Department of Agriculture and Food

**Potassium fertiliser requirements for annual ryegrass pastures – a new approach**

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The DAFWA Dairy Team are undertaking a new study to provide WA dairy farmers with updated potassium (K) fertiliser recommendations for modern intensively managed annual ryegrass dominant pastures. Current K fertiliser recommendations are based on requirements for clover which are higher than for ryegrass. As a result, farmers may be applying more fertiliser K than required for ryegrass dominant pastures. Some dairy farmers have started to apply fertiliser K based on ryegrass plant test results rather than soil test results. However, suggested minimum plant test concentrations for ryegrass are based on work with perennial ryegrasses. Our experiment will determine the minimum plant test K concentrations for annual and Italian ryegrasses to achieve pasture production at 95% of the maximum yield potential during 2013 and 2014.

The experiment is located in a paddock at Vasse Research Centre and has been depleted of soil K over the past 6 years. Basal fertilisers and lime have been or are being applied to ensure that soil pH and nutrients other than potassium are not limiting pasture production.

Our treatments are Aristocrat annual ryegrass and Concord Italian ryegrass which is treated with K fertiliser as follows K0-low, K0, K10, K20, K40, K80, K160 or K320 (K in kg/ha/year split over 6 applications per season after each pasture harvest). Initial soil K levels were ~43 mg/kg for treatments K0 to K320, while it was ~31 mg/kg for treatment K0-low.

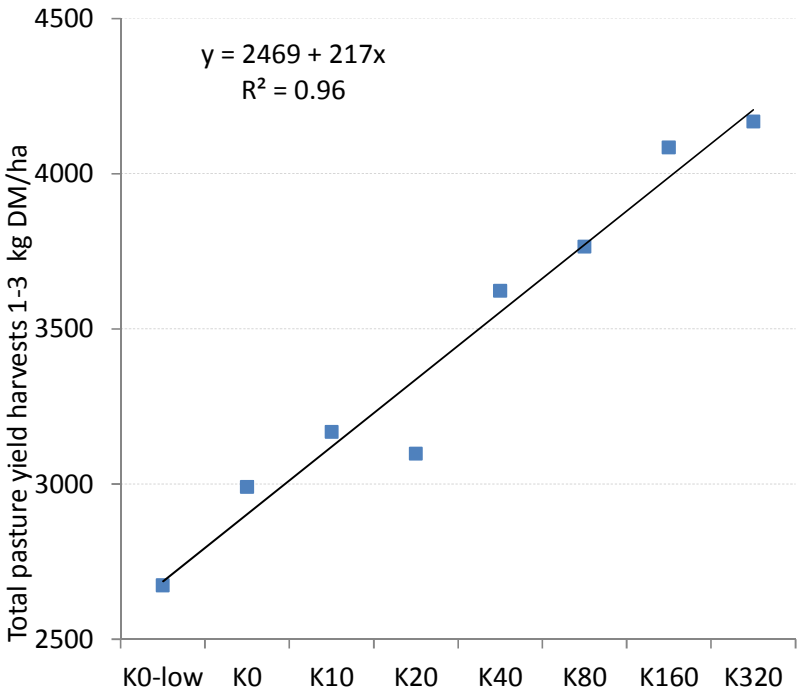
All plots (4 x 4½ meters each) are being harvested mechanically each time ryegrass reaches the 3 leaf stage. Pasture DM yield per plot is measured at each harvest and pasture samples are taken to determine potassium concentration.

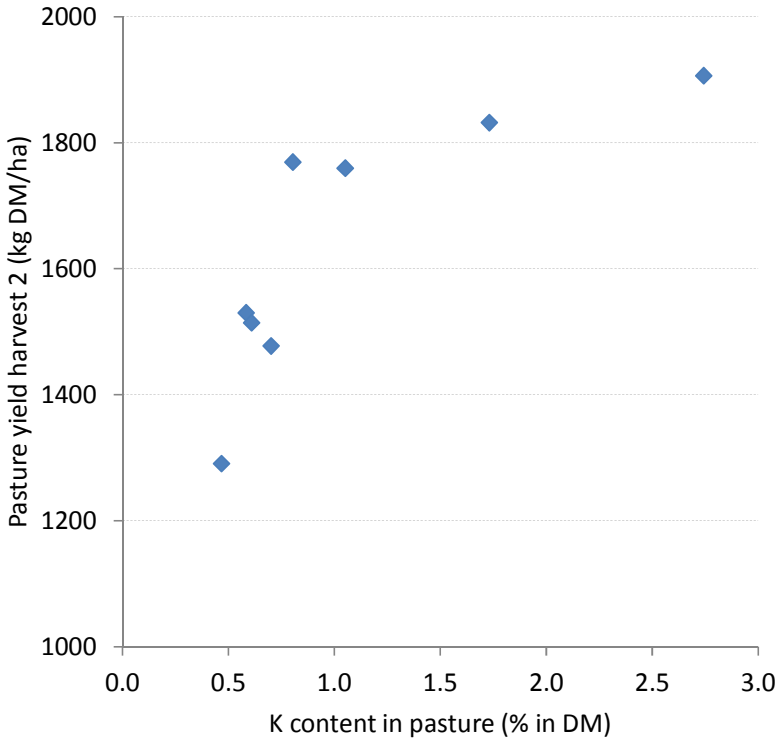
Three pasture harvests have been conducted so far, with 3 fertiliser applications (0, 0, 5, 10, 20, 40, 80 and 160 kg/ha of fertiliser K for the 8 treatments respectively). Results are summarised in the 2 figures shown below. The two species of ryegrass have been responding similarly so far and results are therefore averaged across species.

Total pasture yield is shown in the 1st figure. The effect of K fertiliser on pasture yield was highly significant and linear from 2670 kg DM/ha for the lowest K treatment to 4170 kg DM/ha for the highest K treatment. Soil with an initial soil K level of ~31 mg/kg was limiting pasture production. Soils with initial soil K of ~ 43 mg/kg did not respond to K fertiliser of 5-10 kg/ha, but did respond to 20 and 40 kg/ha and responded further to 80 and 160 kg/ha (amount applied from the 3 K fertiliser application so far). Due to the low soil K status at the start of this experiment, the highest treatments may not yet have reached 'K saturation' at this early stage of the experiment.

The relationship between pasture K levels and pasture DM yield for harvest 2 only is shown in the 2nd figure below (data not yet available for harvest 3). It suggests that 'luxury uptake' of K has started to happen above 1% K in pasture DM.

It is simply too early to draw any major conclusions from this work. An update will be provided once the results for the 2013 pasture season are complete.

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