

Fertilising 1st Cut Grass Silage

March, 2020

Grass silage has a large nutrient demand and adequate N, P & K is essential for maximising grass yield and producing sufficient winter feed.

Nitrogen (N) is the key driver of grass yield. Grass swards with high levels of perennial rye grass 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 (5t/ha of DM) will require 125 kg N/ha (100 units/acre). Grass silage will take up on average 2.5kg/ha/day of N (2units/day), therefore apply N at least 50 days before cutting to ensure full crop N utilisation. Make adjustment for fertiliser N applied for early grazing for example assume ~25% of N applied will be available for the silage crop. For example where 40 units/ac of N applied for grazing reduce N applied by 10units/ac for grass silage crop.

Phosphorus (P) and **Potassium (K)** are essential to maximise grass yields therefore adequate supply of these nutrients in the soil is critical. Consult the most recent (3 to 5 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 4kg P and 25kg 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.

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 (i.e. a larger quantity of diluted slurry will be needed to supply the same levels of P and K as undiluted slurry). The slurry hydrometer is a useful tool than can be used to assess the DM% of slurry helping you to predict the nutrient content more accurately and adjusting application rates.

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

Manure type	Available N, P & K (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

For example 3,000 gallons/ac of good quality cattle slurry (7% 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 for 5t/ha grass dry matter (10 tonnes fresh grass / acre).

Maximum K Application 90kgK/ha (In spring time)

Luxury amounts of K may be taken up by grass where more than 90 kg/ha K are applied. This can reduce fertilizer 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 to the aftermath or in late autumn.

Table 2:- 1st Cut Grass Silage N, P & K Requirements (5t/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^{3,4}	
				No Slurry¹ (bags/ac)	+ Cattle Slurry⁵ 3,000gal/ac
1¹	125 (100)	40 (32)	175 (140)	3.5 bags/ac 13-6-20 1.4bags/ac ProUrea	1.9 bags/ac ProUrea + S
2¹	125 (100)	30 (24)	155 (120)	3.5 bags/ac 13-6-20 1.4bags/ac ProUrea	1.9 bags/ac ProUrea + S
3	125 (100)	20 (16)	125 (100)	3.0 bags/ac 13-6-20 1.6bags/ac ProUrea	1.9 bags/ac ProUrea + S
4²	125 (100)	0	0	2.5bags/ac ProUrea	2.5 bags/ac ProUrea

¹Index 1, 2 & 3 soils apply P & K balance to build / maintain soil P & K levels to after grass for example apply as 24-2.5-10 / 0-7-30 / Cattle slurry / etc...

²Index 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.

³For new / older swards with higher / lower yield potential reduce N, P, K by 25 kg N, 4kgP & 25kg K per tonne of grass dry matter (DM).

⁴ProUrea + S = Protected Urea (Urea 38% N + 7.5% S + NBPT or 2-NPT or NPPT)

⁵Cattle slurry (6.3% DM) assumed to be applied by low emission techniques – Slurry N-P-K = 9-5-32

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 1 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 / FYM can replace fertiliser where available.

Don't Forget Sulphur (S)

Sulphur deficiency is most likely on light sandy / 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 have a requirement of 20kg S/ha per cut. The application of 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 to be used more efficiently. Apply S with main N split as N +S (e.g. CAN +S / Urea +S).