



9. FERTILISER



Good knowledge of your farm's soils and intelligent use of fertilisers can save valuable dollars.



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Applying nitrogen fertiliser

N fertiliser is a growth multiplier; when pasture growth rates are high the response to N will be higher, with greatest response rates achieved in spring.

Response rates in autumn are lower but fertiliser N may still provide the lowest cost feed source at this time. However, the risk of N leaching is medium in autumn, for moderate to free-draining soils.

Early winter applications give the lowest growth responses and are most likely to lead to direct leaching of fertiliser N.

Avoid application to waterlogged soils or before heavy rainfall. Ensure adequate soil moisture and soil temperatures (10cm) are greater than 7°C and rising.

It is best not to apply more than 50 kg N/ha in one application. Rates of 20-40 kg N/ha are recommended for pasture. All other nutrients need to be at optimum levels to allow optimal pasture growth and therefore response rates.

Avoid grazing between 4 and 14 days post application as this leads to high N intake and excretion by grazing animals.

When using N, canopy closure will typically occur at a lower leaf stage. Ideal pre-grazing yields of 2600-3200 are recommended with grazing residuals of 7-8 clicks on a rising plate meter.

| Pasture growth rate | Pasture growth (kg DM/ha/day) | Response (kg DM/kg N) | Time for full response (weeks) |
|---------------------|-------------------------------|-----------------------|--------------------------------|
| Slow | 10 | 5 | 10-14 |
| Moderate | 20-40 | 10 | 6-8 |
| Fast | 50-70 | 15 | 5-6 |
| Rapid | 80 | 20 | 3-4 |

A summary of N responses over 40 days across 400 trials was 4, 9, and 15 kg DM/kg N for N applied in winter, early spring or late spring.

Common nitrogen fertilisers

| Fertiliser | %N | %P | %K | %S | Kg/ha needed to apply |
|-----------------------------|------|----|----|------|-----------------------|
| | | | | | 30kg N/ha |
| Urea | 46.0 | 0 | 0 | 0 | 65 |
| Sulphate of Ammonia (SOA) | 20.5 | 0 | 0 | 24 | 150 |
| Nrich Ammo 30N | 30.4 | 0 | 0 | 14 | 100 |
| Di-ammonium Phosphate (DAP) | 18 | 20 | 0 | 1 | 170 |
| PhasedN | 25.3 | | | 28.5 | 118 |
| Sustain/ N protect | 45.9 | 0 | 0 | 0 | 65 |

Lime requirements for common N fertilisers

| Fertiliser | Lime needed for each 100kg N/ha | N applied before 1 tonne of lime/ha is needed |
|-----------------------------|---------------------------------|---|
| Urea | 180kg/ha | 550kg N/ha |
| Sulphate of Ammonia (SOA) | 540kg/ha | 175kg N/ha |
| Di-Ammonium Phosphate (DAP) | 360kg/ha | 275kg N/ha |

Rule of thumb: 1.0t lime/ha will increase pH by 0.1 unit (e.g. from 5.5 – 5.6)

Increasing soil P levels

| Amount of P (kg/ha) to raise Olsen P by1 unit | | |
|---|-----------|-------|
| Soil | Average | Range |
| Ash | 11 (122)* | 7-18 |
| Pumice | 7 (78) | 4-15 |
| Sedimentary | 5 (57) | 4-7 |
| Peat | ** | 6-9 |

* superphosphate equivalent ** depends on ASC

Herbage tests

| Guidelines for interpreting mixed pasture chemical analysis for pasture growth | | | | |
|--|-----------|-----------|------------------|-------|
| Concentrations | | | | |
| Nutrient (% of DM) | Deficient | Low | Optimum | High |
| N | <4.00 | 4.00-4.70 | 4.70-5.50 | >5.50 |
| P | <0.30 | 0.30-0.34 | 0.35-0.40 | >0.40 |
| K | <2.00 | 2.00-2.40 | 2.50-3.00 | >3.00 |
| S | <0.25 | 0.25-0.27 | 0.28-0.35 | >0.35 |
| Mg | <0.15 | 0.15-0.17 | 0.18-0.22 | >0.22 |
| Ca | <0.25 | 0.35-0.29 | 0.30-0.50 | >0.50 |
| ppm | | | | |
| Fe | <45 | 45-49 | 50-65 | >5.50 |
| Mn | <20 | 20-24 | 25-30 | >0.40 |
| Zn | <12 | 12-15 | 16-19 | >3.00 |
| Cu | <5 | 5 | 6-7 | >0.35 |
| B ¹ | <13 | 13-14 | 15-16 | >0.22 |
| Mo ¹ | <0.10 | 0.10-0.14 | 0.15-0.20 | >0.50 |

¹ Clovers only, NOT mixed pastures samples. For a Mo deficiency, clover N must also be below 4.5%

Guidelines for critical mineral concentrations

(where levels should be above in pasture for adequate nutrition of a lactating cow)

| Nutrient | Pasture Concentration |
|-----------------|-----------------------|
| Na | 0.11% |
| Cu ¹ | 10ppm |
| Co | 0.06ppm |
| Se | 0.03ppm |
| I ² | 0.25ppm |

¹Depends on Mo and Fe concentrations

²2 ppm recommended if feed contains goitrogens (e.g. forage kales, other brassicas). (Source: The Mineral Requirements of Grazing Ruminants, 1983)