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Decline in land condition in *Astrebla* grassland during prolonged drought in Australia

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Key words : *Astrebla* grassland, pasture condition, sustainable use, monitoring

Introduction Mitchell grasses (*Astrebla* spp.) are arid tropical tussock grasses endemic to Australia which become dormant during drought to escape desiccation and death. Drought is a regular feature of these grasslands. The Mitchell grasslands of Queensland, Australia, cover 33,800,000 ha, support 15% of the cattle herd, more than 40% of the Merino sheep flock and provide employment to 2500-3000 people. The short-term productivity of these grasslands declined as pasture yield was reduced in association with prolonged drought from 2001 to the present. Many Mitchell grass tussocks failed to respond to reasonable rains during the 2003-04 summer and this created concerns about extensive tussock death and hence reductions in long-term productivity and land condition. This paper presents preliminary results from surveys undertaken to quantify the extent of tussock death and resultant reduction in land condition.

Materials and methods A rapid appraisal technique (Hassett *et al.* 2000) was modified to assess pasture condition in western Queensland during winter 2005 and again in the same area in 2006. Nearly 6000 observations of live and dead *Astrebla* tussock density (number/m²) and response (growth relative to the average) together with pasture species abundance were used to classify 1 ha sized roadside areas into A (good), B (moderate), C (poor) or D (degraded) condition classes.

Results and discussion Less than 10% of observations of condition were assessed as being in A (good) condition in 2005 and 2006 (Figure 1). In 2005, 60% of observations were in B condition but this declined to 41% in 2006 in association with continued drought and in conjunction with the frequency of C condition observations increasing from 32% to 53%. D condition was less than 5% in each year. This decline in overall condition was associated with a reduction in live *Astrebla* spp density and an increase in undesirable forbs and annual grass species. Orr and Phelps (this volume) provided evidence that plant species diversity analyses would strengthen the assessment of land condition in *Astrebla* grassland. Historically, land condition in these grasslands has improved through seedling recruitment associated with improving summer rainfall. However, predictions of greater rainfall variability and increased incidence of drought associated with climate change may restrict future recovery.

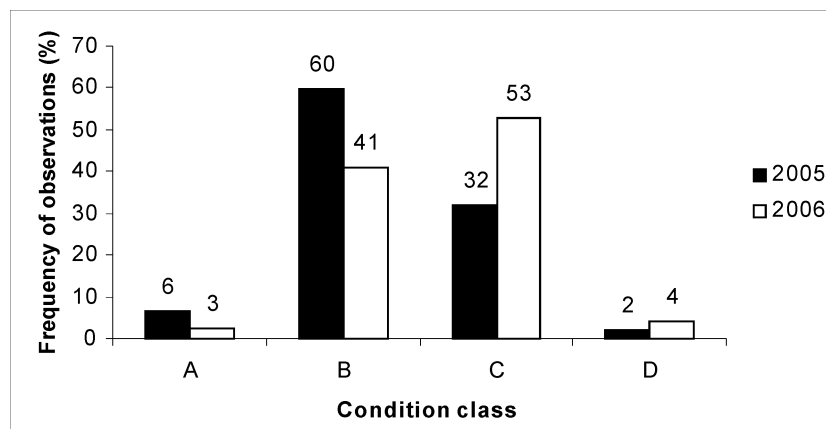


Figure 1 The frequency (% of total observations) of A (good), B (moderate), C (poor) and D (degraded) condition classes in Queensland's Mitchell grasslands in 2005 and 2006.

Conclusions *Astrebla* spp. are generally drought tolerant, but the severe drought conditions of 2001-2006 resulted in tussock death and hence reduced land condition. Recovery may be limited under climate change scenarios of increasing droughts.

References

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