

GRASS AND SOIL STRUCTURE

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

Agricultural Development and Advisory Service

The beneficial effects of grassland on soil structure have been known for many years. The improvement in structure is brought about by a number of processes:

1. Drying the soil

Clay contracts when dried and thus creates cracks in the soil which aid drainage and allow root penetration into the subsoil. As the soil dries, the bonds holding together the discrete particles which make up the crumbs and granules are strengthened.

2. Binding together of soil particles

The network of fine roots produced by the grass weave between and through the soil crumbs and promote their stability both by the direct physical effect of keeping the crumbs separated from each other and by the production of gums and mucilages which bind the soil particles together.

3. Adding organic matter

Leaves, stems and roots of all crops are sources of organic matter for the soil but grass adds most. The debris and residues from crops and grass can have a direct effect on soil structure before they break down by improving aeration and drainage, but they are more often thought of as sources of humus. Grass is superior to most other crops as a source of organic matter; a productive ley can add about 0.06 per cent organic matter to the top six inches of soil for each year of its life.

4. Protecting the soil surface

Tractors and other farm machinery, livestock and the impact of rain all apply pressure to the soil surface. The effect is much reduced when the surface

is protected by leaves and stems. Grass is a particularly useful protective crop as it provides cover throughout the year.

5. Reducing soil disturbance

Cultivations can encourage the break down of organic matter and if ill timed can create clods and pans. The absence of cultivations in a ley allows soil structures to remain undisturbed thereby encouraging the development of stable structural units.

It does not follow that all grass will bring about a dramatic improvement in soil structure. A poor, neglected ley may contribute little either as a source of organic matter or crumb stability. Where a grass break is aimed primarily at structure improvement a vigorous, well managed ley should be grown with attention paid to the following points:

- (i) Care should be taken to obtain good establishment by producing a good tilth and breaking any existing pans.
- (ii) Adequate fertilizer should be given and any acidity corrected by liming.
- (iii) Utilisation should be planned to promote maximum root growth.
- (iv) Avoid poaching by stock or excessive use of farm machinery when the soil is wet.
- (v) Any drainage defects should be rectified.

It must be remembered that on soils with inherently weak structure where low organic matter contents create problems much can be done to mitigate the problem during arable cropping; for example, take extra care with cultivations, avoid dilution of organic matter by over-deep ploughing, match crops grown to the soil properties.