

Soils, Nutrients and Fertiliser Factsheet

Fertilising for First Cut Grass Silage

Nitrogen (N) is the key driver of grass yield. Grass swards with high levels of perennial ryegrass will use N more efficiently than older swards. Recently reseeded swards (0-3 years) will have 25% higher N demand, especially when reseeded after a tillage rotation

A crop of grass silage (5 t DM/ha) needs 100 kg N/ha (80 units/ac). Grass silage takes up, on average, 2.5 kg/ha/day of N (two units/day), therefore apply N at least 50 days before cutting to ensure full crop N utilisation

Phosphorus (P) and potassium (K) Consult the most recent (three to five years) soil test reports to determine the P and K requirements (in organic manure and fertiliser) for silage fields

A crop of grass silage will remove approximately 4 kg P and 25 kg K/tonne of grass DM. Organic manures are an effective source of N, P & K and can provide a large proportion of crop P and K requirements at relatively low cost

Table 1. Available N, P & K values for cattle & pig slurry

Manure type	Available N, P & K kg per 1,000 gals (units/1,000 gals)		
	N	P	K
Cattle slurry (7% DM)	9	5	32
Dilute cattle slurry (3.5% DM)	8	3	15
Pig slurry (4% DM)	19	7	20

Organic manures

Cattle slurry is the most common manure applied to silage fields and can vary in nutrient content depending on its dry matter (DM) content. Diluting cattle slurry with water is beneficial for ease of agitation and can help to improve the N availability in the slurry, however it will also dilute the P and K content of the slurry. A slurry hydrometer should be used to assess the DM% of slurry, and adjust application rates

For example 3,000 gallons/ac of good quality cattle slurry (6% DM) will supply sufficient P and K levels to grow a crop of grass silage

Table 2 shows the recommended rates of N, P & K at different soil P & K indexes (1 to 4) required to grow a grass yield of 5 t DM/ha (10 t fresh grass/ac)

Maximum K application – 90 kg K/ha (in spring)

Luxury amounts of K may be taken up by grass where more than 90 kg/ha K are applied. This can reduce fertiliser K efficiency and may upset the K:Mg:Na balance in herbage. Where more than 90 kg/ha is advised; only 90 kg should be applied in spring, and the remainder after silage, or in late autumn

Table 2. N, P & K requirements for 1st cut grass silage (5 t/ha DM) & suggested fertiliser programmes

Soil Index	N kg/ha (units/ac)	P kg/ha (units/ac)	K kg/ha (units/ac)	Suggested fertiliser options at silage closing time ^{3, 4}	
				No slurry ¹ (0 gal/ac)	+ Cattle slurry 33m ³ /ha ⁵ (@ 3,000 gal/ac)
1 ¹	100 (80)	40 (32)	175 (140)	432 kg/ha (3.5 bgs/ac) 13-6-20 115 kg/ha (0.9 bgs/ac) ProUrea+S	175 kg/ha (1.4 bgs/ac) ProUrea+S
2 ¹	100 (80)	30 (24)	155 (120)	432 kg/ha (3.5 bgs/ac) 13-6-20 115 kg/ha (0.9 bgs/ac) ProUrea+S	175 kg/ha (1.4 bgs/ac) ProUrea+S
3	100 (80)	20 (16)	125 (100)	371 kg/ha (3.0 bgs/ac) 13-6-20 136 kg/ha (1.6 bgs/ac) ProUrea+S	175 kg/ha (1.4 bgs/ac) ProUrea+S
4 ²	100 (80)	0	0	265 kg/ha (2.1 bgs/ac) ProUrea+S	No slurry P & K needed at Index 4 265 kg/ha (2.1 bgs/ac) ProUrea+S

1 Index 1, 2 & 3 soils apply P & K balance to build / maintain soil P & K levels to after grass for example apply as 18-6-12 / 0-7-30 / Cattle slurry / etc. 2 Index 4 soils omit P for 2/3 years & retest, Index 4 K omit for 1 year and revert to index 3 advice thereafter until next soil test. Don't apply cattle on Index 4 soils. 3 For re-seeded / older swards with higher / lower yield potential increase/reduce N, P, K by 25 kg N, 4 kg P & 25 kg K per tonne of grass (DM) increase or decrease in target yield. 4 ProUrea + S = Protected Urea (Urea 38% N + 7.5% S + NBPT or 2-NPT or NPPT). 5 Cattle slurry (6.3% DM) assumed to be applied by low emission techniques (LESS) – Slurry N-P-K equivalent to a 50 kg bag of 9-5-32 fertiliser

Timing of N, P & K application

Apply crop N, P & K requirements when closing silage fields in early April. Where cattle slurry is applied, delay the top-up fertiliser applications for one week. In wetter soil conditions fertiliser N can be split 50:50, for example 50% in early April and the remainder 7 to 10 days later to reduce the risk of N losses

Building soil P & K in silage fields

Apply additional P and K (soil build-up rates) to Index 1 and 2 soils after 1st cut silage to or in late summer. For example, 16% P or 50% K or 0-7-30 are very suitable fertilisers for building soil P and K's levels to the target Index 3 over a number of years. Slurry or FYM can replace fertiliser where available

Sulphur (S)

Sulphur deficiency is most likely on light, sandy or free draining soils with low soil organic matter. Current research shows that S deficiency is not just confined to light textured soils and S deficiencies are occurring on heavy textured soils in early spring

Grass silage crops require 20 kg S/ha per cut. Applying S to soils where it is required will improve grass DM yields and quality as it helps to maintain an optimum N:S ratio and N will be used more efficiently. Apply S with main N split as N + S (e.g. protected urea + S, CAN + S)