

Lime quality: size does matter!

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Introduction

Chemical composition and particle size distribution are the two biggest influences of the effectiveness of limestone to raise soil pH. Despite published research on the importance of particle size distribution (Scott *et al.*, 1992), it is often overlooked when advisors are sourcing limestone. A survey of limestone materials being used in the Finley agronomy district was undertaken to investigate the degree of variation in lime quality.

Methods

In autumn 2002, NSW Agriculture staff sampled commercial limestones being used in the Finley agronomy district. On arrival at the property, each limestone stack was sampled at 12 points using a 30-mm-diameter by 500-mm-long sampling tube. Samples from 18 different loads representing nine different limestone sources were collected and sent to the Charles Sturt University Environmental and Analytical Laboratories, Wagga Wagga. These were tested for particle size distribution and neutralising value in the < 75 microns, 75 to 250 microns, and 250 to 1,000 microns range. This data was then used to assess the effectiveness of each product in achieving pH change.

Results

There was considerable variation in limestone quality from different (limestone) sources. One way of expressing this variation in quality is to calculate the tonnes required of each product to achieve an equivalent pH change. For instance, 2 t of product 'e' are needed to obtain the same increase in pH as for 1 t of product 'a' (Figure 1). This can be thought of as an adjustment factor to account for the relative quality of

each product, that is, the adjustment needed after calculating a limestone application rate from standard look-up tables (Fenton, 1999).

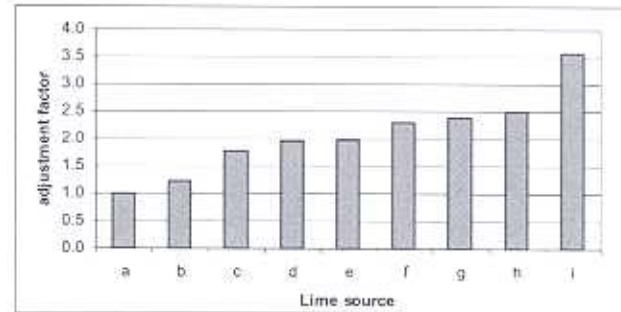


Figure 1. Adjustment factor for nine lime sources.

Conclusion

Considerable variation in lime quality was shown to exist between sources of limestone being used in the Finley agronomy district. This variation needs to be accounted for when determining an appropriate limestone application rate. To make an informed decision on source of limestone, you need to know the particle size distribution and neutralising value of the available limestones.

Ultimately, the choice of lime should be determined by its quality and spread price on-farm, i.e., price ex works plus freight and spreading costs.

References

- Fenton, G. 1999. Planning on liming. Acid Soil Action Information Leaflet No. 4.
- Scott, B. J., Conyers, M. K., Fisher, R., and Lill, W. 1992. Particle size determines the efficiency of calcitic limestone in amending acidic soil. *Aust. J. Agric. Res.* 43:1175–1185.