



GROLIME



GROLIME SUPPLY LOCATIONS

Ballintra
074 9734022

Boyle
071 9662057

Castlemine
09066 29511

Barley Hill
042 9667123

Mullaghcrone
041 9839183

Two-Mile-Ditch
091 709050

Ballyadams
059 8627110

Bennettsbridge
056 7727527

Joseph Hogans
069 65550

Killough
0504 41254

Mallow
022 42173


Cappagh
058 68073

Castlemore
021 7336336

Ballygarvan
021 4888211

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WHAT IS GROLIME?

Grolime is the certified trademark of Grolime Ltd, an Irish company which is administered by the members of the Ground Limestone Producers Association of Ireland.

Roadstone as a member of the Ground Limestone Producers Association of Ireland is committed to promoting the many benefits of ground limestone, otherwise known as agricultural lime, to the farming community in Ireland. The association also works with other stakeholder organisations including the Department of Agriculture Food and the Marine and Teagasc as part of its ongoing efforts to increase the knowledge of the benefits of lime in Ireland.

Roadstone as a member of the Ground Limestone Producers Association of Ireland is licenced by the Department of Agriculture, Food and the Marine to manufacture and sell ground limestone for use as a soil conditioner in Ireland.



WHY USE LIME?

Soil pH plays a key role in soil fertility. Maintaining the soil pH at the optimum level will increase the microbiological activity of the soil and will result in better soil nutrient recycling and release. Soil pH is also critical for maximising the availability of nutrients applied in organic and chemical fertilisers. Lime is a soil conditioner. It corrects soil acidity by neutralising the acids in soils so that the micro-organisms can thrive, break down plant and animal residues and release the elements

necessary for healthy plant growth, in particular nitrogen, phosphorus and potassium.

According to Teagasc, only 35% of soil samples from dairy and drystock farms nationally are at the optimum pH for grassland. By optimising pH, soils can release up to 80kg/ha / year of nitrogen. Lime is a cheap input relative to the cost of fertilisers.

LIME LOSS - IT HAS TO BE REPLACED

Over 60% of Irish grassland soils have low pH and each hectare uses up 0.5 to 1.0 tonnes of lime per year. Lime is continually being lost from the soil and needs to be replaced as part of any nutrient management programme. For example drainage water can remove between 250 kg/ha and 625 kg/ha, depending on the soil type, of lime each year. Light free draining soils will lose lime more quickly than heavier soils. Therefore light land may need extra attention, particularly in areas where limestone is not present in soil parent material or bedrock.

Crops and livestock also remove lime. See below for examples:

- A crop of first cut grass silage (5t/ha DM) removes approximately 75 kg/ha of lime equivalent.
- A finished bullock removes approximately 25 kg/ha per year.
- Cows producing 1,000 litres of milk removes approximately 3kg of lime per hectare per year.



EFFECTS OF CORRECT LIMING ON PLANT NUTRIENTS

Lime improves the availability of Nitrogen, Phosphorus, Potassium, Sulphur, Calcium & Magnesium.

The chemical availability of many nutrients are reduced in soils with low pH. For example in the case of phosphorus, soils with a low pH tend to lock up the phosphorus, making it unavailable for plant uptake. Applying additional phosphorus in this case is poor value for money. The low pH means that the potential of the soil to release phosphorus is not fully realised and some of the phosphorus in the fertilizer is locked up.

Experiments have shown that soil test phosphorus (P) levels after 12 months were over twice as high where fertiliser phosphorus and lime were applied together, compared to where phosphorus was applied on its own. The same experiments also showed that lime application had a positive effect on soil test phosphorus even where no phosphorus was applied.

Acidic soils due to the lack of lime can also contain high levels of Aluminium and Manganese which are harmful in varying degrees to many plants.

