

LIMEX



THE ULTIMATE PERFORMER

The UK's No.1 agricultural liming product for the correction of soil pH



sugar beet



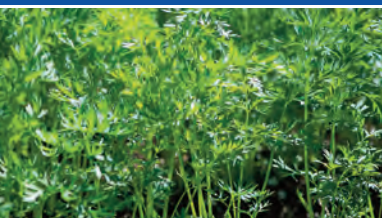
cereals



oilseed



clubroot



carrots



potatoes



maize



grassland



Consult your
certification body

Maximise crop yield & profitability

MAXIMISE crop yield & profitability

Produced by British Sugar,

LIMEX

is the ultimate performer to correct
soil acidity and maintain target pH



LimeX at 7.5t/ha



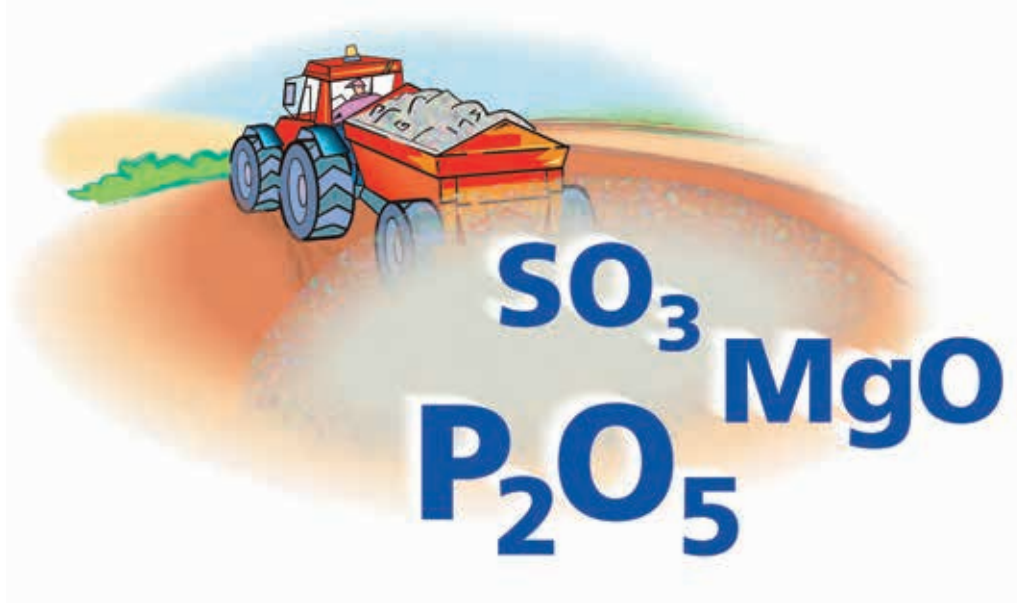
A HIGH-QUALITY, PREMIUM PRODUCT

LimeX is an easily spreadable, high-quality liming material, ideal for the correction of soil acidity and general soil conditioning

PROVEN BENEFITS OF LIMEX

- Optimises pH to maximise yields and profitability
- Rapidly corrects soil acidity for better return on investment
- Provides valuable plant nutrients
- Improves soil structure at higher rates
- Compatible with organic farming systems
- Increases soil available calcium

ESSENTIAL NUTRIENTS



One tonne of **LimeX70** contains a minimum content of:

Total P_2O_5	10kg/t
Total MgO	7kg/t
Total SO_3	6kg/t

LimeX is a 2-15 μ m calcium carbonate precipitate. The primary constituents are:

Product	$CaCO_3$ %	Organic %	Silicates %	Water %
LimeX45	40	13	4	45
LimeX70	52	15	5	30

