common, together with a further 6 ha receiving 252 kg ha⁻¹ yr⁻¹, at 8-10 sheep ha⁻¹; the sheep camped off the experimental area and each plot remained uniform with distinct boundaries. In 1960 all plots were individually fenced and grazed intermittently at equal rates of 8-10 sheep ha⁻¹. Camps developed rapidly on their eastern ends (slightly higher). Samples for yield and botanical composition were taken in spring 1962 and 1973 at a number of locations along the long axis of each plot.

Results and Discussion

By 1962 the control plots (no super) were dominantly native grass; phalaris had retreated to the sheep camps. In Fig. 1 are mean composite yields for the 8 fertilized plots for 1973; the effects of distance from camp were significant in both years ($P < 0.01$, 0.001) but there was no interaction with fertilizer rates on log transformation.

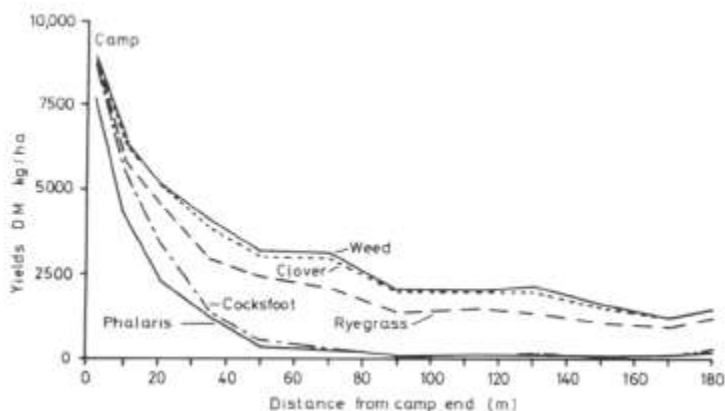


Fig. 1 Mean cumulative yield along 200 m transect of fertilized plots.

Before 1957 the fertilized pastures were uniformly phalaris-dominant with some random plants of ryegrass and cocksfoot (impurities < 1.5 % of original seed). After only two years separate grazing, sheep camping induced changes in pastures similar to those in Fig. 1 but non-camp yields were less depressed. By 1973 phalaris dominated the camp zones, and ryegrass elsewhere. Clover was then more evenly spread than in 1962 when there was a significant bulge near the camp.

The data indicate that animal-induced changes in plant nutrient supply have had a greater influence on pasture productivity than long term differential superphosphate application.

2. Hilder, E.J. 1966. Proc. X. Internat. Grassi. Congr. 977-981.