

Rainfall and grazing impacts on the population dynamics of *Bothriochloa ewartiana* in tropical Australia

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Introduction *Bothriochloa ewartiana* (desert bluegrass) is a palatable, native perennial (C4) grass of considerable importance to the northern Australian grazing industry. However, little is known of the interaction between grazing pressure and the highly variable rainfall found in this area, on its population dynamics. This paper reports interim results (1998-2004) from a long-term study, in which its population dynamics were examined under 3 grazing strategies.

Materials and methods An extensive grazing study was established in December 1997, at "Wambiana" (20°34' S 146°07' E) near Charters Towers, to assess the relative ability of five grazing strategies, replicated twice, to cope with rainfall variability in terms of their effects on animal production, economics and resource condition (O'Reagain and Bushell 1999). Paddock sizes are 93-117 ha and are arranged so that each paddock contains similar portions of each of 3 soil types. Long-term mean annual rainfall is 630 (range 109-1653) mm, with most falling between November and March. The vegetation is open *Eucalyptus* savanna overlying an herbaceous layer of C₄ grasses. Permanent quadrats (n=20; each 50 x 50 cm) delineating 40 *B. ewartiana* plants, were established in each replicate of 3 grazing treatments to examine the persistence of *B. ewartiana* under grazing. These treatments were light stocking (8 ha/steer), heavy stocking (4 ha/steer) and rotational rest (6 ha/steer with 33% of the pasture rested annually during the wet season). The dynamics of these *B. ewartiana* plants were charted annually between 1998 and 2004 using the methodology of Orr *et al.* (2004).

Results Plant size increased between 1999 and 2001 in response to above average summer rainfall but fell dramatically after 2002 in response to severe drought. There were no differences ($P>0.05$) in plant size between the 3 treatments although there was a clear trend for plant size to be greater under light grazing (Figure 1a). Plant survival did not differ ($P>0.05$) between treatments with high survival between 1998 and 2002 but there was evidence of accelerated plant death between 2002 and 2004 in response to the severe drought (Figure 1b).

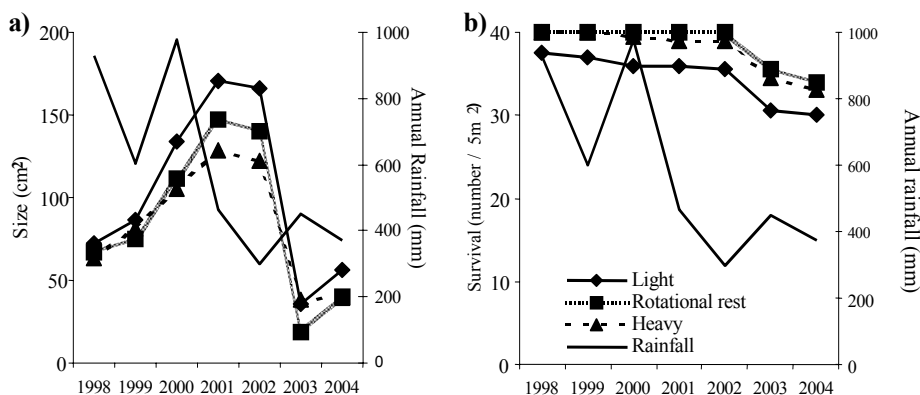


Figure 1 Changes in (a) plant size (b) plant survival of *B. ewartiana* between 1998 and 2004 at Wambiana

Conclusions Rainfall variability rather than grazing pressure appeared to have the greater impact on the dynamics of *B. ewartiana* between 1998 and 2004. This result indicates some resilience under grazing by this grass but we expect a more pronounced grazing impact in future years of this study.

References

- O'Reagain, P. J. & J. J. Bushell (1999). Testing grazing strategies for the seasonally variable tropical savannas. *Proceedings 6th International Rangelands Congress*, Durban, 485-486.
- Orr, D.M., Paton, C.J. and Reid, D.J. (2004). Dynamics of plant populations in *Heteropogon contortus* (black speargrass) pastures on a granite landscape in southern Queensland. 1. Dynamics of *H. contortus* populations. *Tropical Grasslands*, 38, 17-30.