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Potassium Fertiliser for Ryegrass Pastures

KEY MESSAGES

- In ryegrass dominant swards aim for a minimum potassium (K) content of 1.5% dry matter (DM) in plant tissue tests.
- Plant testing should take place at the three leaf stage, just prior to grazing.
- Soil testing for K is not a reliable indicator for DM responses in ryegrass.
- Aim for a minimum K content of 2% DM for clover tissue tests, as clover has a higher requirement for K.
- Potassium fertiliser should be applied with nitrogen and sulphur in multiple applications after each grazing.
- Potassium deficient ryegrass has a lower metabolisable energy content.

Dryland dairy pastures in Western Australia have traditionally comprised a mix of annual and/or Italian ryegrass with subterranean clover. However in recent years, intensification of dairy systems and increased usage of nitrogen fertiliser has led to a decline in the clover content of intensively managed pastures in the region.

Previous research has shown that clover is very susceptible to potassium deficiency, particularly in WA where the sandy soils are inherently low due to subsoil leaching. Therefore, management of pastures to ensure they are not limited by K availability is critical to ensure dry matter yields are maximised.

Soil testing for K deficiency is unreliable as the K content is soil is highly influenced by urine patches, therefore plant tissue testing at the 3-leaf stage is a much more reliable indicator of the K status of fresh pasture.

The Potassium Trial

A three-year plot experiment was conducted at Vasse Research Centre to define the minimum critical K level required in the leaf tissue of annual and Italian ryegrass in order to achieve 95% of the maximum yield. The site was depleted of K for seven years, and plots were assigned various levels of K fertiliser, with all other relevant basal nutrients supplied to ensure K was the only limiting nutrient.

The results were very distinct and repeated in all years; at 1.15 to 1.3% K in the DM of plant tissue, 95% of the maximum potential yield was achieved. This is significantly lower than the 2% K requirement in DM of clover to avoid K deficiency, and indicates substantially less K fertiliser is required than earlier recommendations in ryegrass dominant pastures. No difference in the minimum K requirement of plant tissue was observed between annual and Italian ryegrass.

Implications:

Importantly, these recommendations apply only to farmers with ryegrass dominant pastures (greater than 90% annual or Italian ryegrass). For less intensive farmers, who still have a substantial level of clover in the sward, a K level of 2% DM in leaf tissue is still required to avoid a decline in the clover content of the sward. Potassium is an essential element to achieving high productivity from pastures; the experiment showed significant “mining” of K from the soil occurred over the 3-year period. Therefore, a close eye should be kept on the K content of paddocks cut for fodder, as removal of large amount of dry matter from paddocks can deplete K levels rapidly. Farmers should rotate sacrifice paddocks in the dry season to ensure nutrient recycling from animal faeces and urine is more evenly spread throughout the farm.

Muriate of potash is the most common fertiliser used to supply potassium to pastures. High levels of potassium can induced metabolic issues such as milk fever and grass tetany and therefore should be managed accordingly. It is recommended that potassium should be applied to dairy pastures after grazing in small (10-20 kg K/ha) and regular applications if required.

For further information contact the Western Dairy Research, Extension and Development Hub.

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