



# FARMER LED, FARMER DRIVEN

**Roxburghshire**  
Soil and sampling  
2023



## Soil Analysis

Whole farm soil sampling was undertaken earlier in the year with Soil Essentials at Cowbog and showed some variation across the farm. Robert noticed that the grazing fields had much more variation and brought it down to the fact that the arable fields have had more attention paid to them over the years.

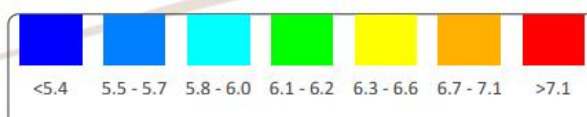
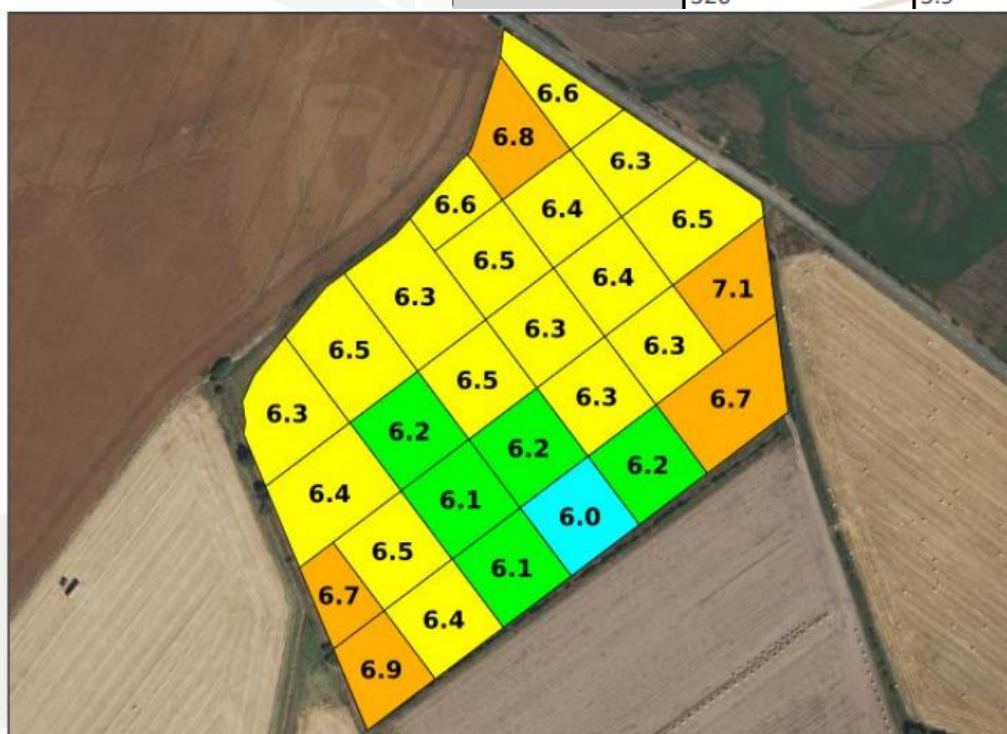
There was still some lime to be applied on a few fields. Soil Essentials have found that, from their experience, a **50% NV lime at 1 t/ha will raise the pH by 0.1 in a medium soil type, with soil cultivation at plough depth.**

Robert can use the **variable rate application map** provided by Soil Essentials to spread less lime and reduce costs across the farm (see map below)

| Field            | Samples      | Avg pH        |
|------------------|--------------|---------------|
| 10 Acre          | 13           | 5.8           |
| 20 Acre          | 31           | 5.7           |
| BCH/LM WBS       | 7            | 5.8           |
| Big Cover Haugh  | 40           | 6.4           |
| Cauldshiels      | 26           | 6.3           |
| Caverton March   | 16           | 6.1           |
| Cessford March   | 29           | 6.7           |
| Cow              | 9            | 5.5           |
| Cuddy            | 31           | 6.3           |
| Doddies Haugh    | 3            | 5.6           |
| Front            | 5            | 6.0           |
| Jumps Paddock    | 1            | 5.4           |
| Marlefield March | 28           | 6.5           |
| Mid              | 31           | 6.0           |
| Middle Haugh     | 1            | 5.3           |
| Normans          | 2            | 5.4           |
| Petties Haugh    | 4            | 5.7           |
| Pond             | 5            | 5.9           |
| Roadside Pilmuir | 1            | 5.8           |
| Stackyard East   | 6            | 6.1           |
| Stackyard West   | 5            | 6.0           |
| Tennis Court     | 3            | 5.6           |
| Toll             | 21           | 6.2           |
| Top Riverside    | 4            | 5.5           |
| Upper Haugh      | 2            | 5.5           |
| West Plimuir     | 2            | 6.1           |
| <b>Summary</b>   | <b>Total</b> | <b>Avg pH</b> |
|                  | 326          | 5.9           |