A CO-PRODUCT

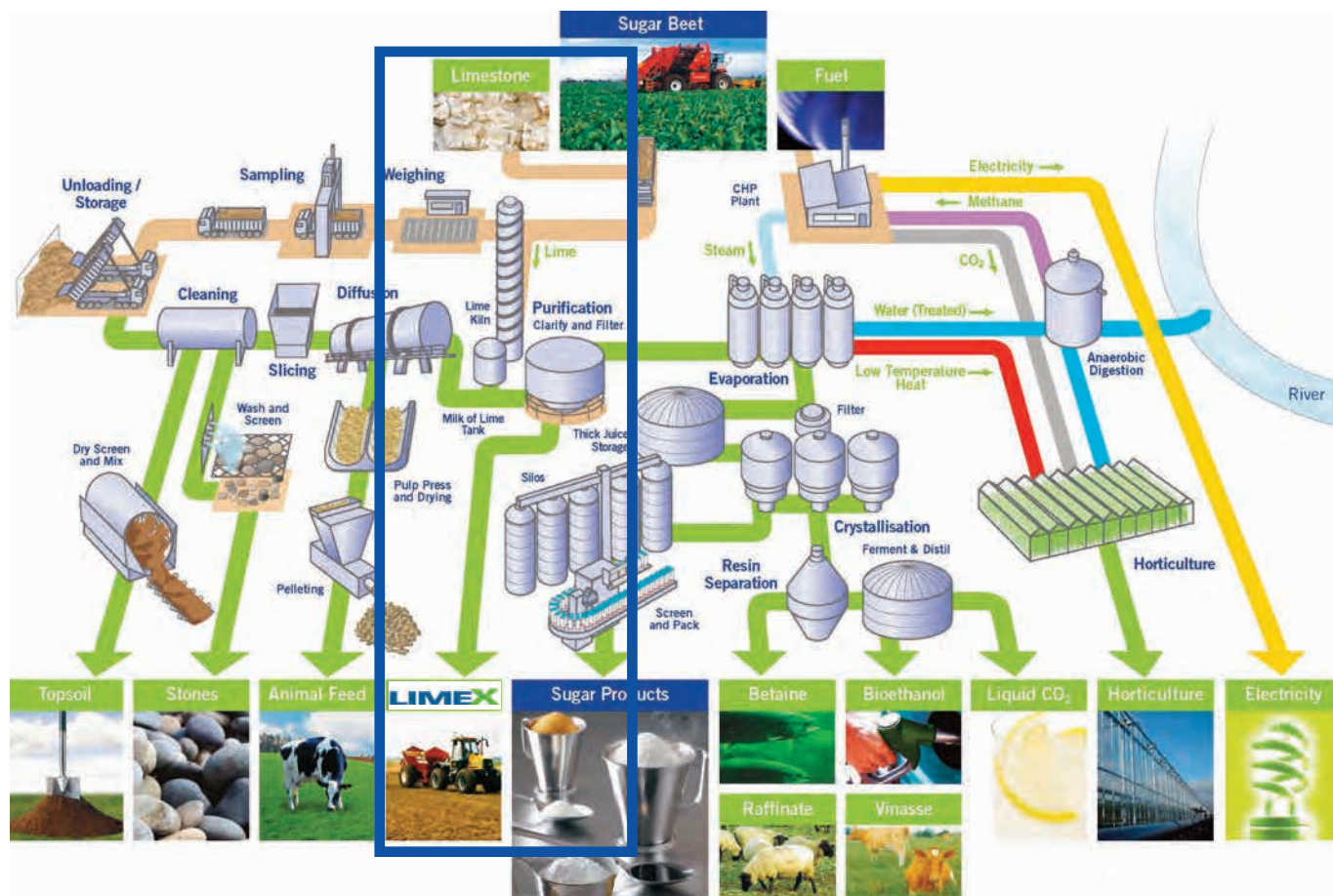
of sugar beet manufacturing

LimeX is a business division of British Sugar plc, a name synonymous with quality and professionalism in all operations.

LimeX is derived from high-purity limestone. It is a co-product of sugar beet manufacturing, as shown below.

LimeX is available across the UK, direct from British Sugar or via authorised distributors.

Backloading of LimeX is available during the sugar beet campaign whilst lorries are delivering beet to the factories, providing least-cost transport.



LimeX is 'AgLime Quality Standard' accredited

The Aglime Quality Standard (AQS) was created by the Agricultural Lime Association (ALA) in 2017 and is the first assurance benchmark within the UK fertiliser sector for agricultural lime products.

LimeX is AQS accredited and undergoes annual testing, reinforcing customer confidence and expectation with full compliance with UK national and EU regulatory standards.

LimeX is rigorously tested to ensure its efficacy, from measuring reactivity* (speed of reaction), neutralising value and fineness, to calcium, phosphate, magnesium and sulphur content.

*LimeX is greater than 95% reactive.



LIMEX IS KEY

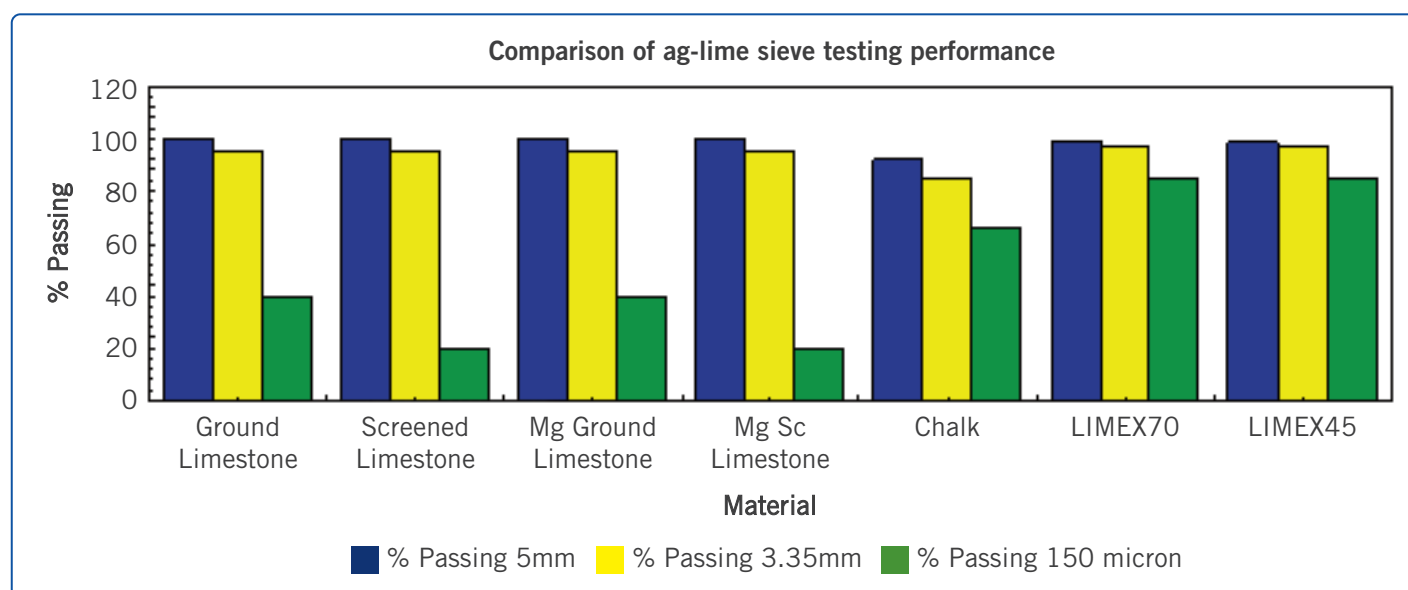
to soil pH management

One of the unique features of LimeX is its very fine particle size. This brings two major advantages – rapid action and longevity of effect.

FINENESS

- is a measure of a lime product's potential to change soil pH over time
- directly influences reactivity, and products that have the majority of particles finer than 250µm are most reactive. In comparison, particles greater than 1300µm (1.3mm) are unreactive, and can be very slow to break down.

