



Horse Sense

Jennifer Micklem Diamond

jmicklemdiamond@theirishfield.ie

Soil fertility an invaluable commodity

Teagasc's **Wendy Conlon** looks at the importance of soil fertility and how best to maintain it

HOW we manage soils to maintain soil quality is critical to their productivity. The health of soils is a key component to the efficient utilisation of soil nutrients in the production both of quality forage for winter feeding and quality grass during the grazing season.

To maximise the productivity of soils it's important that we understand their chemical, physical and biological properties. Soil testing is the starting point and the foundation to delivering the correct balance of both major and minor nutrients.

Soil management is an important skill not only for maximising productivity of grass, but it is also an important part of cross compliance which requires the maintenance of a farm fertiliser plan on an annual basis. This is a critical component of farming for those with income from the Basic Payment Scheme (BPS).

A review of soil sample results over 2017 and 2018 analysed by Teagasc indicates that soil fertility levels on Irish farms may be turning a corner with some positive signs of overall improvement.

Soil fertility had been in decline since the mid 1990s, linked closely with lower lime and lower compound fertiliser

use, and had reached very low status between 2013 to 2015 with just 10% of soil samples showing good overall fertility in terms of pH (>6.2), P and K (= index 3) status. However, the Teagasc soils data now indicates large improvements in soil pH levels and early signs of improvements in both soil P and K levels on farms, although the rates of these improvements are enterprise specific.

Across all farm enterprises the only soil fertility indicator showing significant positive signs of improvement was soil pH. Increased research and advisory emphasis on the importance and benefits of lime application to our naturally acidic soils since 2013 has helped to raise awareness amongst farmers.

The optimum soil pH for grassland mineral soils is =6.3 and during the period 2014-16 on average 37% of soils tested were in this range whereas 2017-18 on average 54% of soils had optimum pH levels. This large improvement in soil pH will have significant positive effects on nutrient uptake efficiency from applied fertiliser and organic manures and also on the longevity of grassland swards.

Managing soil fertility is about focusing on the key aspects of soil and nutrient applications, and setting targets for the farm. The following five practical steps should be followed to manage soil fertility.

Managing soil fertility

1

Soil samples

It is recommended to have soil samples taken for the whole farm every three to five years. Unless you know what is already in the soil, it is impossible to know how much fertiliser it needs. Therefore, by taking soil analysis and putting the results into practice, the fertiliser programme can be tailored to the needs of the soil. Now is a good time of year to take samples.

Avoid any unusual spots such as gateways/old field boundaries/feeding points. A sample should represent two-four hectares with a minimum of 20 cores per sample from the top 10cm of soil. Do not sample within six months of fertiliser application (Phosphorous - P - and Potassium - K); and do not sample within two years of lime application.



2 Soil pH and lime

Soil pH is a measure of soil acidity and we aim to maintain a pH of 6.3 on mineral soils and 5.5 on peaty soils for grass production. This is essential for nutrient availability (nitrogen N, P and K) and will increase the productivity of the grass sward annually.

Soil acidity is controlled through the application of ground limestone once every five years applied only on the basis of a recent soil test report. A maximum single applica-

tion of lime is 7.5t/ha with any remaining lime applied in year three. Over-liming will reduce nutrient availability. Lime may be applied at any time of year.

On high molybdenum (Mo) soils, maintain soil pH <6.2 to reduce problems with copper deficiency. On heavier and organic soils lower lime rates (<5 t/ha) are best on a more regular basis to avoid 'softening the soil' and risk of poaching where lime is required.

3

Target Index 2 or 3 for P and K

Generally advice to farmers is to aim to have optimum soil P and K (Index 3) fertility levels in all fields. At optimum fertility levels, nutrients being removed in products need to be replaced. Low fertility (Index 1 & 2) soils need to be fertilised correctly to achieve soil index 3. For soils in Index 3 the fertiliser program should be designed to replace the nutrients being removed, thus maintaining the soil fertility levels.

Index 1 and 2 soils have a very low to low nutrient supply, and require additional nutrients to increase the fertility levels on an annual basis. Index 4 soils have a high nutrient supply. These soils present an opportunity to save money on fertiliser inputs by harvesting the P and K soil reserves for a number of years depending on the soil test reading.

For example, high P index 4s (>10-15 ppm) omit for 2/3 years and retest. For high soil K levels (>150- 200ppm) omit for 2/3 years on grazing ground then revert back to index 3 advice until next soil tests. Maximising grass production on grazing ground for horses may not be required or desired, particularly with good doers, and maintaining soil Index 2 may in many cases be sufficient, depending on grass production requirements. Index 3 is desired for forage production.

4

Organic manures

Organic manures are a valuable source of N, P and K and can effectively replace artificial fertilisers.

To maximise nutrients in organic manures, it is essential they are applied at the correct time of year. Spring is best, under cool, calm, moist conditions that will reduce N losses to the air.

Well-rotted farmyard manure (FYM) can be used very successfully on grass for horses. It has the advantage that it releases nutrients over a longer time than chemical fertilisers.

