Effect of Different Phosphorous Sources and Levels on the Productive Behaviour of a *Lotus Pedunculatus* CV. Grasslands Maku Oversown Pasture

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Effect of different phosphorous sources and levels on the productive behaviour of a *Lotus pedunculatus* cv. Grasslands Maku oversown pasture

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Introduction The organic meat production protocol of Uruguay (INAC, 2003) requires that the animals graze pastures that receive no chemical fertilisers. The oversown legume pastures in Uruguay used to be fertilised with soluble phosphorous (P) sources that are not accepted by the protocol. The relative efficiency of different P sources would be useful data for farmers. This information is not available for the acid soils of the eastern region of Uruguay. *Lotus pedunculatus* cv. Grasslands Maku is one of the most adapted legumes to be included in this type of pasture, as the sown area has increased in the last few years. The objective of this experiment was to evaluate the P levels response and the relative efficiency of different P fertilisers for forage production.

Material and methods The experiment was established on a farm (32º 20´S) with the following chemical soil characteristics pH5.3, OM 4.0%, P Ac. Citric4.5 µg/g, K 0.29 meq/100g and Al 0.41 meq/100g. The treatments were four levels (0, 13, 26 and 39 kg of P/ha) of natural ground phosphate rock (NPR) with a relation P soluble/P total (Pt/Ps) of 4.4/12.2, one level (26 kg of P/ha) of granulated partially acidulate reactive phosphate rock (H) (Ps/Pt) of 6.1/11.8 and one level (26 kg of P/ha) of granulated superphosphate (S) (Ps/Pt) of 9.2/10.0.
The design was a randomised block with two replicates and three blocks; plot size was 2*5 m. Three cuts were taken on 24/9/02, 29/10/02 and 10/4/03 at 4 cm height. The cutting area per plot was 6.27 m^2, a sub sample of 1 kg was taken to estimate dry mater (DM) content and lotus content by manual separation. The measurements were total dry matter (TDM), lotus DM (LDM) (kg/ha). Rhizome length (m/m^2), diameter (mm) and dry weight mass (g/m^2) were estimated in autumn 2003, taking four cores of8 cm of diameter and 5 cm depth per treatment.

Results The TDM production was not affected (P>0.05) by P levels but the LDM yield response was 65.4 kg/ha/kg P (P<0.01) applied as NRF, which added between 0 and 39 kg of P/ha (Table 1). There were no differences (P>0.05) between P sources in TDM production but NRF increased LDM production 24 % (P<0.05), with the H source giving an intermediate response. Rhizome lengths were not affected (P>0.05) either by P level or by P sources.

Table 1 Effect on total DM (TDM), lotus DM (LDM) production and rhizome characteristics

				Rhizome		
	P (kg /ha)	TDM (kg/ha)	LDM (kg/ha)	Length (m/m^2)	Diameter (mm)	Dry weight (g/ m^2)
	0	7745	1647	56	2.2	4,0
NRF	13	8308	2498	85	2.6	6,1
	26	7443	3348	68	1.8	3,9
	39	7288	4198	109	2.1	5,4
	SEM	463 (6)	1222 (6)	22.4 (4)	0.94 (4)	1.6 (4)
NRF	26	7443	3348	68	1.8	3,9
H	26	4199	3682	67	2.0	3,0
S	26	4719	2980	129	2.1	7,1
	SEM	220 (6)	350 (6)	21.9 (4)	0.73 (4)	1,3 (4)

SEM standard error of the mean; (n) observations for each treatment mean

Conclusions TDM and rhizomes were not significantly affected (P>0.05) by P levels of NRF and by the different P sources evaluated. There were a significant LDM P response (P<0.01) of 65.4 kg/ha per P applied as NRF. NRF was significantly more efficient (P<0.05) than S producing LDM. NRF could be efficiently used to produce organic meat on this type of soil.

Reference

INAC, 2003 Protocolo de producción de carne natural. http://www.naturalmeaturuguay.com/sis-prod.shtml