FACTSHEET

Identification of Molybdenum deficiency in legumes using test strips

October 2023

Test strips can be used to identify Mo deficiency in pastures.

Molybdenum (Mo) is an important micronutrient for nitrogen (N) metabolism in plants. It helps create proteins in plant leaf cells and is required for N fixation in legumes.

Molybdenum (Mo) deficiency has been found to limit clover growth especially on downland soils formed from loess.

Molybdenum deficiency:

- Laboratory data shows that it probably occurs in some 5 - 10% of pastures
- Is normally identified by leaf analysis of the legume and is most severe when Mo content is below 0.1 ppm and N content is below 4.5%.

Key messages

Problems with using leaf analysis include:

- Difficulty in sampling sufficient amounts of legume - especially on sheep and beef farms in spring (the optimal time to sample as climatic conditions favour legume growth) as this usually coincides with closer grazing during the lactation period at set-stocking.
- Time to sample 4 – 5 paddocks per farm especially if legume is sparse.
- Failure to take into account clover N content, which has to be less than 4.5% regardless of a low Mo content for Mo deficiency to occur.

Legume Test Strips Trial

A project on 21 farms from Hawkes Bay to Central Otago has been carried out to trial the feasibility of legume test strips as an alternative:

- At each site there were plots receiving 200 g/ha of either sodium molybdate or no Mo.
- Measurements include legume vigour and cover and Mo and N content.
- The lack of an increase in clover vigour and cover in response to Mo at these sites was likely due to adequate clover Mo and N content.

Conducting a legume test strip approach requires:

- 500 g of Granular Mo (10% Mo) weighed into plastic bags.
- On the 4-5 soil test monitoring paddocks in winter/early spring, the Mo will be applied to a roughly 5 x 2 m strip which has at least 10% legume cover and the location of the strips recorded using GPS.
- Over the following season, the farmer will be asked to observe whether legume vigour is improved where Mo was applied and if so notify their Company Representative or Customer Centre to include Mo with their next fertiliser application.
- It is important that all other required nutrients apart from Mo (usually P and S) are adequate so that the potential response in clover growth is not limited.

Factsheet 325

What does a Mo deficiency look like:

An example of a response in clover vigour and cover to Mo between two plots is shown below:

In the photograph, the right-hand plot has had no Mo applied and has poor clover vigour and cover. The other plot has had Mo applied and is much healthier with a 40% increase in pasture yield.

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Further information

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References:

Morton JD 2023. A review of research on the molybdenum requirements of New Zealand pastures. New Zealand Journal of Agricultural Research 66: in press. DOI: 10.1080/00288233.2022.2132963