

Soil Compaction

Overview

Soil compaction can be a major limiting factor for plant growth. It refers to soil becoming denser as air is squeezed out of the pore space between grains of soil. Compaction is usually caused by heavy machinery, as well as livestock feet and also prolonged periods of heavy rain.

Why is it a problem?

Plants in compacted soils struggle to grow to their full potential, due to the lack of pore spaces reducing the availability of air and water which are essential for root growth. Stunted roots are then less able to access nutrients and water, particularly during periods of drought. Compacted soils are also less able to absorb rainfall, increasing the risk of water runoff and soil erosion.

Identifying soil compaction involves digging a hole and assessing the soil with the Visual Evaluation of Soil Structure (VESS) test. This scores soil from 1 (Friable) to 5 (Very Compact), anything over 3 is compacted.

How can it be fixed?

As with many issues, prevention is better than cure. Think about whether travelling across a field in a machine is strictly necessary. In some instances, controlled traffic farming could be implemented to reduce the area of fields that are driven on. Maintaining a reasonable leaf canopy cover helps to reduce compaction by protecting bare soil from rain.

For compaction caused by livestock, avoidance can be achieved through managing stock movements such as along cattle tracks. At a field-scale, rotational grazing can give soils time to rest and recover. Deep-rooting herbal leys can help to maintain porosity through the soil profile.

If compaction is identified, then there are some mechanical interventions that can be used to alleviate the issue. These include sward slitters, aerators and subsoilers which aim to re-introduce air into the soil.

How does compaction affect my carbon footprint?

As compacted soils limit plant growth, they also limit organic matter inputs into the soil through plant decay and root exudates. Limited plant growth is often addressed through applications of artificial fertiliser, which has a high carbon footprint. Avoiding compaction can therefore reduce fertiliser requirements and carbon emissions.

Measures that avoid compaction can also contribute to protecting and enhancing soil carbon levels.

