

# Make the most of magnesium

**M**agnesium has many qualities, but these will only become apparent if the nutrient is managed according to soil types in which the crop is grown.

Magnesium is traditionally applied rotationally prior to the most responsive crop in the rotation (usually potatoes or sugar beet).

The principle is that this will then supply adequate Mg for the remaining crops in the rotation.

This system is adequate provided that the soils are of a suitable pH (6-6.5), are of medium to heavy texture and with a reasonable CEC value so that magnesium can be 'held' for some time.

Sufficient magnesium must be applied to allow for the offtake from all of the following crops with an additional allowance made for some inevitable losses to lower soil zones or to unavailable forms.

Care must also be taken to apply the correct

In the previous issue of *The Agronomist*, **Jerry McHoul** looked at the need for magnesium. Here, he examines its management

source of magnesium.

An alternative practice is to apply magnesium annually or biannually with the little and often approach. This method is particularly suited to soils with high (>7.5) pH, low (<6.2) pH, or on sandy or chalky soils where magnesium can easily be lost or masked by excessive calcium or other cations respectively.

If starting from a satisfactory index of 2 for arable crops, magnesium can be applied to match the offtake in a similar way to potash fertilisation, although around 25-50% greater should be applied to allow for losses and movement into less available pools.

In practice, this means around 20-50kg of MgO annually, depending on the crop type, soil status etc. Magnesium can be applied this way by using

a separate magnesium fertiliser, a fertiliser blended with magnesium or a fertiliser containing magnesium, such as Korn-Kali.

## FOLIAR MAGNESIUM

It is notoriously difficult to get sufficient magnesium into a fast growing, magnesium loving crop such as potatoes, particularly during a dry spell when requirements often exceed uptake from the soil. Ask any potato farmer in East Anglia if he has noticed magnesium deficiency on older leaves in a dry hot summer, and almost all will reply "yes".

One answer is to supply magnesium via the foliage with the use of a soluble product tank mixed with the fungicide programme. Bittersalts is often used in this way to supply magnesium at times of peak demand and foliar magnesium is also particularly effective on calcareous soil types which typically have a high pH that inhibits magnesium availability.

Foliar applications are best applied in a little and often approach (5-10kg/ha at each application), which is why they fit so easily with a blight programme that is regular and usually covers the peak magnesium demand period.

## MAGNESIUM DEFICIENCY

Magnesium deficiency symptoms are very similar for most broad-leaved crops. The early symptoms appear as yellowish mottling between leaf veins, which typically remain green. Discolouration worsens with time until almost white interveinal areas appear

that might then become necrotic in severe cases.

In cereals, there is a yellow mottling on the older leaves with localised necrosis in severe cases.

These symptoms often appear when magnesium concentration in leaves falls to around 0.2-0.3% (dry matter).

Older leaves are usually affected first due to mobilisation of magnesium to the greatest point of need (younger leaves), but if left untreated, all parts of the plant could become affected.

The extra expenditure involved in treating preventatively in high risk situations is almost always cost-effective because negative effects on yield and quality will occur well before symptoms become visible.

## CROP RESPONSES TO MAGNESIUM

A guideline index is given in RB 209 for each crop based on historical experiments investigating crop responses to magnesium. This, in principle, is a good system and allows growers to manage magnesium in a simple way.

Magnesium has long been undervalued, however, and therefore very little public research has been done during the past two to three decades. The classic experiments used to determine these recommendations are often very old and based on varieties and yields that were very different

from our current situation.

A 'one recommendation fits all' approach is at best an oversimplification. Privately funded research carried out by independent bodies has been conducted in the past decade, particularly in Europe where soil magnesium levels are often not dissimilar from ours, but where the nutrient is treated with greater consideration, particularly in oilseed rape.

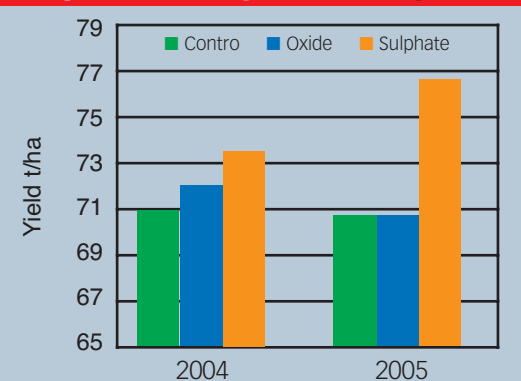
From this research, it is apparent that the most important factor is the form of magnesium, particularly on high pH, low magnesium status sites and these trials, conducted by Armstrong-Fisher in the UK, highlight this well.

Similarly, responses from bittersalts trials that were conducted in the UK and Germany over the past seven years have shown average yield responses (shown in the table below) that, while not revolutionary, prove particularly cost-effective due to the relatively low cost of this foliar application (typically around £3-£15/ha depending on rates and specific products used). **A**

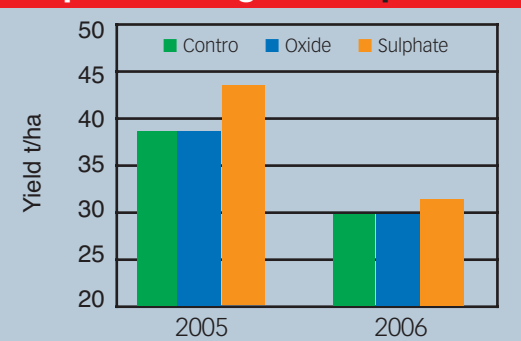
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Next issue: Sources of magnesium.

### Comparison of magnesium in sugar beet



### Comparison of magnesium in potatoes



### Average yield responses

Crop	No of trials	Average yield response
OSR	22	0.22t
Potatoes	48	1.75t
Sugar beet	49	0.41t sugar (approx 2.5t beet)