Deep-placed vs surface liming

Time to Re-Lime

Whether you are recovery or maintenance liming, surface application (at appropriate rates) is the recommended method—because we know it works. Good results have been achieved with deep placement of lime using modified farm-scale machinery, but it is difficult to control all the factors necessary.

Surface application

Lime applied to the surface will be effective in treating soil acidity if sufficient is applied to keep the topsoil pH above 5.5. This will treat on-going acidification due to farming practices and, in time, acidity in the subsurface soil.

The main aim when applying lime to the surface should be an even coverage of the ground. The spreading width should be approximately 6 to 8 m (depending on wind conditions) to get good coverage of fine particles (<0.5 mm). Larger particles will spread up to 15 m but the effective distribution is poor and will only change pH slowly.

Deep placement

Deep placement is only recommended for soils in which subsurface acidity is constraining production and, before it is attempted, ***detailed consideration should be given to whether it is likely to be profitable.***

Direct injection

This technique deep-places lime while deep ripping using modified machinery. Research has shown that successful direct injection is possible and subsurface acidity can be quickly removed as a production constraint. When the distribution of lime is correct, responses of 20–30% in wheat are common, however increased costs due to machinery modification and slow operation need to be considered.

It is difficult to achieve adequate distribution of the lime. Poor distribution can result in the lime being placed below an untreated acidic layer and plants will still be restricted. Where compaction is also a constraint, direct injection may be worth considering.

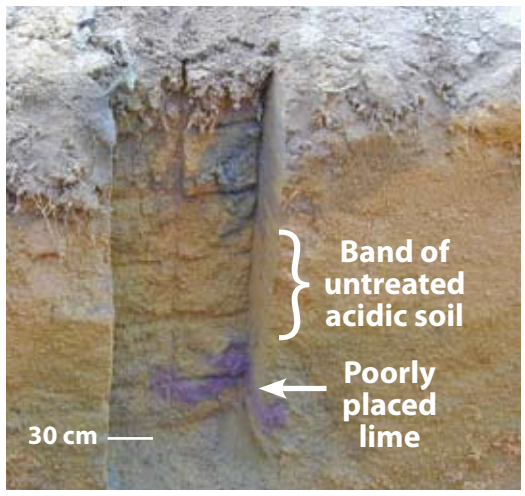
Surface applied then deep-rip

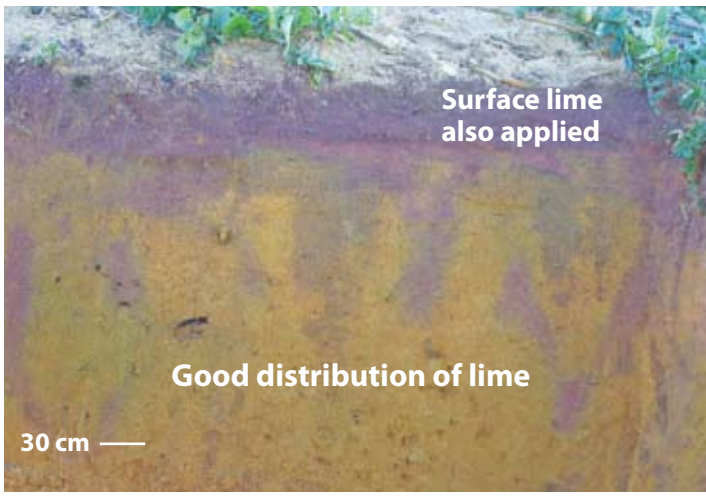
It is good practice when applying lime to spread the lime prior to any soil disturbance such as ploughing and deep ripping.

Shallow incorporation

Some farmers use shallow incorporation of 200–300 kg/ha of lime at seeding. Little work has been done to test whether this makes a difference to the rate or amount of amelioration that can be achieved. Department of Agriculture and Food Western Australia research shows that low rates of lime that do not increase the surface pH above 5.5 are insufficient to prevent on-going subsurface acidification.

Extensive modification of machinery is required for good distribution of deep-placed lime





Soil profiles stained with universal pH indicator; purple shows placement of the lime. Good distribution of lime (right) is difficult to achieve.

Points to consider

- **Surface applied lime to keep topsoil pH above 5.5 will also treat subsurface acidity**
- **Spreading too wide results in uneven treatment of pH**
- **Direct injection of lime can ammeliorate subsurface acidity quickly**
- **Direct injection of lime is difficult and expensive to get right and a waste of lime if you get it wrong**
- **Liming before deep ripping for compaction adds value to both treatments**

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The Avon Catchment Council has set a target pH_{CaCl_2} of 5.5 for topsoils and 4.8 for subsurface soils in the Avon River Basin by 2020.

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