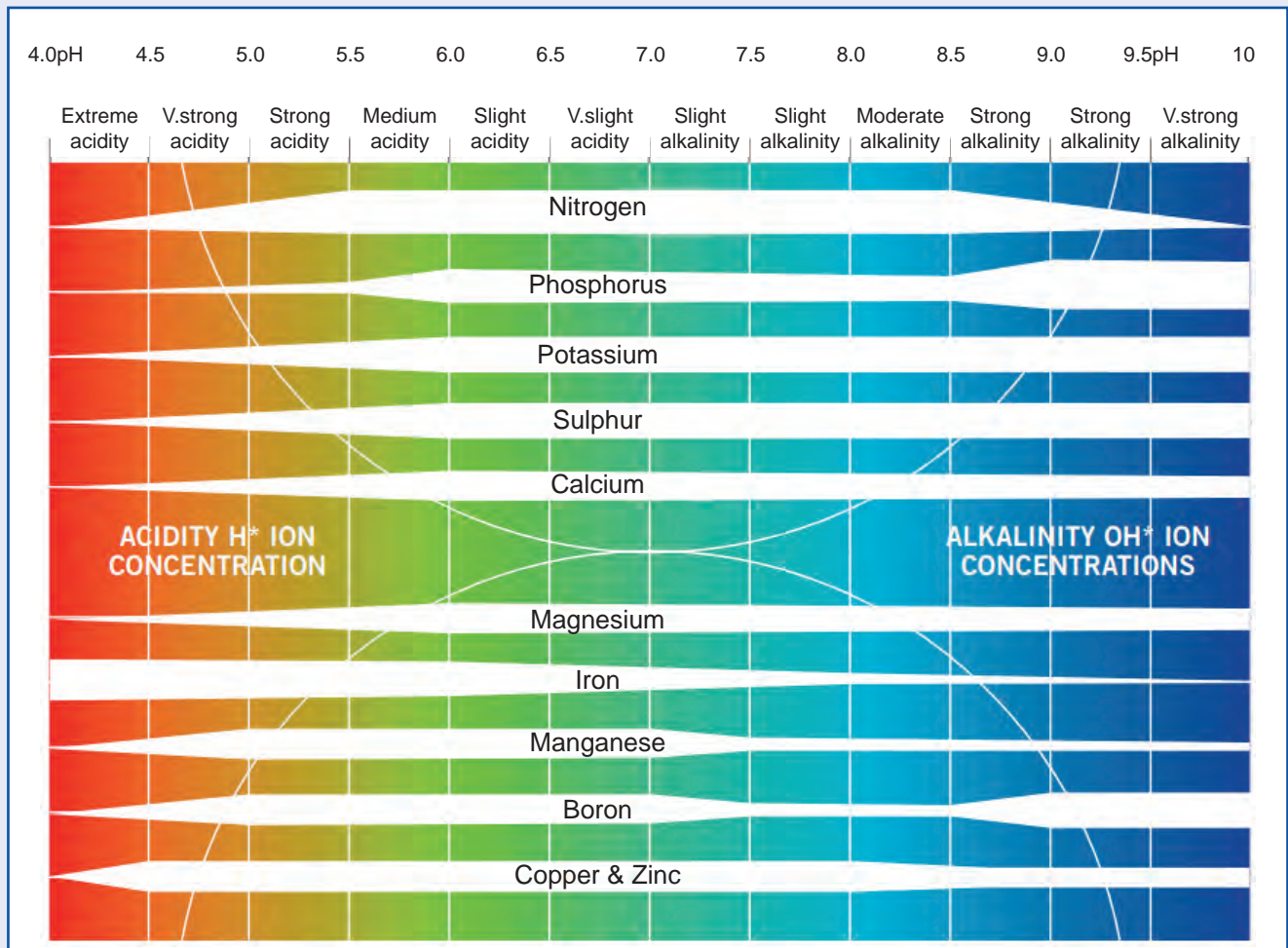
LimeX is at least 85% passing 150µm sieve and is greater than 95% reactive



Minimum Neutralising Value (NV) and sieve testing performance figures, conducted via accredited laboratory tests required by The Fertilisers Regulations 1991, are as follows:

Parameter		LimeX45	LimeX70
Neutralising Value (NV as %CaO)	Typical	25%	29%
	Minimum	22%	25%
Sieve testing: % passing 5.00mm		99%	99%
Sieve testing: % passing 3.35mm		97%	97%
Sieve testing: % passing 150µm		85%	85%
P ₂ O ₅ : kg/tonne		7	10
MgO: kg/tonne		5	7
SO ₃ : kg/tonne		4	6

The effect of soil pH and nutrient availability



Reduction in the uptake of nutrients and applied fertiliser due to low pH can have a significant impact on yield potential.

Research has shown dramatic losses in nutrient utilisation can occur in low pH conditions.

pH and fertiliser efficiency

Nutrient efficiency (utilisation)			
Soil pH	N	P	K
4.5	30%	23%	33%
5.0	53%	34%	52%
5.5	77%	48%	77%
6.0	89%	52%	100%
7.0	100%	100%	100%

Even 'mildly' acidic conditions can have a major impact on nitrogen and phosphorous efficiency
 – **can you afford to ignore this risk?**

TAKE CONTROL of your soil pH

Follow this simple step-by-step approach and realise the full potential of your land

1 pH testing

If you suspect your land is too acidic or simply want reassurance, then the first step is to produce an accurate field pH map. Our dedicated LimeX team offers a professional soil sampling and pH mapping service, with optional nutrient testing, across much of the UK. Soil samplers are trained to high standards, offering 'field walked' or 'ATV driven' options.

In addition to creating the data for field assessment, field maps also assist hauliers to locate tipping points and ensure spreading contractors have the specific 'field by field' detail they require for overall or part field treatment.

