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# **ASTREBLA MORTALITY IN QUEENSLAND AFTER THE 2002 DROUGHT**

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## **ABSTRACT**

The adjusted mean frequency of live Mitchell grass (*Astrelba* spp.) in western Queensland grazed by sheep, cattle and large macropods declined from 75 to 45% between 2002 and 2003, following a nine year period of stability. Similar declines occurred in sites exclosed from domestic animals and large macropods. Therefore, it is unlikely that the grazing pressure in the last decade caused the mortality. As the period of decline occurred during the worst drought on record, water stress is the most likely cause.

## **INTRODUCTION**

The Mitchell grass (*Astrelba* spp.) area of Queensland covers 32.8 million hectares (19% of Queensland). The native grasses are resilient under grazing and usually respond well to good summer rain. However, for many parts of western Queensland the 2002 El Niño produced the worst drought on record. Grazing pressure comes from domestic animals and kangaroos. This paper reports the findings of monitoring Mitchell grass at up to 69 sites for a 10-year period between 1994 and 2003.

## **METHODS AND RESULTS**

The monitoring sites were located on six properties located around the towns of Longreach and Muttaborra in the central Mitchell grasslands, and Richmond and Julia Creek in the northern Mitchell grasslands. A total of 69 monitoring sites, each 30 sq m were erected in 1994/95 and were in paddocks either grazed by sheep, cattle and large macropods (TGZ), or exclosed from sheep and cattle grazing (e.g. grazed by large macropods, DEX), or exclosed from all grazing (TEX). Between 1994 and 2003 measurements of pasture yield, frequency of live *Astrelba* and ground cover were recorded. Numbers of macropods (red kangaroo, eastern grey kangaroo and common wallaroo) were taken from helicopter surveys that were flown along permanent transects at Julia Creek and Longreach each year. Domestic animal stocking rates were taken from property paddock records. Monitoring of sites occurred at the end of each pasture-growing season (April-August). Pasture yield and ground cover were measured using visual appraisal with the aid of photostandards. Black, pedestalled tussocks that were dislodged from the soil when kicked with a force approximately equal to kicking a soccer ball ten metres were recorded as dead. Samples of these plants were collected and double staining with tetrazolium and Evans blue confirmed they were neither alive nor dormant.

Queensland's Mitchell grasslands experienced moderate drought in 1994-96, a near record wet season in 1999/2000 and the driest year on record in 2001/02 (Figure 1). There was an apparent decline in both the adjusted mean frequency of live *Astrelba* and mean ground cover % between 2002 and 2003 (Figure 2). The reduction in adjusted mean frequency of live *Astrelba* tussocks between 2002 and 2003 was: TRZ (75 to 45%), DEX (80 to 46%) and TEX (63 to 53%), however this decline was not consistent across all properties. Mean ground cover declined from 44 to 22% (TGZ sites), 58 to 37% (DEX sites) and 67 to 45% (TEX sites) between 2002 and 2003. Macropod numbers from 1994 to 2003 averaged 23 per sq km, comprising of 10 (range 6-20) per sq km in the open downs at Julia Creek and 36 (range 18-53) per sq km in shaded downs at Longreach (Figure 2). Mean stocking rate of domestic animals in the paddocks where the sites were located was 0.88 dry sheep equivalent/ha (annual range was 0 to 1.8 DSE/ha).

