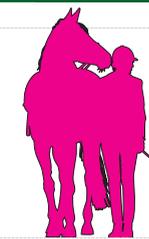




# EXCELLENCE IN EQUINE NUTRITION

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## Horse Sense

Practical advice for all horse owners

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### Soil and plant nutrition focus

# Your expert guide to summer

Horse Sense invited soil and plant nutrition specialist **Mark Plunkett** and equine specialist **Wendy Conlon** from Teagasc, to put together a useful guide to nutrient management for horse owners

**F**armers are being urged to focus on nutrient management planning, optimisation of soil fertility, using organic manures strategically and increasing clover in swards, all balanced with prudent fertiliser usage. While increasing clover use is not something equine farms are encouraged to do, the other management aspects mentioned all merit adoption by equine owners. Good grassland management is a key component of horse production as it ensures good quality grass during the grazing season, the production of quality forage to meet winter feed requirements, and healthier horses.

Horse owners should be familiar with their fields/paddocks and the type of land/soil they have. Having healthy soils is a key factor in growing healthy crops (including grass) and can also help reach environmental goals. If unsure of what type of land you own or rent, take out a spade to look beneath the surface at what condition of soil structure is present.

Soil flora and fauna such as earthworms, insects (e.g. beetles) and microorganisms (e.g. bacteria and fungi) which play a crucial role in soil functioning, can't survive without a healthy soil environment and a good supply of air and water. Under poor soil conditions, plant roots don't function as they cannot explore the soil to extract soil water and nutrients. A healthy soil with good biological activity is vital in nutrient cycling and making nutrients available to plants.

In most cases, the release of fertilisers can be applied is directly controlled by soil microbes. If soil microbes



Taking soil samples to test nitrates in equine grazing fields will pay dividends \ IFJ

don't have the right conditions, nutrients are not used efficiently and can be lost to the environment. For example, in water-logged soils where oxygen is absent, nitrogen is converted into nitrous oxide. If you dig up water-logged or compacted soil, a foul or putrid smell may be noticed, generated by microbes working where there is no oxygen and is a bad sign. Plant roots equally not only need water, but also air to survive.

#### Soil sampling

Soil sampling is another important step in understanding soil nutrient requirements and soil analysis establishes

### A healthy soil with good biological activity is vital in nutrient cycling and making nutrients available to plants.

fertility levels of major nutrients such as lime, phosphorous (P) and potassium (K). Knowing the farm's soil fertility, field by field, is the first step to calculating fertiliser requirements, and controlling fertiliser costs. Properly taken soil samples, sampling the top 10cm of soil, in a W pattern, avoiding any unusual areas of the pasture i.e. gateways, latrine areas etc., a minimum of 20 cores per two-four ha, not sampling within three

to six months after the last application of P and K or within two years of last lime application, are crucial.

#### pH and lime

Ascertaining lime requirement is always the starting point of good soil nutrient management. Aim for pH 6.3 on mineral soils and 5.5 on peaty soils for grass production. This is essential for soil nutrient availability (N, P, & K) and will increase the productivity of the grass sward annually.

#### Guidelines on lime application

- Maximum single application 7.5t/ha. Apply remaining lime two years later.
- Do not over-lime soils as this reduces nutrient availability, especially P.
- Lime can be applied at any time of the year, best applied to low grass covers (i.e. after grazing/ cutting, or to avoid residue).
- Maintaining soil pH increases the release of soil N (up to 70kgN/ha) from organic matter in spring contributing to early season growth.
- On high molybdenum (Mo) soils maintain soil pH <6.2 to reduce problems with copper deficiency. Alternatively, apply lime as recommended and supplement animals with copper.
- On heavier and organic top soils apply lower rates, < 5t/ha, on a more regular basis to avoid 'softening the soil' and risk of poaching



Table 1. Soil P & K Index System

Soil P&K index	Soil P (mg/l)	Soil K (mg/l)
1	0.0 – 3.0	0 – 50
2	3.1 – 5.0	51 – 100
3	5.1 – 8.0	101 – 150
4	> 8.0	>151

Table 2:- Nitrogen advice and P & K requirements for maintenance (Index 3) based on stocking rate

Stocking rate (SR)	N (kg/ha)*	P (kg/ha)	K (kg/ha)
1.0	25 - 40	3	4
1.5	25 - 40	5	6
2.0	25 - 40	6	8

\*Apply 25kgN/ha in springtime. Apply additional N based on grass demand during the growing season (kg/ha x 0.8= units/ac)

Table 3: Annual nutrient excretion rates of Nitrogen for horses:

Horse Age	Total Nitrogen excreted kg/ year
Three years old	50
Two to three years old	44
One to two years old	36
Foal < one years old	25
Donkey/ Pony	30



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**Horse Sense**, in association with



# soil and fertiliser for horses



**Having healthy soils is a key factor in growing healthy grass and can also help reach environmental goals** \ Helen Sharp

This is based on the type and number of livestock on the holding each year. Table 3 on the opposite page shows the organic N produced by different types of equine stock during one year. To calculate the farm organic N value on a holding multiply the annual average number in the various stock categories, described in the table below, by the total nitrogen excreted value and then add these together. Values are also available for other livestock that may be present (i.e. cattle & sheep). (See Table 2).

The total nitrogen produced by all livestock on the holding divided by the hectares (ha) of the farm determines the nitrogen from livestock manure produced on the holding (kg Org N/ha/year). This figure is then adjusted for any imports or exports of livestock manure to determine the whole farm stocking rate. For example one mare and foal (50 & 25 Org N) on one hectare (ha) of land will equate to a stocking rate of 75kg Org N/ha. (See Table 3).