2 Treatment recommendations

FACTS-qualified members of the LimeX team review the results to provide technical recommendations that take into account specific crop rotation or other requirements. Precision at this stage provides confidence in the rate of LimeX required and ensures outstanding cost-efficiency.

LimeX70 application guidance for 1pH unit increase (1 in 3 - 1 in 4 rotation)		
Soil Type	Arable 20cm depth t/ha	Grassland 15cm depth t/ha
Sands	6.0-7.5	4.5-5.5
Light	7.5-10.0	5.5-7.5
Medium & Clay	10.0-12.5	7.5-9.0
Organic	15.0-20.0	9.0-15.0
Peats & Peaty	20.0-25.0	15.0-18.0

More detailed information is available at
www.limex.co.uk

3 Supply & spreading

A popular approach is our 'delivered & spread' package, comprising experienced safety-approved haulage and spreading contractors providing a professional, timely and cost-effective service.

An alternative option is to take full advantage of the backloading opportunity available from all our sites during the beet campaign. Hauliers can collect LimeX immediately after delivering beet to the factory, saving transport cost.

Customers can collect ex-factory if preferred



The combined value of these integral nutrients is typically **£80.00 per hectare** inclusive of the saving of application

SUGAR BEET

is highly sensitive to sub-optimal pH

Yield losses can be severe if soil pH status is overlooked.

Therefore many sugar beet growers assess their rotational liming requirement in advance of growing sugar beet.

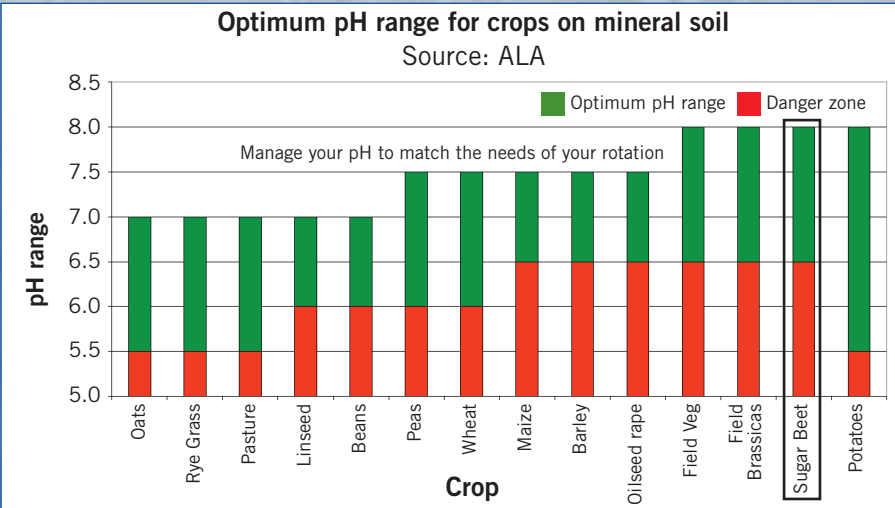
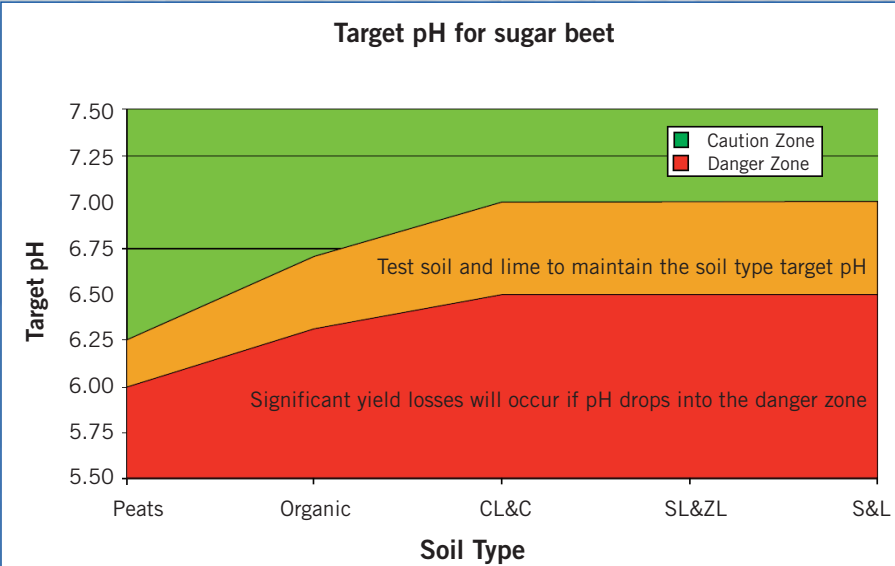
Mild yield effects can be seen on mineral soils below pH 6.5, with serious effects below pH 6.0.

It is risky to rely on a composite soil sample pH result as few soils are truly uniform for pH.

Calcium is a major nutrient - a 70t/ha crop contains over 100kg of calcium.

Apply in good time to allow thorough mixing into the top 20cm – prevention is better than cure!

The information below shows the integral nutrient benefit at 7.5t/ha:



Phosphate (P₂O₅)

- Minimum of 10kg in every tonne of LimeX70
- At an application rate of 7.5 tonne/hectare (3t/acre) this equates to 75kg/hectare of P₂O₅ worth £43.00
- This is sufficient maintenance phosphate for a 90t/hectare sugar beet crop

Magnesium (MgO)

- Minimum of 7kg in every tonne of LimeX70
- At an application rate of 7.5 tonne/hectare (3t/acre) this equates to 50kg/hectare of MgO worth £18.00
- This provides approximately 70% of the recommended magnesium at Mg Index 1 (75kg/ha)

Sulphate (SO₃)

- Minimum of 6kg in every tonne of LimeX70
- At an application rate of 7.5 tonne/hectare (3t/acre) this equates to 45kg/hectare of SO₃ worth £5.00 (25-40kg SO₃/ha is recommended where deficiency may occur)
- This is a valuable contribution significantly reducing the risk of SO₃ deficiency

The combined value of these integral nutrients is typically

£60.00 per hectare

inclusive of the saving of application

CEREALS

are sensitive to sub-optimal pH

Yield losses can be severe if soil pH status is overlooked.