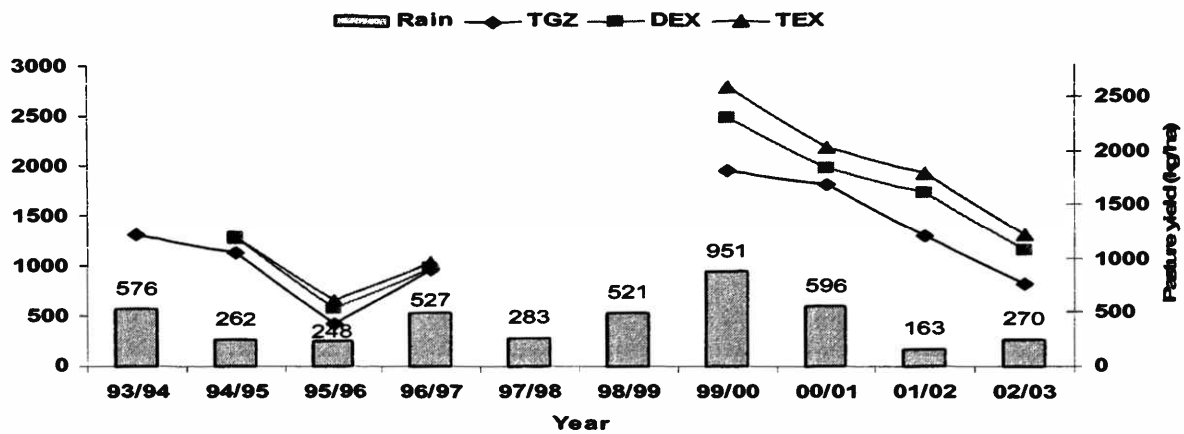


Figure 1. Rainfall at Winton (June-May) and adjusted mean pasture yield for grazed sites (TGZ), sites where domestic animals were excluded (DEX) and sites where all large animals were excluded (TEX).

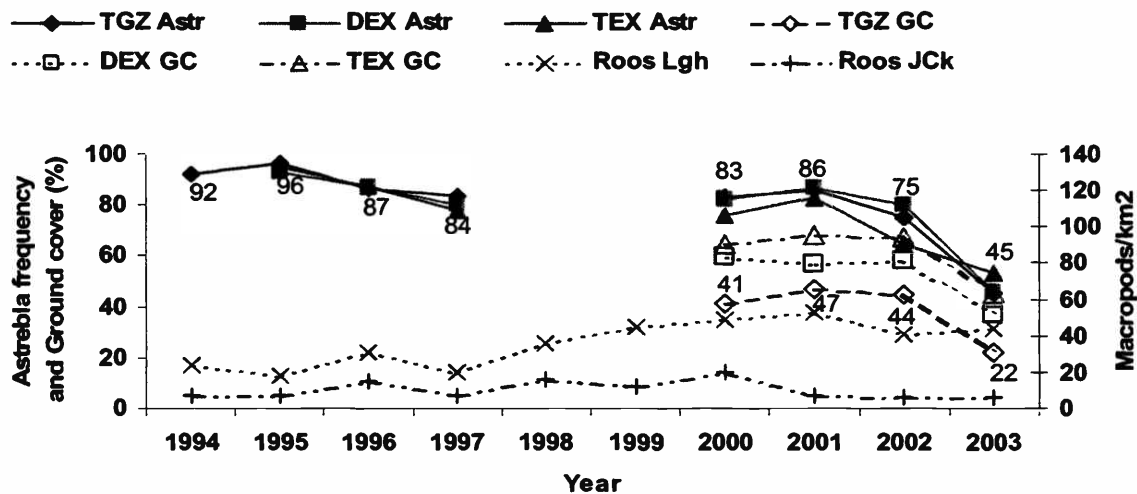


Figure 2. Adjusted mean frequency of live *Astrebla* (Astr) and ground cover (GC) for grazed (TGZ), domestic animal (DEX) and large animal (TEX) excluded sites, and macropod numbers for Longreach (Roos Lgh) and Julia Creek (Roos Jck). Data labels show Astr and GC values for grazed sites.

## DISCUSSION

There was no apparent difference in Mitchell grass survival between sites experiencing different grazing pressures for the previous 10 years. Mean grazing pressures (domestic animals plus kangaroos, 1 DSE equals 0.8 kangaroos) of TGZ, DEX and TEX sites were 1.1, 0.18 and 0 DSE/ha respectively, but were as high as 2.2 (TGZ, Longreach) and 0.42 (DEX, Longreach), and as low as 0.14 (TGZ and TEX, Longreach) in some years. This level of grazing pressure had no adverse impact on the survival of Mitchell grass tussocks in 2003. The death of Mitchell grass is likely to reduce livestock production in the short-term, but anecdotal evidence suggests these pastures have recovered from previous droughts (eg. 1969) and the long-term outlook may depend on a sequence of good years (eg. 1971/72 to 1976/77).

The resilience of Mitchell grass was shown by its survival during the 1994-96 drought, and the severity of the 2002 drought was demonstrated by the mortality of Mitchell grass. However, the variation in mortality that occurred between properties needs further investigation.

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