

4 Reasons Why Your Soil Isn't Ready to Garden Yet,



and How to Fix It

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Poor soil means sad plants and owners.

This guide will help you identify the 4 main soil problems that hold back your garden, and show you the steps to fix them.

Life is too short to settle for poor soil under your plants, so we made this Char Bro guide so you don't have to.

Problem 1 – The plant root zone can't breathe

Most garden plants and their microbe partners in the soil need access to fresh air to 'breathe'. Your plant works as a team with beneficial soil life to get the right nutrients to the plant, but this is stopped when there is no more fresh air in the soil to supply nutrients, or take excesses away.

Solution 1 – Aerate the soil by unclogging your soil's airways and letting your soil breathe

Clogged airways in soil are usually caused by:

- A. Heavy clay soils without enough drainage can act like a big saucer under your plants, filling up and becoming waterlogged, drowning your plants
- B. A crusty lid of compacted soil. The compaction layers in the soil are caused by foot or machinery traffic, as well as rain on uncovered soil. These become airtight and watertight over time, causing your soil to stop breathing and becoming dehydrated.



What can I do about it?

There are a few ways to break open the lid and unclog your soil's airways so that your soil becomes a happy, healthy sponge. We recommend the following steps:

1. Permanently improving the soil. First open up the soil by digging then broad forking, then mix in in biochar (up to 10% by volume) and lots of organic matter, followed by an optional spray of fungi-rich compost tea or worm castings tea mixed with a little molasses. This will help to break up hard crusts and keep the soil structure open
2. Minimising traffic on garden beds
3. Planting tap-rooted plants like daikon radish to bio till the soil
4. Broad forking to aerate the soil before each planting
5. Keeping the soil covered with mulch or crops at all times
6. Regular applications of finished compost to maintain organic matter levels and feed the soil microbes.

Over time, your soil will transform from concrete to a softer, spongy texture.

If you still have flooding problems a year later, your problem may be excess water flowing into your garden area above or below ground. To remedy this, consider ways to build up a garden bed above the water table, beneficially use up excess water, or divert the excess water to a storage area so the soil you want to grow in is not waterlogged for more than a couple of days at a time.

Problem 2 – Lack of water

Like us, water is essential for plants to survive and thrive. A lack of water means the plant stops growing and starts collapsing



Solution 2 – Slow down water on your garden, increase capacity of soil to take in and maintain water supply

When someone asks “how much rain did you get?”, you want your answer to be “all of it”

A lack of water, or dry soils are caused by:

- Water on steep, compacted soil sheets across it because there is not enough time for the water to soak in before gravity pulls it down the slope instead of into the soil
 - Increase time before water runs off
 - Lower gradient – terracing,
 - Retention structures - swales, sunken beds etc
 - Groundcovers to slow water flow
 - Keyline and contour subsoiling

- Water storage at the top of the slop, then using and infiltration – water at height can become a safety hazard. Speak to your Council and get any significant water storage designed by a competent professional engineer
- Increase the rate that your soil can drink in the water
 - As above for aerating the soil
- Hard crusts stop water from soaking in
 - As above for aerating the soil
- Hydrophobic soils
 - are usually the result of bacterial coatings on soil particles which repel water
 - As above for aerating soil, with emphasis on a tea made from worm castings
- Heavy clay soil with few water-accessible voids prevent water soaking in, limiting water holding capacity
 - As above for aerating the soil, with emphasis on broad forking and adding biochar and organic matter into the soil
- Light, sandy soil drains too quickly down through the soil layers
 - Sink garden beds into the soil to maximise water coming in
 - Line with clay, topsoil, biochar and compost
- Too much evaporation
 - Shade, windbreaks, groundcovers, organic mulch, stone mulch
- Tried everything above - irrigation

Problem 3 – Low fertility of existing mineral soil

Fertility is the ability of a soil to hold onto nutrients without leaching out, and allow plants to access nutrients when plants need it



Caused by:

- Low ion storage (CEC and ASC)
- Leached soils from low ion storage capacity or high rainfall

Key strategies include:

- Slow down water
- Recycle nutrients with diverse, continuous plant coverage over soil, diverse soil life
- Make a cup to capture nutrients
- Plant deep rooted plants to mine nutrients that have seeped into deep subsoil layers

Solution 3 make the soil like a cup that catches and retains nutrients

- Clay then
- Topsoil
- Biochar
- Paramagnetic minerals
- Lime flour
- Compost
- Soil test and top up of deficient nutrients

Problem 4 – Excess organic matter smothering plants

Yes, sometimes you *can* have too much of a good thing.



In some circumstances, organic matter will build up to excess and smother seeds, preventing new growth. This is less common in New Zealand than other countries because of our high rainfall, but excess organic matter does still build up in some ecosystems like drylands.

Excess organic matter is what happens when the ecosystem can't digest all the leftovers and turn them into plant food.

Yes... even your garden soil can get constipated.

Solution 4: wake up and feed the bugs which digest the organic matter

- Organic microbes need air, water, sugars, calcium, a little N and P for energy
- Fluff up any areas with excessive buildup of organic matter, then apply humic acid and sugar / molasses
- Test for 10:1 to 12:1 C:N ratio
- Stop watering with chlorinated water – this kills good microbes as well as harmful pathogens, but if your garden doesn't have any good bugs its digestive system will stop!
- If still not working, repeat the above after applying a compost tea made from a diverse, locally sourced, high quality biological compost