The table below shows how soil PH effects the availability of Nitrogen (N), Phosphorus (P), and Potassium (K).

	pH 4.5	pH 5.0	pH 5.5	pH 6.0	pH 7.0
NITROGEN(N)	30%	43%	77%	89%	100%
PHOSPHOROUS(P)	23%	31%	48%	52%	100%
POTASSIUM(K)	33%	52%	77%	100%	100%

SOIL INDEX REFERENCE GUIDE

SOIL INDEX	DESCRIPTION	RESPONSE TO FERTILIZERS	SOIL TEST RESULT RANGE FOR EACH INDEX (MG/L)		
			P	K	MG
1	VERY LOW	DEFINITE	0-3.0	0-50	0-25
2	LOW	LIKELY	3.1 – 5.0	51 – 100	26 – 50
3	MEDIUM	UNLIKELY	5.1 – 8.0	101 – 150	51 – 100
4	HIGH	NONE	≥8.1	≥151	≥101



SOIL FERTILITY

How to improve soil fertility

SOIL TESTING

- Know your soil fertility so you can plan your fertilizer.
- The cost of soil sampling is low relative to the cost of fertilizer.

SLURRY & MANURES

- Where to spread? Apply to fields with a P & K requirement.
- When to spread? Apply during cool and moist weather

TARGET INDEX 3 FOR P & K

- Low fertility soils (Index 1 & 2)
Apply additional fertilizer
- High fertility soils (Index 4)
A resource and can save you money

SOIL pH & LIME

- Low pH reduces fertilizer efficiency
- Target pH for grassland = 6.3
- Target pH for tillage = 6.5

NUTRIENT BALANCE

- Choose a fertilizer compound that has the correct balance of N, P, K and S.

BENEFITS OF LIMING GRASSLAND SOILS

Growing as much grass as possible is the best opportunity to reduce on-farm costs. Soils maintained close to the target pH will have benefits of increased grass yields; more efficient utilisation of applied fertilisers and manures and better persistence of more productive species in the sward such as perennial ryegrass and clover. Limed soils also tend to release more Nitrogen from the soil organic matter. The

ideal pH for grassland soils is pH 6.3 while the optimum pH for clover is 7.0. By applying lime every couple of years it will help improve grass availability, raise soil pH and help condition the soil, this in turn will improve nutrient availability and soil structure. With better soil structure comes improved drainage, which allows for better root development and nutrient uptake.



EARN €7 EXTRA GRASS

for every €1 spent on lime annually for dairy

EARN €4-5 EXTRA GRASS

for every €1 spent on lime annually for drystock



BENEFITS OF LIMING TILLAGE SOILS

The optimum soil pH is 6.5 for cereals (barley, wheat, oats and maize) and pH 7.0 for beet, peas, beans and oilseed rape. Potatoes and oats are more tolerant of low pH and pH 6.0 is adequate to produce a good crop. Lime should be