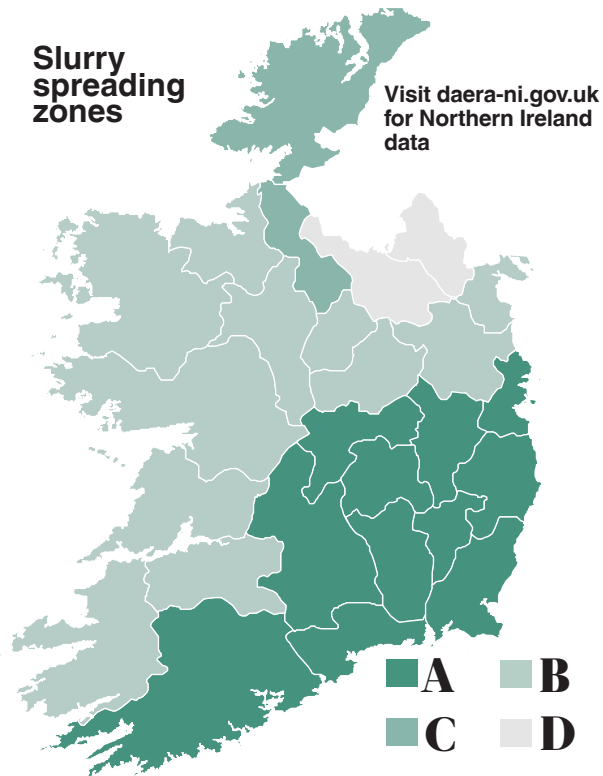
Say goodbye to the **thermometer**



Say hello to **Stablelab**



Slurry spreading zones



- Zone A** = Carlow, Cork, Dublin, Kildare, Kilkenny, Laois, Offaly, Tipperary, Waterford, Wexford, Wicklow.
- Zone B** = Clare, Galway, Kerry, Limerick, Longford, Louth, Mayo, Meath, Roscommon, Sligo, Westmeath.
- Zone C** = Donegal, Leitrim.
- Zone D** = Cavan, Monaghan.

Table 2: Storage capacity required, and prohibited periods for spreading fertiliser

Zones	Storage period for manure	Prohibited application periods		
		Chemical fertiliser	Organic fertilisers	Farmyard manure
A	16 Weeks	15 Sept–12 Jan	15 Oct–12 Jan	1 Nov–12 Jan
B	18 Weeks	15 Sept–15 Jan	15 Oct–15 Jan	1 Nov–15 Jan
C (Donegal and Leitrim)	20 Weeks	15 Sept–31 Jan	15 Oct–31 Jan	1 Nov–31 Jan
D* (Cavan and Monaghan)	22 Weeks	15 Sept–31 Jan	15 Oct–31 Jan	1 Nov–31 Jan



Manure pit with channel to divert effluent to underground tank \ Wendy Conlon

Table 1: SOIL FERTILITY INDEX

Soil Index	Soil Nutrient Supply	Nutrient Response
1	Very low	Definite
2	Low	Likely
3	Optimum	Unlikely
4	High	None

Prohibited application times

There are times of the year when you must not spread any fertiliser or manure at all on your land. These are called the prohibited spreading periods. These periods are necessary to prevent nutrient loss to water during the most environmentally risky time of the year.

The Nitrates Regulations divide the country into zones. The table below indicates prohibited spreading periods (the times when you are not allowed to spread organic and chemical fertilisers). Zone C (the northwest) is divided into two parts (Donegal/Leitrim and Cavan/Monaghan), which have different minimum storage requirements, but have the same rules about the times when fertilisers must not be spread.

You must have sufficient capacity and storage facilities for farmyard manure, effluents and soiled water collected in a way that prevents run-off or seepage directly, or indirectly into ground waters or surface waters until it is to be applied to land.

A concrete base with surrounding channels that divert the run-off to a holding tank is one option, in which case rainfall must also be factored in, or store manure on a concrete base under a roofed structure for the duration of the closed period in the relevant zone during the closed period. All storage facilities must be leak proof and structurally sound.

5

Nutrient supply

If one nutrient is deficient, no amount of another nutrient will overcome this.

For example, if a field is deficient in K, then excess N application will not be fully utilised. Make sure the selected fertiliser compound is supplying nutrients in the correct balance for the crop, the soil, and to complement any other nutrients applied in organic manures.

Nitrogen (N):

There is, as yet, no useful Irish laboratory test for N in soils.

Therefore, the nutrient N advice for grassland systems (grazing and conservation) depends mainly on land use and farming system, and particularly on the stocking rate.

Low levels of Nitrogen are required in horse production. Therefore, maintain good soil fertility levels (pH, P and K) to ensure grass palatability and persistency of the productive grass species. An application of 25-30kg of N per hectare (20-25 units of N per acre) is sufficient at any one time.

Good agricultural practice guidelines indicate you must not spread livestock manure and slurry containing more than 170 kg of nitrogen per hectare in a year.

Start now on a suitable fertiliser plan for next spring

SOIL test results are only as good as the soil sample taken. This is one of the most important steps in attaining reliable information regarding the soil fertility on your farm. Up to date soil test results are unique for the soils on your farm and will have a large influence on the productivity of your soils over the next four to five years.

This information will form the basis to formulating fertiliser / lime advice and decisions regarding fertiliser types and formulations. It is important that soil samples are taken correctly, which includes sampling to the correct sampling depth of 10cm.

Now is a good time of the year to take soil samples as the majority of fertiliser P and K is applied in the

spring, so taking soil samples now will ensure that you have results back in time. Allow three to six months between fertiliser P and K applications and taking fresh soil samples.

Comparisons

Soil test results will reveal a lot about the soils on your farm and will help explain why some fields perform better than other fields on the farm. It is also a good exercise to compare old and new soil test results for individual fields to assess the effectiveness of the fertiliser programme on your farm over the last number of years.

By not soil sampling, you may be missing out on knowing your soil fertility levels.

Wendy Conlon is an Equine Specialist within the Teagasc Farm Management and Rural Development Programme. Within the role she provides educational and advisory support to the sport horse sector.



There are many facets to the role with more direct support provided to some clients through for example the Knowledge Transfer

Programme over the past three years, and wider support by means of demonstration or workshop events, conferences and educational tours abroad for example.

The 'ISH Young Breeder' training programme (a joint programme with Horse Sport Ireland) is also a significant area of work in educating and encouraging future breeders.