



Assessing the Texture of Your Soil

Why do you need to know the texture of your soils ?

If you need to know how to:

- estimate the amount of lime needed to raise soil pH;
- estimate soil water holding capacity;
- estimate the RAW (readily available water) and refill point for irrigation;
- assess infiltration rate and soil drainage characteristics;
- convert soil test salinity results ($EC_{1:5}$) to actual soil salinity (EC_e);
- select crop and pasture species to better suit soil types;
- assess whether a soil is at correct moisture content for cultivation;
- select suitable sites for farm dams, banks, channels, drains, storages etc;

To make these and other land management decisions, you should know the texture of your soils.

What is texture ?

Texture is an estimate of the amounts of sand, silt and clay in a soil. The mineral part of soil is a result of the breakdown of rock into sand and silt, and the recombining of some minerals to form clay. These particles vary in shape and are broadly divided into the following three size categories:

Sand	the largest soil particles	0.02 mm to 2 mm
Silt	smaller particles of parent rock	0.002 mm to 0.02 mm
Clay	the smallest soil particles	less than 0.002 mm

In the simplest terms, soils can be divided into three major texture groups: **sands**, **loams** and **clays**.

Sands are dominated by sand particles, and therefore are the coarsest or lightest of soils. Sometimes the sand can be described as light, fine or coarse. Sandy soils feel **gritty**.

Loams have a fairly even mix of sand, silt and clay. Their feel can be described as **smooth** or **silky**, and also **greasy** if there is plenty of organic matter present.

Clays comprise more than 35% clay particles, and are referred to as fine textured or heavy soils. Clays can be described as light, medium or heavy. Clay soils have a **plastic** feel when moulded.

What do the names mean ?

When a texture class is given a name, the dominant soil particle or its major texture class comes last. For example, a sandy loam (SL) is a loam with a high sand content. A loamy sand (LS) is a sand which is approaching the texture of a loam, but feels more like a sand than a sandy loam. Many alluvial soils have a high silt content, such as a silty loam (SiL or ZL).

There are many texture classes, and the method described on the following pages allows you to assess sixteen of the most common classes.

Where do you sample ?

Before you begin assessing the texture of your soil, you need to identify the different soil types on your farm, and select representative sites for a closer look. Assess texture separately for the topsoil and subsoil. Take a representative slice of soil, remove any excess organic matter, roots and stones (gravel and rock are ignored for this test), mix it up and then take a small subsample in your hand for your texture test.

How to texture your soil

1. Take a sample of soil that has been crumbled and crushed, sufficient to fit comfortably in the palm of your hand.
2. Moisten the soil with water, a little at a time. Knead the soil until it forms a ball 3 - 4.5cm in diameter, or about golf ball size. Knead it until the ball just fails to stick to your fingers, adding more water if needed. The ball of soil should not be saturated (water dripping out) or too dry (still a bit dusty, lumpy and hardly wet at all).
3. Continue kneading and moistening, if necessary, until there is no apparent change in the feel of the ball; this usually takes 1 to 2 minutes, but may take longer with clays.
4. Assess the soil for coherence (the way the ball holds together) by squeezing the moist ball in your hand. Knead the ball for a further minute.
5. Assess the feel as you knead it (see table opposite). Rub the soil between the end of your thumb and forefinger to detect grains of sand.
6. Press the soil between your thumb and side of forefinger, and squeeze it to make a thin continuous ribbon about 2 mm thick until it breaks of its own accord.
7. Measure the length of the ribbon. Repeat this ribboning test a few times to obtain an average length of the ribbon.
8. Try to roll it into a rod 8 - 10 mm thick. If it makes a long rod, see if the rod can form a ring without cracking.
9. If the ball has a plastic behaviour, check its resistance to shearing. Do this by placing the ball between thumb and forefinger and squeeze, and try to push the ball apart by sliding your thumb across it.

You should be able to assess the soil's texture by its coherence as a ball, its feel, and the length of a ribbon before it breaks off. Clays can be assessed by resistance to shearing, and the ease of making a rod and forming a ring. The table opposite is your guide to assessing texture into the sixteen different groups.

After you have assessed your soil into one of the texture groups, you can check it and estimate the percentage of sand, silt and clay by using the Soil Texture Triangle on the back page.