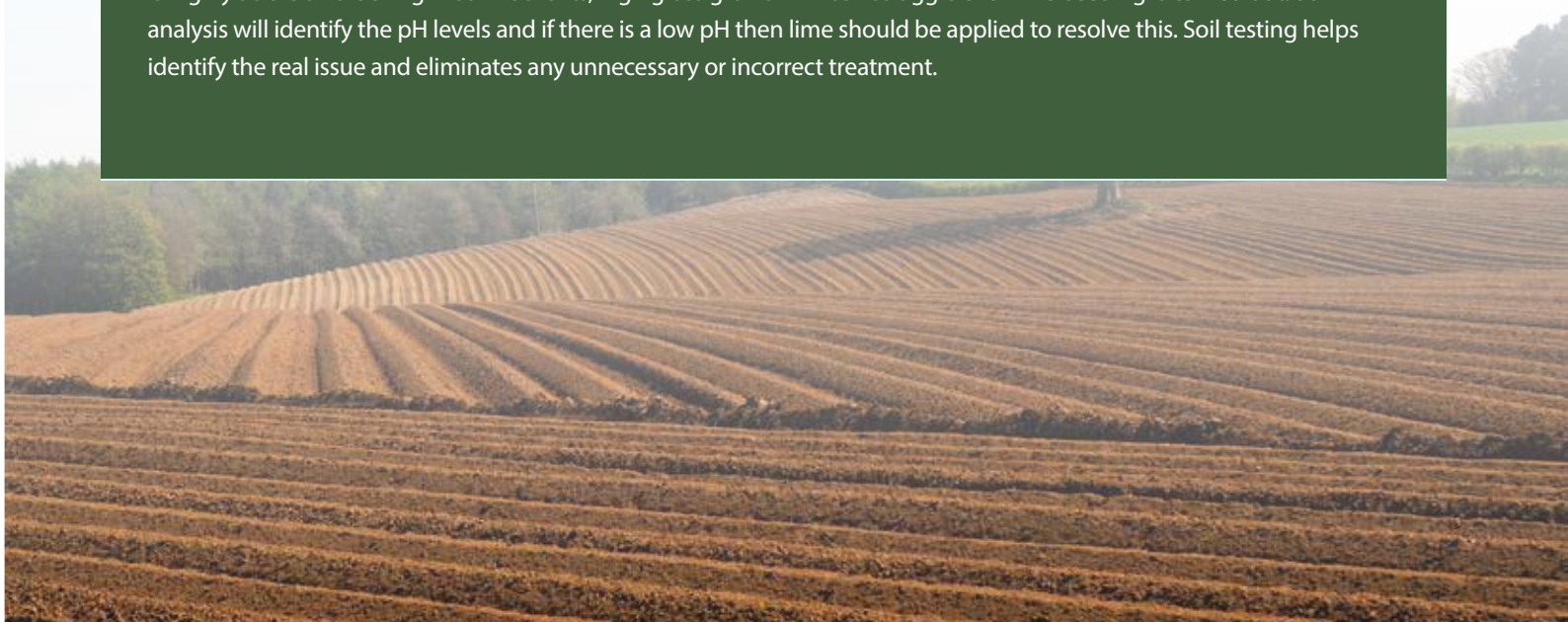
applied to tillage soils based on the most sensitive crop to lime in the rotation. In 2014 Teagasc estimated that 60% of Irish tillage soils have a pH < 6.5

SOIL ACIDITY EFFECTS ON GRASSLAND AND TILLAGE CROPS

	pH	EFFECT
<p>Optimum range for efficient use of N and P fertilizer</p>	8.0	Overlimed: Low availability of trace elements, especially Mn & B
	7.2	Top of optimum range for efficient use of N & P fertilizer.
	7.0	Optimum pH for white clover, beet (sugar and fodder), beans, peas, and oilseed rape.
	6.5	Optimum pH for barley, wheat and maize
	6.3	Optimum pH for grass
	6.2	Bottom of optimum range for efficient use of N and P fertilizer for most crops. Maximum pH for grass on high Mo soils.
	5.8	Optimum pH for potatoes/oats.
	5.5	Optimum pH peats
	5.0	Very acid. Possibility of Al and Mn toxicity

RE-SEEDING

Before re-seeding it is important to carry out a soil sample test. If a field is underperforming the real issue needs to be identified, re-seeding may not be the solution. A soil sample test however will determine the soil pH level. If a field is highly acidic or is lacking in soil nutrients, high grass growth will still struggle even if re-seeding is carried out. Soil analysis will identify the pH levels and if there is a low pH then lime should be applied to resolve this. Soil testing helps identify the real issue and eliminates any unnecessary or incorrect treatment.



SOIL TESTING

A recent soil report will show the rate of lime required depending on the soil type, soil pH and crop type. However a soil analysis result is only as good as the sample taken.

A sample normally comprises around 1kg of soil which is taken to represent an entire area or field which contains around 1,000t of soil per hectare to a plough depth of 4" (10cms). It is therefore imperative to obtain as representative a sample as possible or the results will not reflect the nutrient status accurately. The lime requirement is calculated in the

laboratory based on a test that measures the soils buffering capacity. The buffering capacity is a measure of how much lime it takes to change the pH of the soil to the target pH.

