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Grazing impacts on the dynamics of two long lived perennial grasses in tropical Australia

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Key words : *Bothriochloa ewartiana*, *Chrysopogon fallax*, demography

Introduction *Bothriochloa ewartiana* (desert bluegrass) is a long lived perennial grass which is important for the northern Australian pastoral industry, however, little is known of its basic population demography. Interim results from an extensive grazing study indicated that rainfall had a greater impact than grazing pressure on the dynamics of *B. ewartiana* (Orr and O'Reagain 2005) but suggested that a more pronounced grazing impact may emerge with time. This paper reports further data on the continuing impacts of rainfall and grazing on *B. ewartiana* and also on another long lived perennial grass *Chrysopogon fallax* (golden beard grass).

Materials and methods A large grazing study was established in 1997 in open *Eucalyptus* savanna at Wambiana, Charters Towers (20°34'S, 146°07'E), northern Australia to assess the impacts of 5 grazing strategies on animal production and resource condition. In 1998, 20 permanent quadrats (50 × 50 cm) delineated 40 *B. ewartiana* and a variable number of *C. fallax* plants to examine their persistence under constant light 8 ha/Animal Equivalent (AE) and heavy stocking (4 ha/AE) and rotational wet season resting (6 ha/AE) with 33% of the pasture rested annually. (The rotational stocking treatment was changed to 9 ha/AE in 2003 and the heavy grazing treatment to 6 ha/AE in 2005). The dynamics of *B. ewartiana* and *C. fallax* are charted annually by charting the survival of original plants along with that of recruited seedlings (Orr and O'Reagain 2005). Plant survival was analysed using a proportional hazards survival model (Cox 1972).

Results and discussion Seasonal rainfall (October-March) between 1998-1999 and 2000-2001 was above the long term mean (513 mm) while rainfall since 2001-2002 has been below the long term mean (Figure 1). Seedling recruitment of both species between 1998 and 2007 has been minimal such that the persistence of both species is due almost entirely to the presence of the original plants. Survival of the original *B. ewartiana* plants has been reduced ($P < 0.05$) by heavy grazing particularly after 2005 (Figure 1a) while survival of the original *C. fallax* plants has been reduced ($P < 0.05$) by light and rotational grazing particularly after 2002 (Figure 1b).

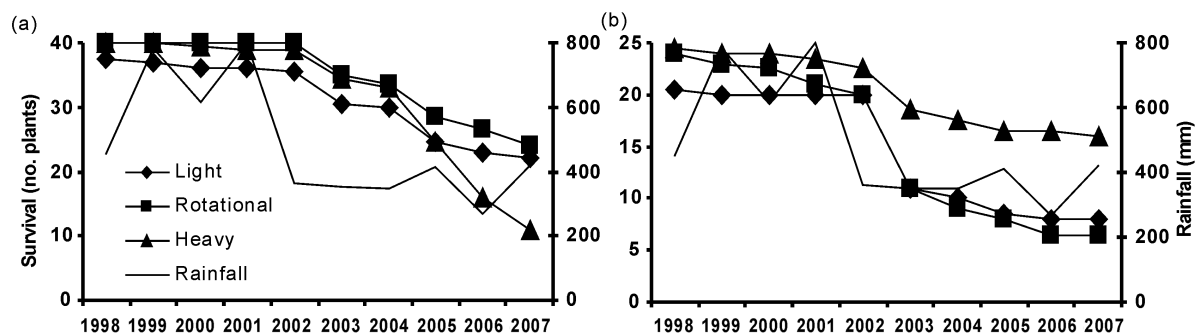


Figure 1 Changes in the survival (number of plants) of (a) *B. ewartiana* and (b) *C. fallax* in relation to seasonal rainfall (October-March) (mm) between 1998 and 2007 under 3 grazing strategy at Wambiana.

Conclusions Contrary to previous findings, these results indicate a clear impact of grazing pressure with increasing grazing pressure reducing the survival of *B. ewartiana* but increasing that of *C. fallax*. These current results also emphasise the importance of long term research in drawing valid management conclusions.

References

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