

Soil management

The need to maintain soil quality

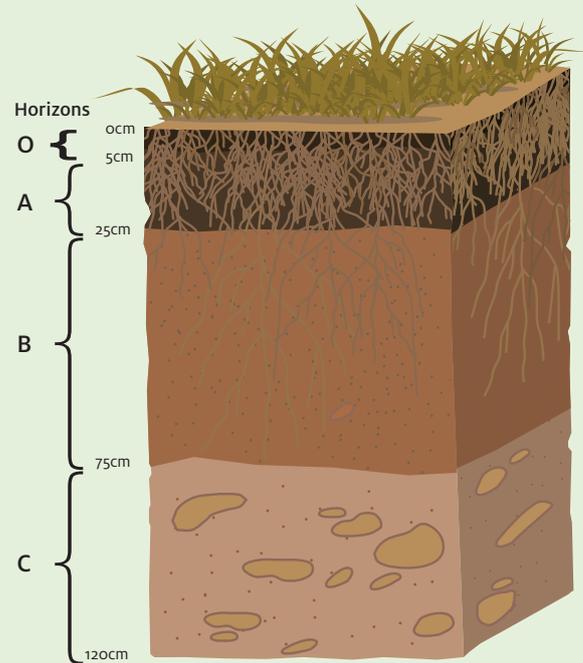
New Zealand pastoral farming is based on a grass and clover system. This is cheaper than the more intensive feeding systems used overseas and allows us to be competitive in an international market. However, to maintain productivity we need to preserve our soils and their structure. It is the biological and organic system below ground that supports the grasses and clover. It is the engine room of a farming system.

The diagram opposite depicts a healthy soil profile. Note the root mass and root depth. Other factors to consider in a healthy soil are soil structure, porosity (soil pores), colour, number of earthworms and soil smell.

Soil is prone to damage. A decline in soil quality has a marked impact on pasture production, pasture quality, animal health and the environment. Damaged paddocks take time to become healthy again, so avoiding pasture damage is the best strategy.



A soil sample showing a structure dominated by friable, fine aggregates. At the top of the photo there are coarse clods, firm and angular in shape, indicating a compacted layer at the surface.



A soil profile showing a well aerated soil structure with few clods.

GENERAL INFORMATION

Soil structure controls the movement of air and water through the soil and the ability of roots to penetrate into the soil. It also provides a habitat for a number of beneficial organisms like earthworms, bacteria and fungi. Soil with good structure has a significant number of large pores that provide air to these organisms, good drainage and high water-holding capacity. If your soil is physically healthy and fertile, your pasture production will be high.

A high soil organic matter content increases aeration, water holding capacity and nutrient holding capacity. High organic matter in soils is associated with a healthy soil. Organic matter losses can be caused by repeated cultivation and compaction.

Pugging and compaction can degrade the soil structure. Pugging is caused by animal treading in wet conditions. Compaction is caused by animal treading, vehicle movement and repeated cultivation.

Pugging and compaction reduce the number of pores in the soil. This leads to reduced pasture growth, more frequent and persistent surface ponding and increased sediment, nutrient and effluent losses through surface run off. Weed invasion can occur in the bare sites created by pugging and compaction. Subsequent grass growth on pugged paddocks is significantly reduced.

RECOMMENDED ACTIONS AND BEST MANAGEMENT PRACTICES

To minimise damage, undertake the following actions and practices.

- Stand heavy animals off pasture in very wet weather.
- Graze paddocks prone to pugging before the very wet weather arrives.
- Constantly monitor pugging and compaction during at-risk periods and move stock before damage occurs.
- Use the bike rather than the tractor where possible.
- Avoid working the soil when it is wet.
- Drop fences when moving stock in very wet weather.
- Back-fence cows to limit pasture damage in the winter.
- If practical, choose block grazing over strip grazing in the winter.
- Limit cultivation and use low impact cropping techniques such as strip tillage or direct drilling.
- If re-contouring, ensure erosion control measures are in place and use a skilled contractor. You may need resource consent so check with Waikato Regional Council.
- Ensure the pH is in the recommended range to create the best soil environment for earthworms.
- Do not substitute fertiliser nitrogen for poor growing pastures or a lack of feed budgeting as a first option. Examine the soil structure, using Visual Soil Assessment if compaction is suspected. Soil and herbage test to eliminate any nutrient deficiency before considering nitrogen.

MORE INFORMATION

Contact

- Waikato Regional Council
Freephone 0800 800 401

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Graze paddocks prone to pugging before the very wet weather arrives.