### Trace minerals

Trace minerals including copper, selenium, manganese, iodine, zinc and iron are all important. Lack of trace minerals or imbalance in trace mineral intake has been linked to reproductive and orthopaedic deficiencies. Antagonists including molybdenum, iron and sulphur can, for example, interfere with the uptake of copper. Climate change is also having an impact with cases of selenium toxicity increasing as perhaps a hidden impact of the dry summers. Herbage sampling undertaken in the summer months can act as a check on the fertiliser programme and maximise information to inform decision making re supplementation.

### Nutrient management planning

Identifying if soils are at optimum pH levels and optimum phosphorous (P) and potassium levels (K) before spreading fertiliser ensures only to apply fertiliser that is required. This can also be a cost-saving measure, particularly relevant with fertiliser prices at an all-time high and prices not expected to fall for the foreseeable future. Consult an advisor to develop a nutrient management plan for your farm where soil test information is available. This is a written plan calculating maximum farm N & P allowances and planning how major nutrients such as lime, N, P & K will be delivered during the growing season at the right time and right rate.

Research has shown that there is significant scope to improve farm nutrient management planning on Irish farms, and soil testing is central to achieving this. Having a nutrient management plan for your farm is the best way to:

- Identify soil fertility problems,
- Make the best use of the available nutrient resources on your farm,

**Table 4:-Recommended Rates of N, P & K kg/ha at 1.0LU /ha (units/ac)**

Soil Index	N	P	K	Suggested Fertilisers
1	25 (20)	23 (18)	64 (51)	10-10-20 @ 250kg/ha
2	25 (20)	13 (10)	34 (27)	10-10-20 @ 125kg/ha + CAN @ 62kg/ha
3	25 (20)	3 (2.5)	4 (3)	27-2.5-5.0 @ 125kg/ha
4	25 (20)	0	0	CAN @ 90kg/ha

Table 4 shows the recommended levels of N, P & K for a farm stocked at 1 LU/ha (i.e. Mare & Foal). The suggested fertiliser examples in the table above do not take into account farm adjustments to N & P allowances and it is therefore advisable to work from a fertiliser plan on actual farm N & P allowances.

- Calculate your fertiliser requirements for the year
- Increase farm productivity

The aim should be to only apply sufficient nitrogen and phosphorous to meet annual grass demands which tend to be low on equine farms. (See Table 4).

Table 4 shows the recommended levels of N, P & K for a farm stocked at 1 LU/ha (i.e. Mare and Foal). The suggested fertiliser examples in the table above do not take into account farm adjustments to N & P allowances and it is therefore advisable to work from a fertiliser plan on actual farm N & P allowances. (See Table 5).

### Organic manures

Well-rotted farmyard manure (FYM) can be used successfully on grazing

**Table 5. Suggested fertiliser options for Hay/Haylage ground**

Soil Index	Nutrient Requirements 1 t Grass DM Req. 4kg P & 25kg K			Fertiliser Options (kg /ha of suggested fertilisers)	
	N (kg/ha)	P (kg/ha)	K *(kg/ha)	No Slurry	Cattle Slurry @ 33m <sup>3</sup> /ha (3,000ga/ac)
1	100	40	175	10-10-20 @ 370kg/ha	
2	100	30	155	10-10-20 @ 310kg/ha	
3	100	20	125	15-3-20+S @ 620kg/ha	CAN 27%+S @ 370kg/ha
4	100	0	0	CAN 27%+S @ 370kg/ha	

\*Apply P & K balance after first cut (June / July / Aug) to maintain soil fertility

areas for horses. However, composting before spreading, to temperatures above 40 degrees celsius, is critical to protect against parasitic re-infestation of pasture. FYM application can encourage more even grazing, and provides organic matter. FYM also has the advantage that it releases nutrients over a longer time period than chemical fertilisers. It contains the following available nutrients – 1.4kg N, 1.2kg P & 6kg K/ tonne. An application of 25 tonnes per hectare (10 tonnes /acre) is beneficial and should be targeted to areas of the farm that are cut for silage / hay. Manure varies widely in composition depending on its origin and storage. Cattle or pig slurry may be used where available.

### Spreading fertiliser

Spread fertiliser when soil and weather conditions are suitable i.e. soils at >5 degrees Celsius, good traffic ability where machinery can work without damaging soil structure; and with 48 hours dry weather after application (Check Met Eireann in advance).

**40°C**

**composting before spreading, to temperatures above 40 degrees celsius, is critical to protect against parasitic re-infestation of pasture**

### Conclusions

- Check soil structure with a spade to identify any soil structural issues
- Soil test every four years
- Apply lime as recommended
- Prepare a farm fertiliser plan on a field by field basis
- Apply fertilisers under good conditions to maximise utilisation

### Phosphorous (P) and (K)

Under the most recent Nitrates Action Plan March 2022 (Good agricultural practice for the protection of waterways) the regulations state that “P index for soil shall be deemed to be Index 4 unless soil test indicates a different P index is appropriate in relation to that soil” with the implication that no P chemical fertiliser can be spread without prior soil testing (tests not more than four years apart). Applying fertiliser without soil test information is akin to shooting in the dark.

A soil test report indicates the soil’s P and K status. On productive ryegrass swards the aim is for P and K Index 3, the agronomic optimum. Maximising grass production on haylage / hay areas is important for both grass yield and quality. However, on the grazing areas for equines this may not be required due to lower grass demand. Maintaining soils P & K Index 2 may be sufficient depending on grass production requirements. (See Table 1).

### Nitrogen (N)

The nitrates directive sets a limit on the amount of livestock manure that can be applied to land in any year on a holding at 170kg of organic nitrogen per hectare (50kg Org N/ha on commonage land) when combining Org N deposited directly by grazing livestock and that applied as organic livestock manure.