Soil Testing Guide

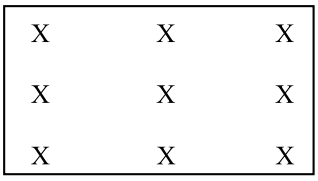
Soil Sample Collection and Storage

Equipment required

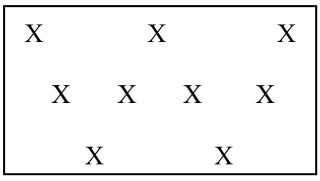
- An auger (available from DoA) or a clean shovel (preferably stainless steel)
- A clean knife.
- Clean gloves. (Soil should not be handled as this can affect it chemical properties)
- Clean plastic bags (new freezer or snap lock bags are ideal)
- Permanent marker to record site information on plastic bags
- Map or GPS co-ordinates showing where samples were taken. Collecting the sample.

Sampling Process

1. Identify the paddock/s you wish to sample
2. Collect samples across entire site.
3. You can either collect the samples in a grid pattern or a W pattern



Grid Pattern



W Pattern

4. Try to keep the samples representative of the paddock.
   Identify areas in the paddock which are not representative of the paddock. E.g. old fence lines, stock camps, wet spots, drainage lines, gateways or dung and urine patches. **Do not take samples from these areas.**
5. To operate the auger, push the probe into the ground by standing on the foot step then transfer the collected sample/core into the plastic bag. Repeat process until you have at least 750-1000g sample. If using a shovel dig into the ground and lift a wedge of soil out, use the knife to cut a slice 15cm (6 inches) long and 2-3cm (1 inch) wide. Place sample in the bag and repeat process until you have at least 750-1000g sample.
6. Mark map showing where samples were collected from.
7. Send samples to the DoA as soon as possible after collection. **Keep samples in an air tight container** (ie. A Ziplock bag).
8. Label the Plastic Bag with your **farm name, paddock name and date**.
9. Fill out a Soil Sample Submission form available from the DoA website: https://www.falklands.gov.fk/agriculture/doa/services/laboratory

Available Soil tests Information

pH: pH is determined by the use of a pH probe, we test for the pH in soil-water mix, a soil-$CaCl_2$ mix and a soil-KCl mix, this allows us to make estimates on other properties of the soil.
The pH is a measure of the H^+ ions in the soil or its Acidity/Alkalinity. It varies on a scale from 1-14, and typically most plants like to grow in a soil with a pH around 6.5

Nitrogen (NO_3-N): is determined by the Griess test, in which the Nitrate is reduced to Nitrite, then all Nitrite is reacted with several reagents to create an Azo-Dye which can be detected through Photospectrometry. Nitrate and Nitrite are the parts of the Nitrogen cycle which are most active and Nitrate is the end stage product used by plants, it is vitally important for the production of DNA and Proteins.

Phosphorus (P): is determined using the Bray I method this enables us to determine both extractable Phosphorus. P is a measure of the Phosphorus that is available in the soil for the plants to use, or exchangeable P, P is important to plants as it is essential for cell division and the development of the growing tip of the plant

Potassium (K): is determined using flame photometry allowing us to determine the extractable K in a sample. K is a measure of the Potassium available to plants in the soil, or exchangeable K, Potassium helps to stimulate plant growth particularly in early life, and is important for Water absorbency throughout a plant's life time.

Sodium (Na): is determined using flame photometry allowing us to determine the extractable Na in a sample. Na is a measure of the Sodium that is available for plants in the soil, or exchangeable Na, much like K, Na is important to help the plant control its water absorbency, it also is important to aid the plant sustain the structure of the plant.

Organic Matter (OM): is a measure of the percentage of the soil that is un-decayed organic matter, it is determined by the complete combustion of carbon. OM is a highly important part of the soil makeup, om contributes to the structure of the soil and also to it nutrient holding capacity (cation and anion exchange capacity), nutrient turnover. The factors that it affects in the soils structure also influences the soils capacity to retain water, its aeration and workability.

Basic Cation Exchange Capacity (CEC_B): is determined by the modified compulsive exchange method where all exchangeable cations are replaced by a suitable ionic replacement and the conductivity is measured to allow for the calculation of cation exchange while maintaining the soils native pH and therefor ignoring non-exchangeable cations such as Al^{3+} common in soils with high pH. CEC_B is the capacity of the Soil to hold and exchange Cations (positive Ions) such as K^+, Na^+, and most other metal salts, these are all used by plants and it is important to know the CEC_B because it gives you an indication as to whether it is worth while using fertilizer or if the cations in the fertilizer will not be retained by the soil and instead be washed out of the soil.

Sulphur (S-SO_4): is determined through turbidimetric analysis using Photospectrometry to determine the concentration of Barium Sulphate extracted from the Soil through reaction with Barium Chloride. Sulphur is required by plants for helping to control Nitrogen metabolism, enzyme activity, as well as protein and oil synthesis.