**Variation in phosphorus content between subspecies of subterranean clover**

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The response of pastures to superphosphate may be predicted from the inorganic phosphorus (P) content of fresh subterranean clover (*Trifolium subterraneum*) leaves (1, 2). At Hamilton, the test has been used for one maturity type of one subspecies. The objective of this study was to determine if the result of the leaf test varied with subspecies or maturity type.

**Methods**

Early and mid-season cultivars of both ssp. *subterraneum* (Seaton Park and Mount Barker) and ssp. *yanninicum* (Trikkala and Larisa) were sown at 100 kg of inoculated seed/ha in previously unfertilized soil at Hamilton on 25.4.87 in 6 m x 1 m plots. Next day, the plots were top-dressed with superphosphate at rates that applied 5, 20, 45 or 80 kg of P/ha. The 16 treatments were arranged in 3 randomized blocks. The plots were not grazed. Leaf samples were taken for the P leaf test on 9.9.87 and several complete runners were collected on 15.9.87 for determination of total P in plant tops. The data for leaf P (LP) and tops P (TP) were analysed by stepwise multiple regression operating at the 5% level of probability with subspecies (S), maturity type (M) and P applied as fertilizer (FP) as independent variables.

**Results and discussion**

The analysis of the leaf P data revealed a linear response to FP and a significant interaction between S and FP. Leaf P in parts per million (ppm) of extractable P in fresh leaf tissue, varied with subspecies and fertilizer as follows:-

LP = 33.0 + 1.39 FP for ssp. *subterraneum* and
LP = 42.8 + 1.99 FP for ssp. *yanninicum*

This model had a residual standard deviation (RSD) of 24.5 ppm and accounted for 82.8% of the variance in LP.

Tops P data showed a curvilinear response to FP with significant influences of S and M. The interaction between S and M was also significant. The P content of tops, as percent total P in tops dry matter, varied with cultivar and fertilizer as follows:-

$TP = a + 0.00573\ FP - 0.000034FP^2$
where a = 0.12 for cv. Seaton Park, 0.19 cv. Mount Barker, 0.16 for cv. Larisa and 0.19 for cv. Trikkala. (RSD = 0.03% with 92.9% of variance in TP accounted for).

The higher leaf P in ssp. *yanninicum* indicate that an adjustment should be made to the value of the leaf test if this subspecies is sampled with the intent of assessing the P status of pasture. Care should also be taken to sample only one subspecies if both main types are present. The linear response in leaf P to applied fertilizer indicates the sensitivity of the leaf test for assessing plant (and pasture) P status.

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2. Cayley, J.W.D., Cumming, K.N. and Flinn, P.C. (1987). Proc. 4th Aust. Agron. Conf. Melbourne, p.249.