Barley is the most pH sensitive cereal crop.

In a long term liming trial conducted at Rothamsted, yield was reduced by 2.0t/ha where pH dropped from 6.5 to 5.5

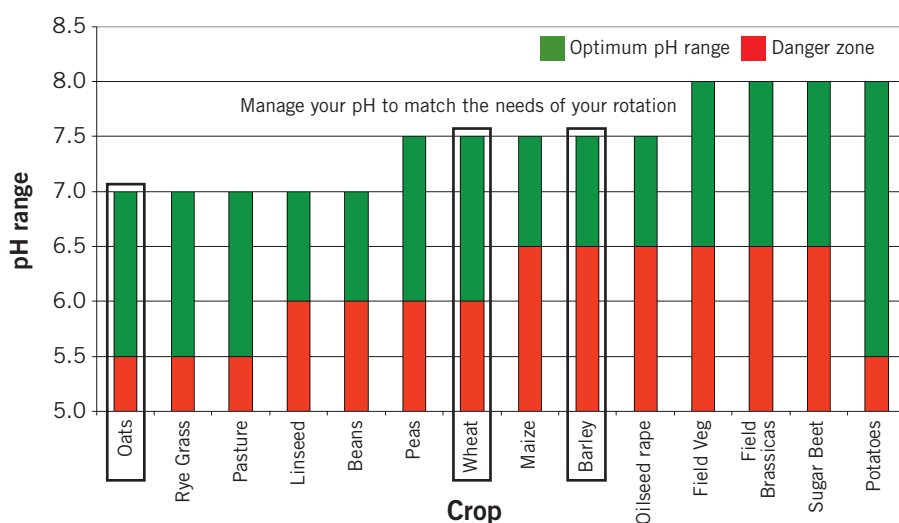
Be aware that composite soil samples showing a pH of less than 6.5 may mask field areas less than 6.2, so consider in-field pH range.

Furthermore, low pH will influence your fertiliser efficiency - a significant factor in yield potential.

Anecdotally, many growers apply LimeX in advance of second wheat to suppress the impact of 'take-all' by maintaining pH and available soil calcium.

Optimum pH range for crops on mineral soil

Source: ALA



Phosphate (P_2O_5)

- Minimum of 10kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 50kg/hectare of P_2O_5 worth £30.00
- This is sufficient maintenance phosphate for many cereals at P index 2 (range 45-65kg/ha)

Magnesium (MgO)

- Minimum of 7kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 35kg/hectare of MgO worth £12.00
- Add 50-100kg/ MgO at Mg index 0 and 1 every 3 to 4 years

Sulphate (SO_3)

- Minimum of 6kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 30kg/hectare of SO_3 worth £3.00 (25-50kg SO_3 /ha is recommended where deficiency may occur)
- This is a valuable contribution and may reduce the risk of SO_3 deficiency and agricultural formulation

The combined value of these integral nutrients is typically

£60.00 per hectare

inclusive of the saving of application

OILSEED

maximise your yields and crop profitability

The optimum pH for mineral soils under continuous arable cropping is 6.5-7.0. This will maximise the availability of most nutrients to plants.

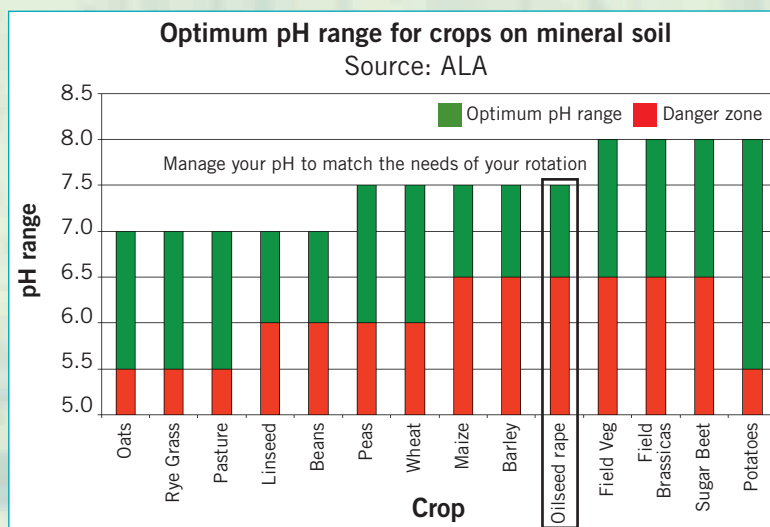
Oilseed rape is one of the more pH susceptible crops, and so soil pH should be managed with the application of LimeX prior to planting.

Clubroot severity is linked to soil pH and crops in acidic soils are more at risk of severe symptom development.

Although the clubroot pathogen is highly resilient and will survive and infect even at high soil pH levels, soil amendments that raise the pH and calcium content of soils can be effective.

A spike in both pH and available calcium at drilling has been shown to reduce clubroot infection. A neutral or alkaline pH (7+) will be most effective in reducing clubroot.

