

2002/V04



Producer Research Support Fertiliser Responses

BIA East Gippsland



This very detailed project attempted to identify the elements likely to be the cause of poor clover performance and persistence in the Gippsland area. The focus was on the interaction of minor elements with lime and phosphorus application. The results show that magnesium was not the culprit, but that boron, cobalt and possibly more lime improved clover performance.

Key points

- Results showed that neither a calcium magnesium imbalance, nor magnesium deficiency, were the cause of poor clover growth on old pasture paddocks.
- Boron, cobalt and possibly more lime was shown to improve clover performance.

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The project

Lime was originally formed as a marine deposit and contains calcium, carbonate and impurities. Some of these impurities contain useful plant nutrients (magnesium, cobalt, boron, molybdenum), while some may contain harmful heavy metals such as cadmium, lead and mercury.

As lime is normally applied in tonnes/ha, producers and scientists need to know the ingredients of lime before its use so that the outcomes from use are better explained.

Problems only occur in specific paddocks on a property, so photographic evidence will be obtained and used to support a publication on this issue.

Objectives

- demonstrate to Gippsland meat producers the impact of magnesium applications on clover growth and pasture production when applied to poorly performing well top-dressed pastures that have been previously limed;
- 2. improve the sub and white clover pasture content from 5 percent to 40 percent;
- 3. improve the pasture productivity levels from 4t.DM/ha to 8t.DM/ha; and
- 4. determine which paddocks respond to this treatment.

What was done

In 2002, three pasture trials (Orbost, Bruthen and Flynn) were established across East Gippsland to evaluate the impact of calcium magnesium interactions on clover performance. These sites were on soils that in the past had acidified and then been limed to overcome acidification.

Cobalt, boron, nil and cobalt boron treatments were applied in blocks to all sites at the start of 2003 and the impact of these treatments were evaluated.

What happened?

All samples of clover taken for tissue testing indicated adequate levels of magnesium. Results from clover tissue tests in spring 2002 indicated that magnesium deficiency was not present in either sub or white clover at the Bruthen and Orbost sites. The same result was confirmed for the Flynn site in 2003.

Results from the 2002 tests also indicated that the trace elements boron and cobalt were at low levels in the clover herbage and were the probable cause of poor vigour. As a consequence cobalt and boron nutrients were applied to all sites in 2003.

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Contact Stephen Feighan - MLA Project Manager, Producer Delivery and Adoption.

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The cobalt and boron additives separately and together, improved the clover content at all sites, however the best overall result was obtained when both cobalt and boron were applied to the Flynn site. This area received normal levels of winter and spring rainfall, while the other sites only received 70 percent of normal rainfall.

In 2002 a lime treatment used as a topdressing treatment significantly improved clover vigour at the Orbost site where boron had been applied. This lime was subsequently shown to have a cobalt impurity.

Discussion

The 2003 clover herbage tests indicated that boron and cobalt levels were still not adequate at the Flynn and Bruthen sites. In the case of boron, this may be due to a slow release form of this nutrient being applied. With cobalt, uptake appears to be dependent on boron levels, but it could also be dependent on both boron levels and the legume used.

While the outcomes were not from replicated treatments, the results obtained do warrant further investigation as the tissue test results taken from 24 properties over a 200km transect of Gippsland indicates the likelihood of an emerging problem.

Further work is needed to more effectively evaluate these issues. Project group members are considering applying for further Producer Research Support to continue this investigation.