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The effect of two magnesium fertilisers, kieserite and MgO, on herbage Mg content

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Introduction Supplementing Mg to dairy cows is widely practised in New Zealand. Various methods are used including drenching, pasture dusting, water trough treatment and adding to hay, silage and other feedstuffs (Young *et al.*, 1979). Fertiliser Mg (calcined magnesite, MgO) is widely used to maintain soil Mg status but research has shown that using fertiliser Mg to achieve good soil, pasture and animal Mg status requires large inputs of Mg (120 kg/ha) and maintaining blood serum Mg status in dairy cows tends to be short-lived without further animal supplementation (O'Connor *et al.*, 1987). The objective of these experiments was to test whether a more soluble Mg product like kieserite (MgSO₄), when applied to pastures, could achieve an immediate but short-term boost in Mg status when applied at critical times of the year.

Materials and methods Field trials were established in Northland in 2002 and Rotorua in 2003 in the North Island of New Zealand. Each trial consisted of 2 products, MgO and kieserite, 3 rates of application (25, 50 and 100 kg Mg/ha) and 2 times of application (spring and autumn). Herbage samples were taken 5 to 6 times at 3-4 weekly intervals following either spring or autumn application and analysed for % Mg content.

Results Mg content in pasture was significantly higher from kieserite than MgO in the first sampling after application at both the Northland and Rotorua sites (Table 1). Both sites showed a marked rate effect to kieserite relative to MgO indicating that kieserite is a more soluble, quicker-acting material (Table 2). At subsequent samplings there was no difference between products at the Northland site but still differences at the third sampling at the Rotorua site before differences disappeared (Table 1). Other research has also indicated that long-term there will be very little difference between Mg fertilisers (Hogg & Karlovsky, 1968). Results suggest kieserite could be applied at critical times of the year to boost pasture Mg content and animal Mg requirements.

Table 1 Percentage Mg in pasture for control (no Mg) kieserite and MgO (mean of rates and times of application, samples taken at approximately monthly intervals post application)

Sample	Northland				Rotorua			
	Control	Kieserite	MgO	SED	Control	Kieserite	MgO	SED
*								
1	0.22	0.24	0.22	0.006	0.23	0.29	0.26	0.007
2	0.20	0.23	0.21	0.008	0.23	0.26	0.25	0.011
3	0.20	0.22	0.21	0.007	0.25	0.29	0.27	0.009
4	0.20	0.21	0.20	0.007	0.24	0.29	0.28	0.013
5	0.21	0.23	0.23	0.007	0.24	0.27	0.27	0.009
6					0.23	0.26	0.26	0.009

Table 2 Percentage Mg in pasture one month after application (mean of two sites)

Rate of Mg (kg/ha)	0	25	50	100	
Kieserite		0.23	0.25	0.26	0.29
MgO		0.23	0.25	0.25	

Conclusions The results from these trials demonstrate that kieserite is a much quicker acting fertiliser than MgO and could be used to provide a significant lift in Mg content of pasture when applied at critical times of the year. Although short-lived this effect could be important in terms of animal requirements.

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