

SUPPLEMENTATION OF BREEDING COWS GRAZING PASTURES ON SERPENTINITE ALLUVIUM SOILS IN CENTRAL QUEENSLAND

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Cattle producers commonly feed phosphorus (P) supplements to lactating cows grazing native pastures growing on soils derived from serpentinite which on average have bicarbonate extractable P levels of 11.8 mg/kg (range 8 to 23) (Forster and Baker 1995). Calcium (Ca) is closely associated with phosphorus but is seldom deficient in plant material unless soil levels are very low. Generally soil Ca levels are one to five times magnesium (Mg) but in soils developed on serpentinite the Mg content may be five times the Ca content (ie 7 meq Ca / 100 g soil vs 34 meq Mg / 100 g soil) (Forster and Baker 1995) resulting in low plant Ca and higher than normal Mg levels.

On one property, lactating cows which had been fed P supplements intermittently exhibited symptoms including pica, malformed hooves, listless demeanour, unusual gait and an overall unthrifty appearance.

Before P supplementation commenced pasture grass leaf, faeces, and bore water samples were analysed to determine the concentration of nitrogen (N), P, Ca and Mg. These analyses show grass leaf contained 23.6, 1.9, 1.9 and 3.6 g/kg of N, P, Ca and Mg respectively. Faecal samples had 16.3, 2.3, 3.3 and 5.1 g/kg and water samples contained 25 and 183 mg/litre of Ca and Mg.

Attempts to feed two groups of lactating cows comprising an unthrifty group and an unaffected group were only partially successful. These groups were offered a supplement of Kynophosá and lime, 1.4 :1, with molasses during spring and summer to supply 10g Ca and 5g P per head. A group of unaffected unsupplemented dry cows was also monitored. All groups were faecal sampled in February 1996, having had access to supplement from September 1995 (Table 1).

Table 1. Effect of a calcium and phosphorus supplement on the Ca, P and Mg in faecal dry matter (g/kg DM) of cows affected and unaffected by deficiency

	Ca	P	Mg
Unsupplemented unaffected dry cows	3.4	4.5	6.3
Supplemented lactating cows : affected	2.2	2.4	5.2
unaffected	8.4	3.9	7.5

Data in Table 1 show unsupplemented dry cows had low faecal Ca and satisfactory faecal P levels. Unaffected lactating cows that consumed approximately 7g Ca and 3.5g P / head / day had satisfactory faecal P and Ca levels. Affected lactating cows that consumed little supplement had very low faecal Ca and P levels.

Little work studying the interaction between Ca, P and Mg in cattle appears to have been published. Chicco *et al.* (1973) reported work with sheep that showed dietary Mg levels up to 5.5 mg/kg decreased plasma Ca and appeared to increase faecal Ca loss but had no effect on bone Ca. While our attempt to quantify 'cause and effect' in the field was unsuccessful, the producer continued to provide extra Ca and reports the disappearance of the condition described above from the herd. We conclude that there is a strong chance the symptoms recorded were associated with low Ca intake and higher than normal Mg intake.

CHICCO, C.F., AMMERMAN, C.B., FEASTER, J.P. and DUNAVANT, B.G. (1973). *J. Anim. Sci.* **36**, 986-93.

FORSTER, B.A. and BAKER, D.E. (1995). Proceedings of the Second International Conference on Serpentine Ecology, Noumea, New Caledonia.