Chicory: The 'Lucerne' of Acid Soils

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Many Tablelands livestock producers recognise the potential lucerne would have for their stock finishing systems, and lament the fact that where subsoil pH is less than 5.0 ($CaCl_2$) and aluminium saturation percentage is above 5%, lucerne is not usually a viable option. Chicory (*Chicorium intybus*) has been found to tolerate much higher aluminium (and lower pH) than lucerne, and is being examined closely as an alternative to lucerne. Trials on acid soils at "Boobalaga" near Crookwell, and "Taradale", near Tumbarumba, have been established to investigate dry matter production and persistence of chicory and lucerne in acid soils.

Method

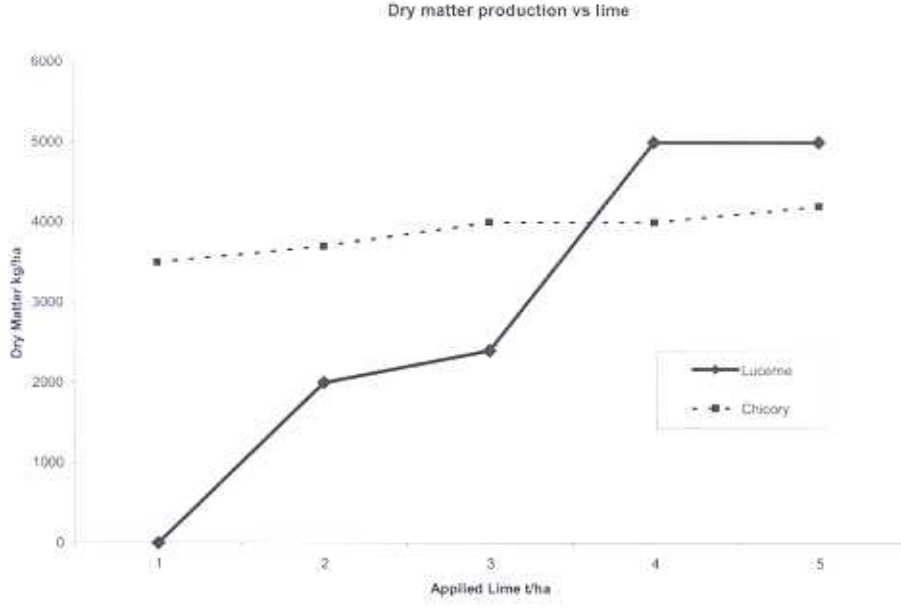
In 1998/9, lime was surface applied, with rates varying from 0 to 5 tonnes per hectare. Replicated plots were sown in 1999 with three varieties of lucerne and Puna chicory, and fertilised to ensure nutrients were not limiting. Plots were sampled regularly to assess dry matter and persistence. Soil chemistry was assessed each year to determine lime movement and effect.

Results and discussion

Chicory demonstrated very little response to lime, with dry matter production being similar across all treatments (Graph 1). Root depth of chicory was found to be uninhibited by sub soil acidity. Persistence on the control (no lime) plots was found to be similar to the limed plots. Chicory demonstrated typical characteristics of acid tolerant plants, with small productivity responses to lime and uninhibited root growth through the soil profile.

With lucerne, dry matter production and persistence was related to quantity of lime applied (Graph 1). Root development was limited to the lime-affected zone, resulting in stunted roots that tended to grow horizontally rather than down through the soil profile. In summer when moisture was limited, stunted root development did not allowed sufficient moisture extraction for plant survival, causing plant population and vegetative production to decline. Higher lime rates moved further through the soil enabling greater root depth.

Figure 1. Effect of lime on dry matter production of lucerne and chicory



At Crookwell, lucerne establishment was higher than chicory, but after 1 year lucerne had failed completely, with virtually a one hundred percent loss of plants on the no lime (control) plots. Almost every lucerne plot had lost over eighty percent of the original plants. The importance of these two trials relates to the potential to utilise chicory as a substitute for lucerne in areas where subsoil acidity (and high aluminium) prevent lucerne from establishing and persisting. For many Tablelands farms, acid subsoils will prevent the use of lucerne, even when the topsoil is incorporated with high rates of lime. Chicory has similar feed quality to lucerne *(Upjohn and Parker, 1999)*. Although overall dry matter production compared to a healthy lucerne stand may be slightly lower, chicory can be regarded as an effective alternative.

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Reference

Upjohn,B., Parker, M. (1999) *Chicory: a high performance forage*. Agnote DPI/243 NSW Agriculture.