Step 1



Step 2



Step 3



Step 6



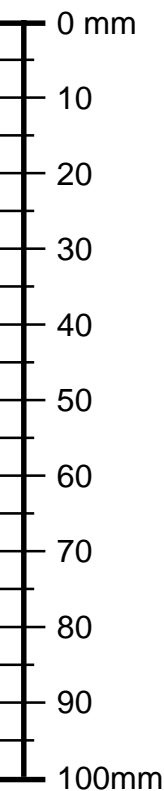
Step 7

Guide to the most common soil textures

Ribbon Length (mm)	Coherence (way ball holds together)	Feel and other Features of a Moist Ball of Soil	Approx Clay %	Texture Class
Nil	Nil	Gritty feel, sand grains adhere to fingers, cannot be moulded	less than 5%	Sand (S)
5	Very Slight	Gritty, medium size sand grains felt, cannot be moulded	5 - 10%	Loamy Sand (LS)
5 - 15	Slight	Sticky, sand grains adhere to fingers, cannot be moulded, clay stain discolours fingers	5 - 10%	Clayey Sand (CS)
15 - 20	Slight to Just Firm	Gritty, dominant sand grains are medium size and visible	10 - 20%	Sandy Loam (SL)
15 - 25	Just Firm	Fine sand can be heard when rubbed between thumb and forefinger	10 - 20%	Fine Sandy Loam (FSL)
about 25	Spongy to Firm	Smooth spongy feel, greasy if organic matter present, ball easy to manipulate, no obvious sandiness	about 25%	Loam (L)
about 25	Firm	Silky, very smooth when manipulated	25%	Silty Loam (SiL)
25 - 40	Strong	Sandy to touch, medium sand grains visible in fine matrix	20 - 30%	Sandy Clay Loam (SCL)
40 - 50	Firm	Smooth and sandy, fine sand felt and heard	30 - 35%	Fine Sandy Clay Loam (FSCL)
40 - 50	Firm	Smooth and silky feel	30 - 35%	Silty Clay Loam (SiCL)
40 - 50	Strong	Smooth plastic feel, no obvious sand grains	30 - 35%	Clay Loam (CL)
50 - 75	Firm	Plastic and smooth, fine sand felt (SC), silky feel (SiC), can be moulded and rolled into a rod	35 - 40%	Sandy Clay (SC) Silty Clay (SiC)
50 - 75	Firm to Strong	Plastic and smooth, slight resistance to shearing, is easily moulded and rolled into a rod	35 - 40%	Light Clay (LC)
75 - 85	Strong	Plastic and smooth, slight to moderate resistance to shearing, rod forms a ring without cracking	40 - 45%	Light Medium Clay (LMC)
85 - 100	Strong	Plastic and smooth, handles like plasticine, resistant to shearing, rod forms a ring without cracking	45 - 55%	Medium Clay (MC)
more than 100 mm	Very Strong	Plastic, like firm plasticine, firm resistance to shearing, rod forms a ring without cracking	more than 55%	Heavy Clay (HC)

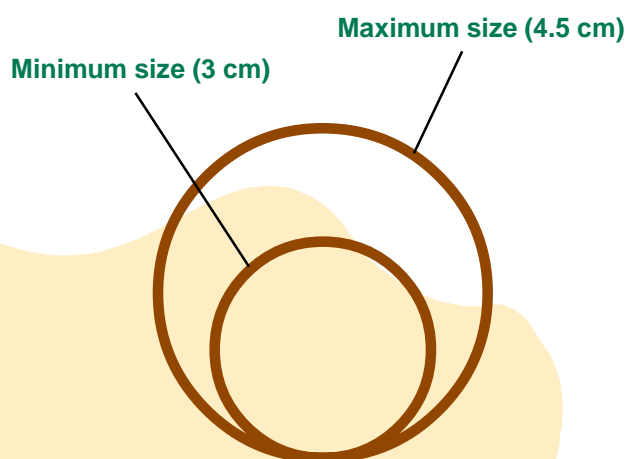
Adapted from: Peverill, Sparrow and Reuter (1999). *Soil Analysis: an Interpretive Manual*. CSIRO Publishing.

Other Useful Information



**Ruler to help
accurately determine
ribbon length**

**Guide to
minimum and maximum size
of your ball (bolus) of moist soil**



References

Save Our Soils website:

<http://sos.cyberhost.com.au>

Refer to the following NSW Agriculture publications for further information on:

Liming rates for soils of different textures

Agfact No.AC.19 *Soil acidity and liming*

Soil water holding capacity and RAWs

WaterWise on the Farm Irrigation Management Course notes: *Assessing your soil*

Testing for soil salinity

Texturing Soils and Testing for Salinity - Salinity Note No. 8
Salt Bag: a do-it-yourself water and soil salinity measuring kit

Soil drainage characteristics and correct moisture content for cultivation

Refer to NSW Agriculture's *SOILpaks* for: cotton growers, vegetable growers, southern irrigators, northern wheat belt, southern dryland areas and red soils of central western NSW. For NSW north coast farmers, see the *Soil Sense* series of publications.

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