Lime contains calcium and magnesium both of which are alkaline. The calcium and magnesium ions replace acidic hydrogen and aluminium ions through cation exchange. The full effects of lime may take two years to have an effect on soil pH.

INTERPRETING RESULTS

"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 4 to 5 years.

This information will form the basis to formulating fertiliser / lime advice and decisions regarding fertiliser types and formulations

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. Recent trends show a decline in national soil fertility levels, so by not soil sampling, you may be missing out on knowing your soil fertility levels.

When soil test results return from the laboratory it is important that you interpret the results correctly. Marked below are three important points to note when reading your results.

1. The current pH reading
2. The target pH
3. The required spread rate per hectare

Nutrient Test Results - On Mineral Soil - Good Permanent Grass (GG)						Nutrient advice - No Org. Manure	
Soil Index							
NUTRIENT	RESULT	VERY LOW (1)	LOW (2)	MEDIUM (3)	SUFFICIENT (4)	/HA	/AC
pH	6.1					5.00t	2t
N						201kg	161 units
P						24kg	19 units
K						90kg	72 units
Mg							
SMP pH	6.3						
Soil Nutrient Supply		Very Low	Low	Medium	Sufficient		

1. Soil pH 6.1

2. SMP pH 6.3

3. LR 5.0t/ha



ASSESSING LIME REQUIREMENTS

The lime requirement is calculated in the laboratory based on a test that measures the buffering capacity of the soil. Buffering capacity is a measure of how much lime it takes to change the soil pH. Therefore, soils that are returned with the same soil pH may be shown to have different lime requirements.

This is because the soils have different buffering capacities require more lime to achieve the same increase in pH. Soils

that are heavier textured (clay soils) or higher organic matter levels tend to have higher buffering capacities and higher lime requirements as a result. However, while these soils may require more lime following the soil test, the higher buffering capacity should result in the soil retaining lime better in the future once it has been applied.



LIME PLANNING

A 3-5 year liming plan for the farm should be developed to address fields that urgently require pH correction and those that will need maintenance lime applications over the coming years.

Lime can be applied at any time of the year, however, mid-summer and autumn are ideal as soils are dryer and firm, there are increased spreading opportunities post silage and grazing and there is less interference with slurry or N fertiliser applications.

UREA + LIME

- Apply Urea 7 days before lime application
- Wait at least 3 months after liming before applying Urea



DOLOMITIC – MAGNESIUM LIME

Calcium limestone is the most common form of ground limestone available. Magnesium limestone (also called dolomitic limestone) can also be used, and are recommended where soil test magnesium levels are less than 50 mg/L.

Typically Calcium based limestone is made up of greater than 95% Calcium Carbonate (CaCO₃). Dolomitic Limestone or Magnesium based limestone is typically 55% Calcium

Carbonate and 45% Magnesium Carbonate.

Where dolomitic limestone is used as a liming material, it is important that it is not used repeatedly without monitoring the soil Mg levels. The release of such Mg can be very slow, and frequent use of dolomitic limestone can cause soil Mg to rise to very high levels where it can impede the availability and uptake of other nutrients such as K.



TEAGASC MAGNESIUM (MG) INDEX SYSTEM

SOIL MG INDEX	SOIL MG RANGE (MG/1)	INDEX DESCRIPTION
1	0 - 25	VERY LOW
2	25 - 50	LOW
3	51 - 100	MEDIUM
4	ABOVE 100	SUFFICIENT / EXCESS



FAQ'S

ARE THERE DIFFERENT TYPES OF LIMESTONE USED FOR MAKING GROUND LIMESTONE?

Yes, there are two types of ground limestone – Calcium (Ca) and Magnesium (Mg) ground limestone. Calcium limestone is the most common form of ground limestone available. Where dolomitic (Magnesium / Mg) limestone is used as a liming material, it is important that it is not used repeatedly without monitoring the soil Mg levels. The release of such Mg can be very slow, and frequent use of dolomitic limestone can cause soil Mg to rise to very high levels where it can impede the availability and uptake of other nutrients such as K.

