

# DECISION MAKING - Ploughing Burnt Lime



Mark Wilson is a Liebe member who farms in Dalwallinu and East Maya.

## What is the problem?

The Wilson's farm contains some wodjil soils, characterised by having a low pH. Due to the low pH the crops suffer from aluminium toxicity, which makes it hard for the plants to access nutrients and water, resulting in yield penalties.

Mark's decision to lime was based on the low levels of calcium in the soil, by liming the pH would increase along with the calcium. He noticed the low levels of calcium upon soil sampling their northern property. Most of the soil's pH was around 4 to 4.1 and the calcium levels were extremely low, however, magnesium levels were good.

The low levels meant Mark needed to do something quickly, from what he knew, he needed to use lime rather than gypsum or dolomite lime as lime has a smaller particle size, therefore is quicker to react to neutralise soil acidity (DAFWA).

After hearing that other farmers had been using burnt lime, Mark chose to use a burnt lime and lime sand mix to get faster results.

## The Process

Mark originally used a DBS system with deep tillage to get more depth, and spread the lime, in the first year the yield increased straight away. He then used a set of 5GP shearer ploughs with hydraulic tines and new discs, and ploughed in the lime mix to 7-8 inches to get quicker results again.

Mark did however encounter problems with the one way ploughs, as they were designed to work the paddock round and round, while their system was working up and back. Mark overcame this by doing a mixer of both round and round and up and back.

To prevent blowing of their paddocks, Mark left the operation until 2-3 weeks before seeding and ploughed it in after the rain – assuming that rain came.

At the moment Mark is not ploughing as he is trying to get the top 8 inches to a pH of 6.

## Doing it again

If Mark could do the whole operation over again he would have done it earlier and gone across it with the seeder, or when ploughing, he would have used rubber tyre rollers behind a two way plough. He would also sow oats straight over the soil, with an aim to compress the soil to reduce the risk of erosion, this way he can do his operation anytime from harvest onwards.

Mark might have also borrowed a machine that could go deeper than 7-8inches, down to possibly 12 inches deep. His aim would be to get more depth of soil and correct it at the same time, as well as getting the process going a bit quicker than it has.

His advice is to "be careful and don't go to quick", due to the occurrence of nutrient deficiencies. His biggest deficiency is manganese where the lime rates are high. This is due to Mark trying to push the process and not waiting for the soil to do its own thing.

When the Wilson's first bought the property they didn't need to apply manganese, however now they have to do their whole northern property. The aim is to apply both zinc and manganese when attempting to correct this deficiency.

### Costs

Mixture \$6/t	2 t/ha 1 <sup>st</sup> time, 1.5 t/ha 2 <sup>nd</sup> time.
Product \$9/t	
Transport \$20/t	
Cost of Spreading \$6 ha	
Total	~\$35 t/ha

\*This does not include the cost of ploughing

### Benefits

There has been a high boost in Phosphorus levels. Five to six years ago the extractable phosphorus in the soil was 15ppm, now it is up to 30ppm. This means a decrease in use of one of the more expensive compound fertilisers. Mark has gone from using 80-90 kg of a MAP or DAP mix, down to 50-60 kg, this is a 20-30% drop in the use of these fertilisers.

Mark has added manure, which has good levels of Potassium. The levels of potassium in the soil are reducing as the yields increase.

### When did Mark start

Mark started the process of liming his paddocks in the mid 90's, about 15 years ago. He wishes he has started 20-30 years ago as there probably wouldn't have as many problems as he has now.

When he started the liming process, Mark was applying 2 t/ha of lime, sometimes with a lime, gypsum and burnt lime mix.

Mark is still struggling on the subsoils after 15 years, having thought that within 10 years the sub soils would be improved. His aim is to increase his subsoil pH to 5.

In the early years the applications resulted in significant yield increases. While it is still improving, the yield benefits are beginning to plateau.

### Where the idea came from

Marks idea to plough in burnt lime came from looking around at what other farmers had done and speaking with them about it. He had also been working with his soil specialist Adrian de Waal by soil sampling his paddocks and working out how to improve them.

Mark has done a lot of soil sampling, with the Liebe Group helping recently with some 1.2m samples. From these samples he hoped the sub soil acidity had been improved, however, he still has problems. Mark stated that "there is a lot of variability at 1.2m, with some being at 4.2 pH".

Mark is disappointed with his deep subsoils, his focus now is to work with the biology of the soil to help the soil at depth. However, first he needs to work on the topsoil, and then hopefully he can manage the soil to depth.

\*This case study is a write up of the video with Mark Wilson featured at [www.liebegrup.org.au](http://www.liebegrup.org.au)