AHDB field trials* showed LimeX70 applied just before drilling at gave average control of up to 90%, relative to the level of disease. (*Project Report 487)



Phosphate (P_2O_5)

- Minimum of 10kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 50kg/hectare of P_2O_5 worth £30.00
- This is sufficient maintenance phosphate for: P Index 2: - Winter oilseed rape (50kg/ha), P Index 1: - Spring oilseed rape (60kg/ha)

Magnesium (MgO)

- Minimum of 7kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 35kg/hectare of MgO worth £12.00
- This is a valuable contribution to the rotational Mg requirement
- Add 50-100kg/ MgO at Mg Index 0 and 1 every 3 to 4 years

Sulphate (SO_3)

- Minimum of 6kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 30kg/hectare of SO_3 worth £3.00
- Apply 50-75kg/ha of SO_3 in early spring on mineral soils
- OSR yield response in deficiency situations can be 50%+ with the majority of benefit from the first 25-50kg SO_3 /ha



CLUBROOT

all brassica crops are at risk from clubroot

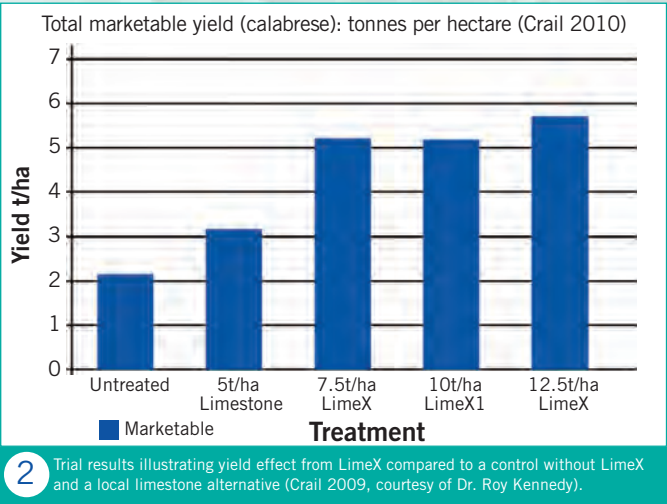
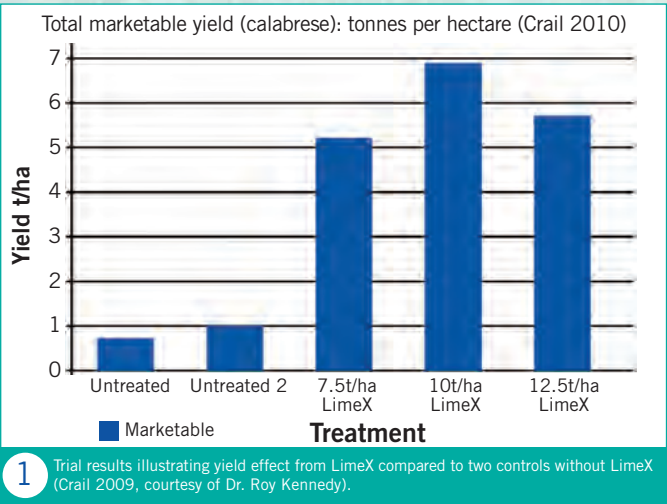
Clubroot is caused by a minute resting spore, *Plasmodiophora brassicae* that can lay dormant for at least two decades before striking at a valuable crop.

In badly infested land entire crops can be devastated, but even with more patchy infection the disease causes uneven maturity, low yields and poor quality. In many cases the affected crop is simply not worth harvesting.

Pre-planting, incorporated LimeX offers unrivalled suppression of clubroot in brassicas.

The fineness of LimeX is essential to raise the pH above 7.2, and to increase available calcium.

LimeX delivers readily available Ca^{2+} ions and raises pH rapidly to inhibit resting spore germination; significantly reducing club development and inoculum level.



Phosphate (P_2O_5)

- Minimum of 10kg in every tonne of LimeX70
- At an application rate of 10 tonne/hectare (4t/acre) this equates to 100kg/hectare of P_2O_5 worth £60.00
- This is sufficient maintenance phosphate for field brassicas at P Index 2

Magnesium (MgO)

- Minimum of 7kg in every tonne of LimeX70
- At an application rate of 10 tonne/hectare (4t/acre) this equates to 70kg/hectare of MgO worth £25.00
- Apply 100kg/hectare MgO for field brassicas at Mg Index 1

Sulphate (SO_3)

- Minimum of 6kg in every tonne of LimeX70
- At an application rate of 10 tonnes/hectare (4t/acre) this equates to 60kg/hectare of SO_3 worth £7.00
- This is a valuable contribution and will significantly reduce the risk of SO_3 deficiency
- Add 50-70kg/hectare of SO_3 where sulphate content of soil is low at, or soon after, planting

The combined value of these integral nutrients is typically

£100.00 per hectare

inclusive of the saving of application

CARROTS

reducing the severity of cavity spot

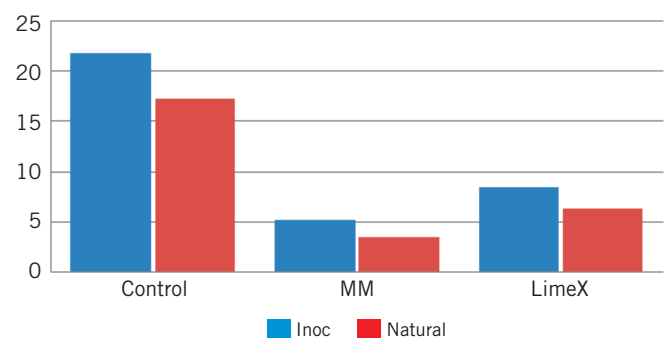
Cavity spot caused primarily by *Pythium violae* can lead to significant losses for growers, with greatest severity in overwintered crops. Recent research undertaken via HDC-funded projects have demonstrated how variable the disease can be, making it difficult for growers and advisers to predict, detect and quantify.

Replicated field trials conducted under HDC FV391 over three years at two trial sites between 2011 and 2013 concluded that there were significant reductions in cavity spot achieved by using Metalaxyl-M (MM) or LimeX70. No other treatments gave significant benefit.