WHAT IS THE MAXIMUM RATE OF LIME IN A SINGLE APPLICATION?

Apply a maximum of 7.5t/ha (3.0t/ac). Where more lime is recommended, apply the balance after two years. For example, where 10t/ha is recommended apply 5t/ha in year 1 and the remaining 5t/ha in year 3.

CAN SLURRY AND LIME BE APPLIED AT THE SAME TIME?

Applied lime can increase the loss of N to the air after slurry application. If slurry is first applied, leave 1 week before spreading lime. If lime has been applied, avoid slurry application for three months.



FAQ'S

HOW LONG SHOULD ONE LEAVE BETWEEN LIMING AND APPLYING UREA?

The N in urea and cattle slurry are in the same form. Treat urea the same as cattle slurry as described in the previous question.

HOW LONG SHOULD ONE LEAVE BETWEEN SPREADING 18-6-12 OR CAN AND LIME?

There is no need to leave a gap with CAN or N P K compounds.

WHAT IS THE TARGET PH FOR GRASSLAND WHERE MY LAND IS IN A HIGH MOLYBDENUM (MO) AREA?

In grassland soils that are high in molybdenum (Mo), it is recommended to maintain the soil pH at or below 6.2. Increasing the soil pH above 6.2 increases the availability of Mo which reduces the availability of Copper in bovines (cattle). Where there is either a history or risk of soils or herbage being high in Mo, it is recommended to reduce the lime application by 5t/ha. However this is a crude estimation and can be tailored for each situation depending on previous experience. Problems with high Mo tend to be more common on wetter soils (or in wetter years) in swards with low ryegrass and/or high clover content and where annual rates of nitrogen fertiliser application is low.

WILL RECENTLY LIMED TILLAGE SOILS BE MORE PRONE TO MANGANESE (MN) DEFICIENCY?

Yes, recently limed tillage soils are more prone to Mn deficiency. To reduce the potential for Mn deficiencies, ensure lime is well incorporated during soil cultivations and seedbeds are well consolidated after sowing.

WHEN IS THE BEST TIME TO APPLY LIME TO GRASSLAND?

Generally, lime can be applied at any time of the year, provided the grass sward is low to avoid excess lime sticking to herbage. It is preferable to avoid grazing or cutting until sufficient rainfall has occurred to wash the lime off the herbage.

For silage it is better to apply lime before mid March for first cut or within one week after cutting on land which is being closed for a second cut as the presence of lime on the grass can increase the pH in the silage pit which affects silage preservation. Applying lime to heavy covers of grass intended for silage can reduce silage quality if the lime is not washed off the grass by rain.

FAQ'S

ARE THERE DIFFERENT TARGET PH LEVELS FOR DIFFERENT CROPS?

Yes, see the table below for guidance. Aim to maintain soil pH close to the target level and apply lime as recommended on the soil test report.

The lime requirement is calculated in the laboratory based on a test that measures the buffering capacity of the soil. Buffering capacity is a measure of how much lime it takes to change the soil pH. Therefore soils that are returned with the same soil pH may be shown to have different lime requirements. This is because the soils have different buffering capacities and require more or less lime to achieve the same increase in pH.

Soils that are heavier textured or have higher organic matter contents tend to have higher buffering capacities and higher lime requirements as a result. However while these soils may require more lime following the soil test, the higher buffering capacity should result in the soil retaining lime better in the future once it has been applied.

WHAT ARE THE STANDARDS IN PLACE FOR LIME IN IRELAND?

All lime marketed in Ireland must meet the requirements of S.I 248/78 – “Marketing of non-EEC Fertilisers Regulations 1978” and this is enforced by the Department of Agriculture, Food and the Marine who issue a licence to all approved operators.

Specific requirements contained in SI 248/78 are as follows:

- Product must have a Total Neutralising Value (TNV) of not less than 90%
- All the product must pass through a 3.35 mm sieve.
- Not less than 35% of the product must pass through a 0.15 mm sieve
- The moisture content of the product must be less than 3.0%

Roadstone Grolime meets all of these requirements.





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