|              |                  |
|--------------|------------------|
| Field Name:  | Marlefield March |
| Target pH:   | 6.2              |
| Lime Type:   | Calcium Lime     |
| Sample Date: | 04 Apr 2023      |

| pH           | Lime Req.          | Area (ha)    | Tonnes       |
|--------------|--------------------|--------------|--------------|
| 6.0          | 2.0                | 0.25         | 0.5          |
| 6.1          | 1.0                | 0.50         | 0.5          |
| 6.2          | 0.0                | 0.75         | 0.0          |
| 6.3          | 0.0                | 1.65         | 0.0          |
| 6.4          | 0.0                | 1.09         | 0.0          |
| 6.5          | 0.0                | 1.42         | 0.0          |
| 6.6          | 0.0                | 0.34         | 0.0          |
| 6.7          | 0.0                | 0.52         | 0.0          |
| 6.8          | 0.0                | 0.25         | 0.0          |
| 6.9          | 0.0                | 0.22         | 0.0          |
| 7.1          | 0.0                | 0.26         | 0.0          |
| <b>Av pH</b> | <b>No. samples</b> | <b>Total</b> | <b>Total</b> |
| 6.5          | 28                 | 7.26         | 1.0          |





# DIY soil sampling

You can take your own soil samples to send away. Soil essential have put together a handy guide to DIY soil sampling

## Sampling bag information

- Farm name, field name and sample bag number

## When & where

- Same time of year each year
- Large field

## When not to sample

- FYM, slurry, henpen applied within the past 3 months
- Straight after mob grazing
- Within 1 year of lime being applied
- After recent applications of nitrogen or other compound fertiliser

## Areas to avoid

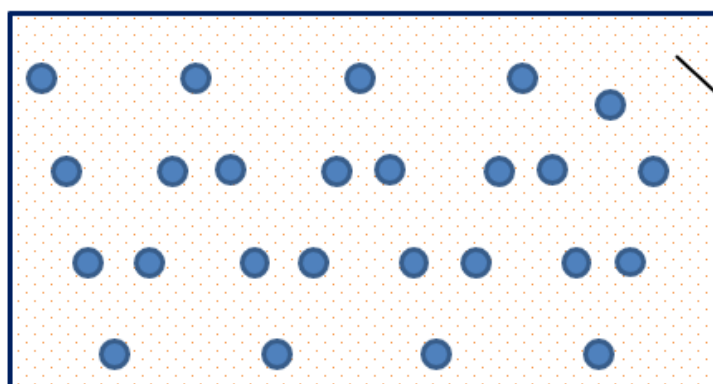
- Gateways, often used for duning lime which can skew average results
- Dung heaps and areas of run-off
- Areas where livestock congregate e.g., feed and water troughs

## How to take good samples

- Take 25 cores mixed together
- Stay 15m clear of the field boundary

## Sampling depth

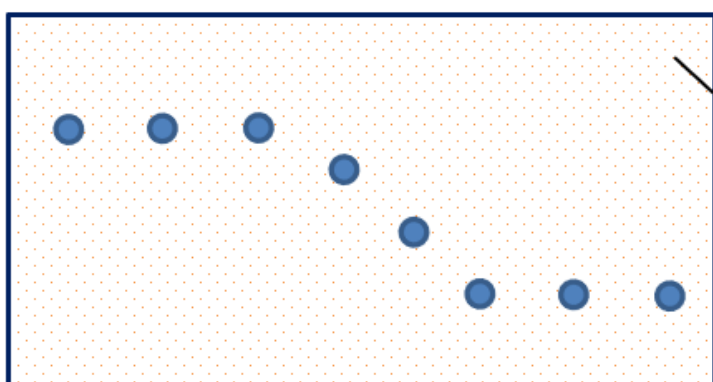
- Permanent grass- 10cm/4"
- Arable/short term rotation 20cm/8"



Keep clear of gateways

Minimum of 25 cores taken

Zig zag path when sampling



Missing large areas of the field

Uneven representation of the field

Taking less than 25 cores



## Healthy grassland soils

### How to assess soil structure

#### Step one: Surface assessment

Look at the quality of the sward to identify potentially damaged areas that require further assessment. Where the sward is moderate or poor, this may indicate that further investigation of the soil quality is required.