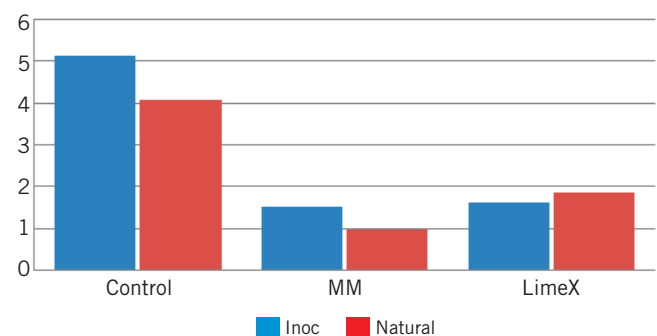


2016 Stockbridge Technology Centre Trial

2016 STC site - number of lesions per root



2016 STC site - % root affected



The research concluded that:

- LimeX provides good control of cavity spot and may be an effective alternative treatment to Metalaxyl-M
- Alternaria was significantly reduced by a number of treatment programmes including Metalaxyl-M and LimeX

The cost of LimeX applied at 10t/ha (delivered and applied) can vary between £150/ha to £250/ha depending on transport distance. With the costs of Metalaxyl-M at circa £300/ha delivered and applied, LimeX is a viable alternative for a number of growers.

Furthermore, the integral nutrients contained within LimeX at 10t/ha also supplied the maintenance P₂O₅ and MgO for the crop in accordance with RB209.

Phosphate (P₂O₅)

- At a LimeX70 application rate of 10 tonne/hectare (4t/acre) this equates to 100kg/hectare of P₂O₅ worth £60.00, sufficient on P Index 2 soils

Magnesium (MgO)

- At a LimeX70 application rate of 10 tonne/hectare (4t/acre) this equates to 70kg/hectare of MgO worth £25.00
- Apply 100kg MgO on Mg Index 1 soils

Sulphate (SO₃)

- At a LimeX70 application rate of 10 tonne/hectare (4t/acre) this equates to 60kg/hectare of SO₃ worth £6.00 (25kg SO₃/ha is recommended where deficiency may occur)
- Apply at, or soon after planting

The combined value of these integral nutrients is typically
£80.00 per hectare
inclusive of the saving of application

POTATOES

reducing the severity of common scab

LimeX can improve the skin finish of potatoes. Replicated field trials confirmed reduced incidences of common scab where LimeX was applied pre-planting prior to commencing secondary cultivations.

Trial results demonstrated improvements in marketable yield of circa 10% (6.0t/ha) where LimeX was applied at 7.5t/ha pre-planting. The product was well distributed into the top 15-20cm to ensure uniform pH buffering and available calcium was achieved.

It is widely understood that the main root system does not supply calcium to the tuber. Therefore, stolons and tubers must be exposed to available calcium. This helps reduce tuber abortion and strengthens the cell walls reducing internal disorders, bruising, and bacterial attacks while maintaining quality, weight, and reduce rotting during storage.

Therefore, providing available calcium in the tuber zone during growth and development may reduce the incidence of hollow heart and internal rustspot, whilst increasing dry matter for improved storability.

COMMERCIAL FIELD TRIAL

Visual differences clearly show the potential improvement and reinforces anecdotal evidence that LimeX improves skin finish:



Phosphate (P_2O_5)

- At a LimeX70 application rate of 7.5 tonne/hectare (3t/acre) this equates to 75kg/hectare of P_2O_5 worth £43.00

Magnesium (MgO)

- At a LimeX70 application rate of 7.5 tonne/hectare (3t/acre) this equates to 50kg/hectare of MgO worth £18.00

Sulphate (SO_3)

- At a LimeX70 application rate of 7.5 tonne/hectare (3t/acre) this equates to 45kg/hectare of SO_3 worth £5.00 (25kg SO_3 /ha is recommended where deficiency may occur)
- Sulphur deficiency is unlikely following an application of LimeX

The combined value of these integral nutrients is typically

£60.00 per hectare

inclusive of the saving of application

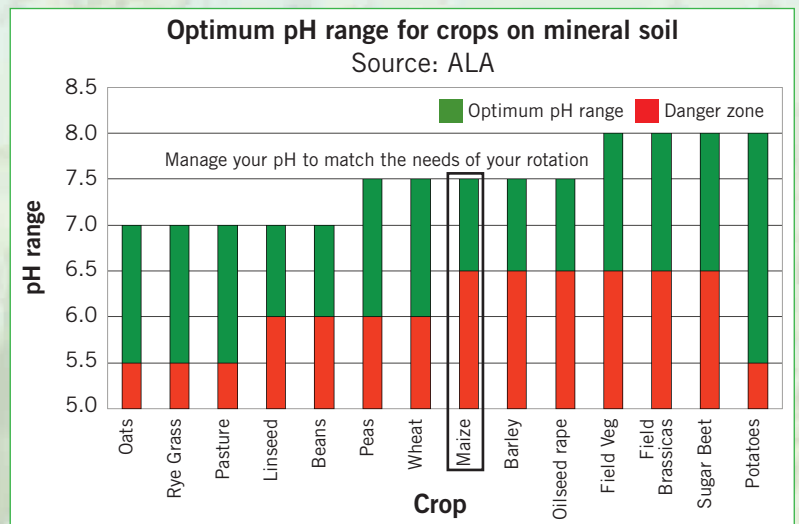
MAIZE

the value in the application of lime

By maintaining the pH of your maize at the optimum level you can ensure you achieve maximum returns from your crop. Maize is responsive to lime but can receive less attention than other crops.

A quick start and high productivity depends a lot on soil fertility. On mineral soils, low pH can induce deficiencies in phosphorus that can slow root and stalk development, delay maturity, and reduce energy transfer and storage. With over 85% passing 150µm sieve, LimeX will rapidly correct soil pH to optimise nutrient availability and support healthy root development that will be more capable of keeping up with rapid vegetative growth!

