



Towards a better understanding of changes in pasture species dynamics

G. M. Lodge

NSW Agriculture, Centre for Crop Improvement, RMB 944, Tamworth NSW 2340

The concept of a Pasture Management Envelope was used by Kemp *et al.* (1996) to interpret the changes in the species composition of a pasture. Of interest to many graziers are the ratios of perennial grasses: annual grasses (both summer and winter growing), and legumes (both perennial and annual); broadleaf weeds. These four functional groups define the state of the pasture in terms of its stability, sustainability and productive capacity. However, tracking changes in these ratios over time has proved difficult for graziers, advisers and researchers.

Methods

Botanical composition data collected as part of the Temperate Pasture Sustainability Key Program (TPSKP, Lodge and Orchard 2000) were used to devise a method that presented changes in the ratio of perennial grasses: annual grasses and annual legumes: broadleaf weeds over time. Measurements were taken from a *Siroso phalaris*, Seaton Park subterranean clover pasture that was sown in autumn 1990. Herbage mass data for individual species were collected on 25 occasions from September 1993 to

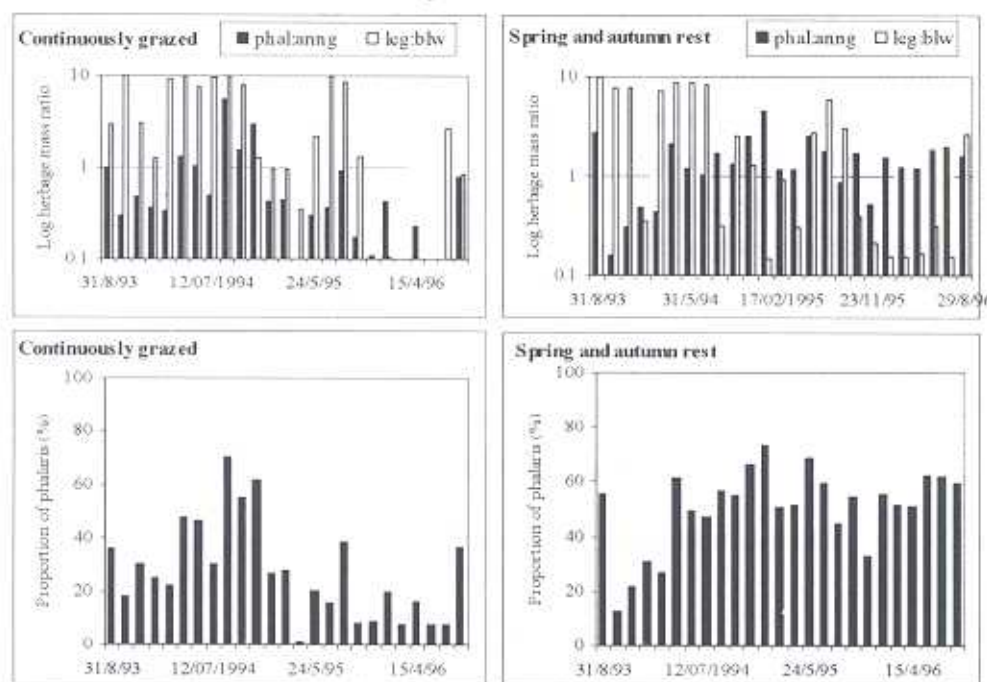


Figure 1. The log of the herbage mass ratio for phalaris: annual grass and annual legume: broadleaf weeds and the proportion (%) of phalaris, for 25 sampling times from spring 1993 to spring 1996 for pastures that were continuously grazed or rested from grazing in spring and autumn.



September 1996. Data are presented for two treatments; a continuously grazed plot stocked at 2-25 dse/ha, and a plot that was rested from grazing in both spring and autumn.

Interpretation of the graphical output shows that when the value for the log of the ratio is close to 10 the pasture is either perennial grass or legume dominant. When the values of the ratios are around 1 there are equal proportions of either perennial and annual grasses or legumes and broadleaf weeds. If the ratio is closer to 0.1, then the pasture is dominated by either annual grasses or broadleaf weeds.

Results and Discussion

The application of this technique to the TPSKP data set clearly shows the differing effects of the two management strategies over time. In spring 1993, the pastures had equal proportions of annual and perennial grasses and were tending towards legume dominance. From about February 1995 the phalaris proportion in the continuously grazed pasture was always <1 , indicating that the pasture was moving towards annual grass dominance. Conversely, the spring-autumn rested pasture maintained a higher proportion (>1), indicating a higher content of phalaris. These trends were reflected in the proportion of phalaris (Figure 1) and shown to be statistically significant by Lodge and Orchard (2000). Both pastures tended to move from strongly legume dominant, to having a higher component of broadleaf weeds, although this was seasonally dependent. Graziers should continue to monitor the proportion of grasses, legumes and weeds in their pastures; the tools described here provide a concise way for researchers and advisers to monitor changes in species composition groups over time.

Acknowledgments

The Temperate Pasture Key Program was funded by MLA (formerly the Meat Research Corporation). I thank Brian Roworth, Brian Sauer and Andrew Schipp for their assistance in collecting the data.

References

- Kemp, D.R. Klein, T.A, Michalk, D.L. & Dowling, P.M. (1996). Development of the Pasture Management Envelope: methods for the analysis, interpretation & application of grazing experiments. Final Research Report DAN.078.
- Lodge, G. M. & Orchard, B. A. (2000). Effects of grazing management on Siroso phalaris herbage mass and persistence in a predominantly summer rainfall environment. *Australian Journal of Experimental Agriculture* (in press).