

Soil assessment methods



Action points

- New methods of assessing soils are available, but they require careful consideration and interpretation
- Assess soils beginning with methods which you understand, before progressing to those that are more complex
- Assess soil texture and structure in several locations representing 'good' and 'bad' areas within a field and compare results with those of un-cropped field margins.
- Develop a soil management plan which takes into account physical, chemical and biological indicators of soil health

Soil health

Many farmers and growers are concerned about the health of their soils. They understand the importance of soil health for the productivity, sustainability and profitability of their business, but many face significant challenges when interpreting results from laboratory analysis or when choosing suitable methods for assessing the health of soils beyond the standard pH, phosphorus (P), potassium (K), magnesium (Mg) analysis.

To be of value to farmers and growers, methods for soil assessment should not only measure soil health, but they should also provide information that can be used to inform decision making in relation to soil management. This factsheet provides an overview of the various methods of soil testing that are currently available.

Indicators of soil health

The functioning of soil depends upon a complex interaction between organisms large and small, chemical reactions in solution and on surfaces of clay particles; all within a structure determined by natural processes and modified by soil management.

A broad range of appropriate indicators of soil health are therefore needed to evaluate the effects and sustainability of agricultural practices. The most commonly agreed and used indicators can be grouped in the three categories of (1) biological, (2) chemical and (3) physical parameters.

Assessment methods

During a series of regional consultation meetings in autumn 2015, horticultural growers in Great Britain discussed different approaches to soil assessment - methods they found useful and reasons why others were not commonly used. Growers rated the methods and the results are given overleaf.

Further information

This factsheet is an output of the AHDB Horticulture GREATsoils project CP 107b.

More information on soils and soil management is available on the AHDB website at ahdb.org.uk/greatsoils

Soil assessment tests evaluated and rated by growers

1 = low; 5 = high rated by growers	Skill req'd	Time input	Cost input	Suitable for	Not suitable for	Comments from growers	
Spade diagnosis (depth 30cm)	1	1	1	Easy, quick, good indication of soil health, fast general impression of the soil status	Subsoil assessment, quantitative nutrient levels	Most common method used, very easy and informative; 'spade is always with me'	
Plant health monitoring (current and previous crop, weeds)	1	1	1	Early signs of nutrient deficiencies or compaction	Specific or quantitative information	Seasonal, need some experience and additional tests for details	
Total soil organic matter (SOM) (usually in %)	1	1	1	Total SOM (labile, stable and inert fractions of SOM)	Monitoring labile SOM (providing/releasing energy and nutrients)	No need to do annually, need specific sampling technique	
Visual soil assessment tools (eg AHDB Healthy Grassland Soil methods)	1	2	1	Good overview of a wide range of soil health indicators (roots, worms, soil structure, colour)	Quantitative assessment of nutrients	Assessment speed comes with experience, easy to learn, need the tool only at first	
Standard lab test (macronutrients and pH)	1	2	2	Soil nutrient content P, K, Mg and pH	eg soil life, structure, compacted layers, root development	Regularly done, directly informs fertiliser strategy	
Visual evaluation of soil structure (eg SRUC VESS tool)	2	2	1	Soil structure and compaction detection	Quantitative assessment of nutrients	Some specific knowledge required	
Earthworm counts	2	3	1	Good indicator for soil structure and health, soil life and activity, soil biodiversity	Quantitative assessment of nutrients, subsoil assessment	Seasonal fluctuations, some skill required for species identification	
Micronutrient test	2	2	3	Trace elements/ micronutrient levels in the soil	eg soil life, structure, evaluation of compacted layers	Done only if deficiencies suspected in plants	
Soil pit/profile (depth range 30–150cm)	3	3	1	Subsoil assessment, horizons and exact location/depth of compacted layers	No quick results, is a rather destructive method, location of sampling important	Very useful results if done properly, good for structure assessment	
Soil health test	3	2	3	Measures pH, available P, K, Mg, texture, total SOM and respiration rate	In-depth evaluation and meaningful results/conclusions	Skill required for interpretation of overall results, eg respiration rates	
SOM balance modelling tool	5	5	2	Input/output estimation of SOM levels on field or farm level	Beginners in SOM assessment, basic day-to-day assessment	Not commonly used in UK yet, but might be a promising planning tool	
Soil life suites (eg food web tests, enzymatic activity, basal respiration etc)	5	2	5	Bacteria and fungi, number, species and diversity (no standards yet)	eg soil structure, compaction evaluation	Skill required for adequate sampling and high skills for interpretation	

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