Potassium deficiency is less likely to occur when pH is within the optimum range, and supports stem strength and water movement within the plant. As more than 50% of the nitrogen and phosphate, and 75% of the potassium are taken up in the vegetative stage, soil pH is fundamental to crop rooting and support nutrient uptake.



To encourage rapid early growth, all of the phosphate requirement and up to 10-15kg/ha of the nitrogen requirement may be placed below the seed at drilling. the remainder of the nitrogen requirement should be top-dressed as soon as the crop has emerged.

P or K Index					
	0	1	2	3	4 & higher
Kg/ha					
Phosphate (P ₂ O ₅)	115	85	55	20	0
Potash (K ₂ O)	235	205	175 (2-) 145 (2+)	110	0

Phosphate (P₂O₅)

- Minimum of 10kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 50kg/hectare of P₂O₅ worth £30.00
- Provides maintenance phosphate for P index 2 (and above) soils at 40 tonne/hectare fresh yield

Magnesium (MgO)

- Minimum of 7kg in every tonne of LimeX70
- At an application rate of 5 tonne/hectare (2t/acre) this equates to 35kg/hectare of MgO worth £12.00
- Deficiency is unlikely following LimeX application. At Mg index 0, magnesium fertiliser should be applied every 3-4 years at 50-100kg MgO/hectare

Sulphate (SO₃)

- Minimum of 6kg in every tonne of LimeX70
- A 5 tonne/hectare (2t/acre) LimeX70 application provides 30kg/hectare of SO₃ worth £3.00
- 25-45kg SO₃/ha is recommended where deficiency may occur. Deficiency is unlikely following LimeX application

The combined value of these integral nutrients is typically

£80.00 per hectare

inclusive of the saving of application

GRASSLAND

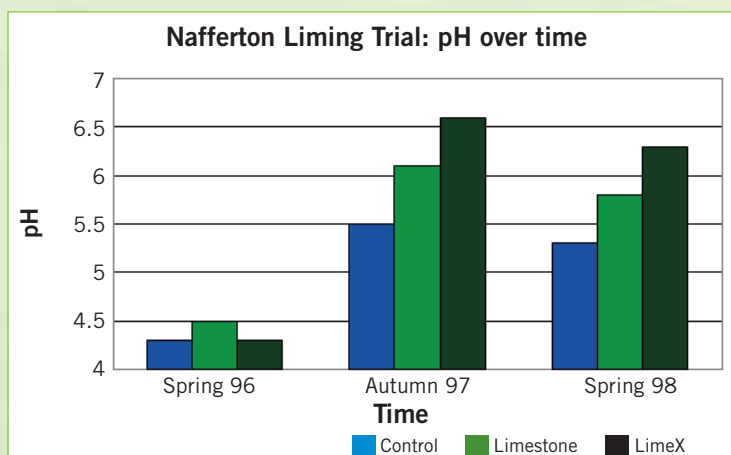
invest in your grassland and improve your yield

By maintaining the pH of your grassland at the optimum level, you can ensure you achieve maximum returns from your crop and livestock.

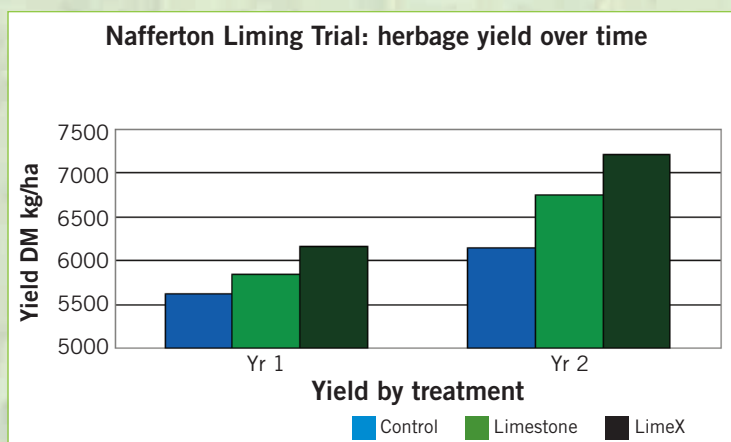
Declining pH lowers soil fertility and sward productivity, unless soil reserves of lime are replenished. Grass grows best at pH 6.5 and above and lime should be applied when needed. It is recommended grassland soils are tested ever 3-4 years.

Trials at Nafferton and Molesden show LimeX generates the greatest yield response on grassland, with Nitrogen offtake increasing by 10-20kg over a season.

Results show the pH increase from LimeX was greater than the response from Limestone, with best results in the Spring. Furthermore, LimeX and limestone applications can increase the Magnesium content of the herbage.



LimeX70 has provided the best pH uplift, reflecting fine particle size and reactivity



LimeX70 has tended to give the best herbage yield advantage and is probably linked to improved N utilisation

Phosphate (P_2O_5)

- Minimum of 10kg in every tonne of LimeX70
- At an application rate of 7.5 tonne/hectare (3t/acre) this equates to 75kg/hectare of P_2O_5 worth £43.00
- Provides maintenance phosphate for many grassland situations (range 20-100kg/ha)

Magnesium (MgO)

- Minimum of 7kg in every tonne of LimeX70
- At an application rate of 7.5 tonne/hectare (3t/acre) this equates to 50kg/hectare of MgO worth £18.00
- Reduces the risk of hypomagnesaemia
- Supports Mg uptake and forage K:Mg < 20:1

Sulphate (SO_3)

- Minimum of 6kg in every tonne of LimeX70
- A 7.5 tonne/hectare (3t/acre) LimeX70 application provides 45kg/hectare of SO_3 worth £5.00 (25-40kg SO_3 /ha is recommended before each silage cut where deficiency may occur)



To discuss your liming requirements or for technical enquiries, contact
0800 090 2376 or **limex@britishsugar.com**



Values are based on the market-average price of proprietary nutrients and were correct at the time of printing.

The most up-to-date values are available on our website: **www.limex.co.uk**