##### Good

- Sward intact
- No poaching
- Few wheelings



##### Moderate

- Surface poached
- Wheelings in places
- More weed species



##### Poor

- Surface capping
- Soil exposed
- Severe poaching
- Poor sward quality

#### Step two: Soil extraction

- Dig out one spade-sized block of soil (depth approx. 30 cm). Cut down on three sides and then lever the block out, leaving one side undisturbed
- Lay the soil block on a plastic sheet or tray

**Tip:** When starting out, it is useful to dig in an area where you know there may be a problem (e.g. a gateway) and get familiar with signs of soil structure damage.

**Remember:** Sample when the topsoil is moist – if the soil is too dry or too wet, it is difficult to distinguish signs of poor soil structure.



#### Step three: Soil assessment

Gently open the soil block like a book to break it up.

- If the structure is uniform – assess the block as a whole
- If there are two or more horizontal layers of differing structure, identify the layer with the poorest structure (the limiting layer)
- Carry out the rest of the assessment on this limiting layer



Moderate over Good



Good over Poor

#### Step four: Soil scoring

Break up the soil with your hands into smaller structural units or aggregates (soil clumps).

- Assign a score by matching what you see to the descriptions and photos overleaf
- A score of 1 or 2 is **Good**; a score of 3 is **Moderate** and 4 or 5 is **Poor** and requires management action
- Record the depth of the limiting layer to assess management options



**Good**

A score of 1 or 2



**Moderate**

A score of 3



**Poor**

A score of 4 or 5



Place the top of the page level with the surface and assess the soil below (cm)










5

10

15

20

25

| Score 1 – Crumbly (aggregates readily crumble with fingers)                         |   |  |  |
|---|---|--|--|
| Identification of structural problem<br>e.g. limiting layer                         | Soil structure features   | Description  | Management options   |
|    | <br>Small (<8 mm), rounded                 | Good soil structure<br>Highly porous<br>Numerous, well-distributed roots<br>Sweet, earthy smell<br>Small, rounded aggregates   | Reassess after equipment crosses the ground, after grazing in wet conditions or every two years.   |
| Score 2 – Intact (aggregates easily break apart)                                    |   |  |  |
| Identification of structural problem<br>e.g. limiting layer                         | Soil structure features   | Description  | Management options   |
|    | <br>Rounded (10 mm)                        | Good soil structure<br>Earthy smell<br>Porous<br>Some indication of larger aggregates<br>Good root distribution  | Reassess after equipment crosses the ground, after grazing in wet conditions or annually in spring.  |
| Score 3 – Firm (most aggregates break down)   |   |  |  |
| Identification of structural problem<br>e.g. limiting layer                         | Soil structure features   | Description  | Management options   |
|   | <br>Rounded (10 mm), but some are angular | Adequate soil structure<br>Larger aggregates, some angular<br>Moderate root distribution<br>No strong smell<br>Less visible pores  | Consider infrastructure changes (e.g. back-fencing, multiple field entrances or tracks) to minimise traffic in marginal weather conditions.  |
| Score 4 – Compact (effort needed to break down aggregates)                          |   |  |  |
| Identification of structural problem<br>e.g. limiting layer                         | Soil structure features   | Description  | Management options   |
|  | <br>Larger (>5 cm), angular              | Large, angular aggregates (>5 cm across) with low pore numbers<br>Some red/orange mottling may be present (sign of poor drainage)<br>Roots clustered in large pores, worm channels and cracks between aggregates<br>May have sulphur smell (i.e. bad eggs)             | If soil structure is poor at a depth of less than 10 cm, use a sward slitter or aerator. If soil structure is poor at a depth of 10 cm or more, use a sward lifter or top-soiler. If the sward is poor, consider ploughing or reseeding. |
| Score 5 – Very compact (aggregates are compact, difficult to pull apart and platy)  |   |  |  |
| Identification of structural problem<br>e.g. limiting layer                         | Soil structure features   | Description  | Management options   |
|  | <br>Large initially (>10 cm), angular    | Very large, angular aggregates (>10 cm), with very few pores<br>Any roots seen mainly at the surface or clustered down large pores or cracks<br>May have grey colour with red/orange mottling (sign of poor drainage)<br>May have strong sulphur smell (i.e. bad eggs) | If soil structure is poor at a depth of less than 10 cm, use a sward slitter or aerator. If soil structure is poor at a depth of 10 cm or more, use a sward lifter or top-soiler. If the sward is poor, consider ploughing or reseeding. |



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To find out more or to sign up, please contact:

Regional Adviser – Maura Wilson

07721 677556

[mwilson@qmscotlandco.uk](mailto:mwilson@qmscotlandco.uk)

[monitorfarms.co.uk](http://monitorfarms.co.uk)

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