FERTILIZER AND SUPPLEMENTARY PHOSPHORUS RESPONSES BY CATTLE ON LEGUME PASTURES IN S.E. QUEENSLAND

P.C. KERRIDGE* AND R.W. McLEAN*

Phosphorus is recognised as the main nutrient deficiency for legume based pastures on light textured soils in S.E. Queensland. However, insufficient information is available to enable an economic evaluation of fertilization and use of phosphorus (P) supplements for beef production.

An experiment was designed to derive response functions of liveweight gain (LWG) with variables that might be affected by inputs of fertilizer P. The experiment was conducted at the Narayen Research Station on light textured yellow podzolic and red earth soils, low in available P. A buffel grass and Siratro pasture was planted on virgin country, P was applied as triple superphosphate and the experimental area grazed with Belmont Red weaners changed annually. As there was a strong LWG response to P fertilization and evidence of dietary P deficiency, the experiment was modified after 3 years to include a P supplementation treatment.

Increasing P fertilization resulted in an increased proportion of legume in the pasture, increased available soil P and mineralisable soil N, better persistence of buffel grass and increased dietary P, Ca and N (McLean and Kerridge 1987). LWG was related to soil P (Fig. 1) when available pasture was not limiting. The size of the response to inputs of P as fertilizer or supplement was greatest at low soil P levels and minimal above 10 µgP/g soil. Supplementation can reduce the input of fertiliser P at low soil P levels. For example, provision of P supplement at 2 kg/hd/yr to steers grazing pastures on unfertilized soils containing 4 µgP/g increased LWG from 75 to 125 kg. The same level of production was obtained by fertilization with 2.5 kg/ha/yr fertilizer P which increased soil P to 6 µg/g. (Fig. 1).

Fig. 1. Relationship between LWG and extractable soil P (0.01 N H₂SO₄) for animals receiving no (—) or 6 g supplementary P per day (---).

We believe these relationships are useful for determining the economic effects of fertilization and supplementation and for making decisions as to where legumes might be planted and supplementary P used. This approach can be used with legumes that have a lower P requirement than Siratro and for soils with lower available P.


*CSIRO, Division of Tropical Crops and Pastures, St. Lucia, Qld 4067.